

HAZNET

The Magazine of the Canadian Risks and Hazards Network

Vol.7 No.2 Fall 2015

Special issue : RESILIENCE

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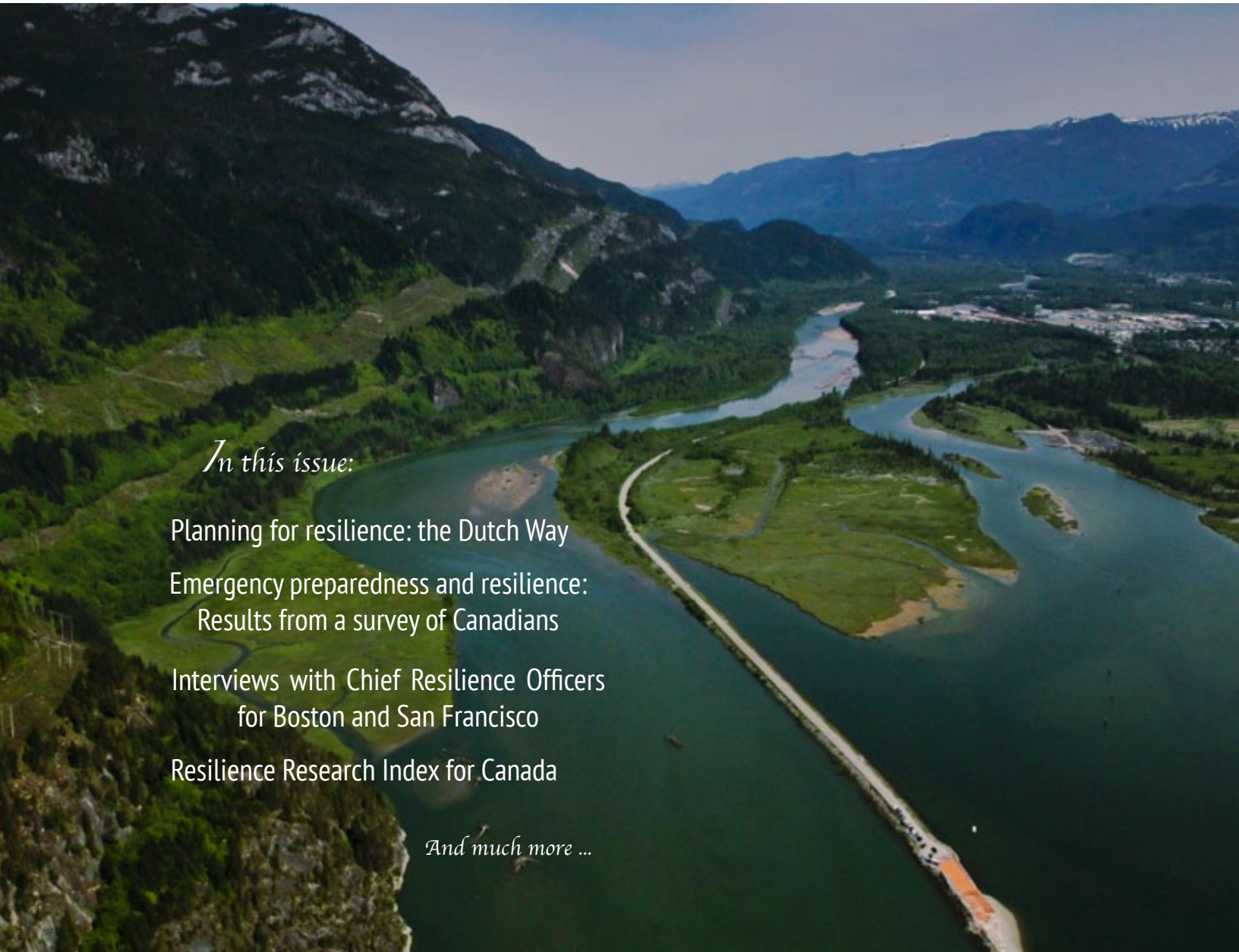
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Réseau canadien d'étude des des risques et dangers:
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www.crhnet.ca

HAZNET is a bi-annual magazine of the Canadian Risks and Hazards Network (CRHNet) that brings together the latest in research and practice to enhance resilience in Canada.

HAZNET aims to facilitate public, professional and scholarly discussion through analysis, views, lessons learned and insights into current and future issues of disaster risk reduction in Canada and internationally.

Editor: Lilia Yumagulova

Layout and design: Marina Shilina and Lilia Yumagulova

Copy editor: Jonathon Reynolds



CRHNet is a not for profit association established to:

- initiate the development of a Canadian inter-disciplinary and cross-sectoral network of researchers, academics and practitioners to enhance understanding of emergency management in all dimensions and help build Canadian capacity to deal effectively with threats and consequences from all hazards;
- create a Canadian annual Symposium for dialogue focusing on disaster risk reduction and facilitate policy formulation and the adoption of best practices in Canada;
- provide a Canadian venue to learn from the experiences of other countries by inviting internationally reputed scholars, practitioners, and participants to the annual Symposium and to share Canadian experience and efforts in disaster reduction; and
- publish bi-annual magazine, HazNet comprised of articles on a wide range of topics within the emergency management and disaster risk reduction sectors.

CRHNet would like to thank all the contributors and especially **John Chapman** and **Shaun Koopman** for their assistance with this issue.

WELCOME

from the CO-PRESIDENTS

The CRHNet Board is proud to once again present to you the latest edition of HazNet. Over the years, our little “newsletter” has grown thanks to its contributors and Editorial Team. Its broad-based and growing readership speaks to its reach within the disaster risk reduction (DRR) and emergency management community. You are encouraged to distribute this issue widely and to contribute to the growing dialogue on DRR and EM-related issues.

CRHNet is again poised to deliver its annual symposia. This year’s event, our 12th, will be held in Calgary during November 4-6 and will again follow the annual Roundtable of the National Platform on Disaster Risk Reduction (November 2-3, 2015). The theme of this year’s symposium is “The Anatomy of Disaster Resilience: Searching for new treatments to enhance mitigation, planning, response and recovery”.

CRHNet is continuing its effort to link or collaborate with other associations, agencies or organizations that are engaged with DRR or EM-related. Our latest such engagement is with the Arctic Risk Management Network (ARMNet), which includes Canadian and US agencies concerned with risk management in the North.

The CRHNet website (www.CRHNet.ca) is designed to serve as a platform for discussion, engagement and collaboration. You are invited to visit this website and engage with its searchable library and social media functions. These are intended to allow you and others to engage in or expand the diverse discussion on disaster risk and emergency management issues. Your content contribution is welcome.

On behalf of the Board, Ernie and I again wish to thank all of you who belong and contribute to the Network, and 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 on the inclusiveness of our growing team.

Ron Kuban and Ernie MacGillivray,
CRHNet Co-Presidents

EDITOR’S NOTE

Greetings and a warm welcome to the 13th edition of HazNet, a special issue on resilience. We are excited to bring this makeover issue to you. While we look forward to working with you to continue to enhance HazNet as a national forum for emergency management and resilience discussions for professionals, the magazine is broadening its horizons. The new HazNet will continue to engage researchers and practitioners, but it will also bring these insights to Canadians at large, making this important work meaningful and accessible to the public. As we enter our eighth year of publication, a lot is in store for this growing magazine: the creation of an editorial board, a dedicated web-site and an increased emphasis on effective communication.

Thank you to all our contributors for taking the time to create informative and engaging content. We are very grateful to Marina Shilina for her incredible design work and guidance. We also thank CJ Carter for a beautiful cover photo of the Skwelwil’em Squamish Estuary.

This issue brings you some of the best international examples of planning for and enhancing resilience: the Dutch approach, insights on building resilience partnerships, community-based, pre-disaster recovery planning initiatives, research papers, technology news, and much more. We are also excited to be able offer a unique insider insight into a new profession emerging in our field: the Chief Resilience Officer or CRO. We explore this work through interviews with the world’s first CRO, Patrick Otellini in San Francisco and the most recently appointed CRO Atyia Martin in Boston.

Be sure to explore the “Canadian Resilience Research Guide 1.0”, an initiative developed by the CRHNet Young Professionals Committee. We hope this guide will grow to turn into Guide 2.0, a convenient online tool that provides easy access to resilience research in Canada that ensures more effective research-to-practice connections. We welcome your contributions to this tool as researchers and practitioners.

Resilience has become a buzzword in our field. Yet, we are still struggling with the practical applications of this concept. Back in 2010, I talked about this with Buzz Holling, a father of ecological resilience theory: “We are having a hard time applying ‘resilience,’ a beautiful theoretical construct, to practice in the field of disaster risk reduction. What needs to be done?” An unusually heavy snow was falling behind the window on the Salish Sea; Buzz’s dog curled up, snoring in an armchair in his Nanaimo home on Vancouver Island. Buzz smiled at me and said, “Try harder.”

Lilia Yumagulova,
editorhaznet@gmail.com



EMERGENCY PREPAREDNESS AND RESILIENCE:
RESULTS FROM A SURVEY OF CANADIANS

By: Mia Dauvergne

Summary:

The first results from the 2014 Survey of Emergency Preparedness and Resilience in Canada, which gathered information on how Canadians prepare, prevent, respond to, and recover from emergencies, are now available.

First findings from the 2014 Survey of Emergency Preparedness and Resilience are now available. The survey was administered across Canada as part of a partnership between Public Safety Canada, Defence Research and Development Canada, and Statistics Canada to better understand levels of emergency preparedness and resilience and to identify the factors that affect how well individuals and communities are able to prepare for, mitigate, respond to, and recover from an emergency or disaster.

The report provides baseline information on Canadians who have taken precautionary and emergency planning behaviours, and answers some preliminary questions on the types of natural and human-induced disasters Canadians believe their community is likely to face, who they would turn to for help or what information they would seek in the event of an emergency or disaster, and the extent of their social support systems. A copy of the full report entitled “Emergency Preparedness in Canada, 2014” is available here.

Eng: <http://www.statcan.gc.ca/pub/85-002-x/2015001/article/14234-eng.htm>

Fr: <http://www.statcan.gc.ca/pub/85-002-x/2015001/article/14234-fra.htm>

Bio: Mia Dauvergne is a Senior Policy and Research Advisor at Public Safety Canada. She works in close collaboration with Defence Research and Development Canada and Statistics Canada in the management of the Survey of Emergency Preparedness and Resilience.

CRHNet congratulates our 2015
CRHNet Symposium Fellows,
the winners of the Symposium Bursaries:

Christopher Carter

(University of British Columbia)

Michelle Marteleira

(University of British Columbia)

Alexandra Rutledge

(University of Waterloo)

Brittany Schina

(University of Victoria) (Declined)

Jeremy Stone

(University of British Columbia)

CRHNet is committed to supporting and developing opportunities for youth and young professionals in the fields of disaster risk reduction and emergency management.

Every year CRHNet supports Symposium attendance of up to 5 students based on competitive application process.

Application process opens in September.

The Young Professionals branch of the Canadian Risk and Hazards Network (CRHNet) aims to connect, enable and represent interests of young academics and professionals from all over Canada whose research of work is related to risks, hazards and resilience.

We encourage students and young professionals to join **CRHNet’s Young Professionals Facebook page** for connecting with the nationwide communities in the fields of emergency management, disaster resilience and climate change adaptation. The forum provides information about jobs and internship opportunities, scholarships and other educational opportunities, publishing opportunities, recent research and serves as a general platform for discussing topical issues (currently at 270 members):

<https://www.facebook.com/groups/226314887482727/>

THERE IS A NEW TITLE IN OUR PROFESSIONAL
FIELD AND IT IS CALLED
“CHIEF RESILIENCE OFFICER”

By: Lilia Yumagulova

For this special issue on resilience, I interviewed two CROs from the east and west coasts of the United States: the world's first chief resilience officer Patrick Otellini for San Francisco and the most recently appointed CRO Dr. Atyia Martin for Boston.

'Resilience is the capacity of individuals, communities and systems to survive, adapt, and grow in the face of stress and shocks, and even transform when conditions require it. Building resilience is about making people, communities and systems better prepared to withstand catastrophic events - both natural and manmade and able to bounce back more quickly and emerge stronger from these shocks and stresses'.

The Rockefeller Foundation (RF)

The Rockefeller's Foundation's 100 Resilient Cities program aims to enable cities around the world become more resilient to the physical, social, and economic challenges. As part of this program the Foundation funds a two-year CRO position in selected member cities.

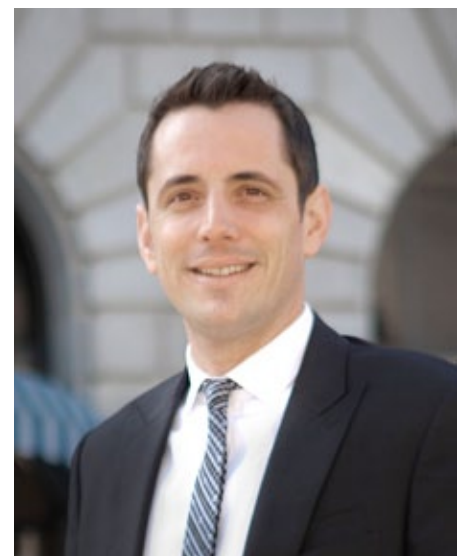
WHAT DOES IT TAKE TO BE AN EFFECTIVE CRO?

According to the Rockefeller Foundation, CROs must be enterprising change-agents - someone who can rally resources, support, and buy-in for innovative work while working in an environment where resources are scarce and where they may be starting with almost nothing. They must:

- Build a coalition of diverse stakeholders and inspire them to work toward a common goal, while navigating the city's complex landscape;
- Maximize collaboration between these participants and drive progress to meet deadlines;
- Maintain perspective and emphasis on resilience thinking within city government despite internal pressures and competing agendas; and
- Bring past experience in urban development and design, city governance, community organizations, consulting management, and/or sustainability planning to bear.

Read more at: <http://www.100resilientcities.org/>

Patrick Otellini is the Chief Resilience Officer (CRO) for the City and County of San Francisco. Mr. Otellini was originally appointed by Mayor Ed Lee in October of 2012 as the Director of San Francisco's Earthquake Safety Implementation Program. This public policy driven group has recently passed unanimously approved pieces of legislation that range from mandatory retrofits of soft story building to post-earthquake repair standards with the goal of making San Francisco more resilient in the face of disaster. Prior to his appointment Mr. Otellini was a Senior Associate with A.R. Sanchez-Corea & Associates, San Francisco's premier permit and code consulting firm. His work there included the management of the permit and inspection process for over \$2 Billion worth of construction in San Francisco. He is a Certified Building Inspector through the International Code Council (ICC) and a Certified Fire Protection Specialist through the National Fire Protection Association (NFPA). Patrick lives in San Francisco with his wife and two children. He received his Bachelor's Degree from Westmont College in Political Science.



Lily: Where does San Francisco's resilience story start?

Patrick: I think a lot of our story here stems from the fact that resilience is not a new challenge for San Francisco. It's something that we've been discussing for quite some time. It is illustrated by my previous role with the city as Director of Earthquake safety and implementation of the work that the Community Action Plan for Seismic Safety did. It was a ten year long community led effort for the city of San Francisco to give us some general policy guidelines and recommendations on how we should think about seismic policy moving forward.

Now it is translated into a big 30-year long earthquake safety implementation plan which I currently oversee. Adding this [RF] grant in mid-stream to our current workflow was a nice supplement to it because, obviously, resilience isn't just about earthquakes. It allowed my staff to build up capacity in order to expand our purview and look at things like sea-level rise and housing affordability and all these other shocks and stressors. That's something that we've always done, but through the lens of seismic safety. I would argue we still kind of consider that approach because we're actually thinking about that in terms of that's our most realistic and threatening hazard, that's what we're planning against and if we can have those conversations about making sure we maintain a sense of social justice and equity through a disaster then I think we're actually accomplishing all of that. I think it is a good way to pivot our planning process.

Lily: In terms of the process of defining resilience for the city of San Francisco - did you have a definition when you started or was that defined throughout the past couple years?

Patrick: I think it's something that is constantly evolving I don't think the definition of resilience is ever going to be super static because our thinking keeps evolving, but I think it's nothing new to us. If you look at our 30 year earthquake safety implementation program on the very first page of the 30 year plan it says 'what is resilience' and we talk about it specific to seismic hazards. We know our major hazards are seismic events. We haven't had an earthquake of the magnitude of 1906 since 1906 (we had a small earthquake in 1989 where we saw substantial damage). But we know that that big earthquake is coming, it's right around the corner so I think that's always been the lens of the resilience conversation that's taken place in San Francisco. I think it's about much more than that but it's a good way to get the conversation started. We're in a housing crisis right now and you know what's going to make that housing crisis a lot worse? An earthquake. Putting it in a context that's relevant to today's problems is also helpful for starting conversation.

Lily: What are some of the core principles that have been guiding resilience planning in your city?

Patrick: San Francisco has always been very disaster heavy. I think we've always focused on that recovery piece - we do response pretty well but as cities, we don't always do recovery very well. So the transition from response to recovery has always been a unique focus of Mayor Lee and something he's wanted to plan against. That quickly countered with balancing our planning for the flood hazard: we have a unique focus on planning around sea-level rise which obviously isn't going to happen overnight and displace thousands of people. But it's a very real threat and if we don't do anything about this and we don't plan for future infrastructure to be able to handle this, we're going to be looking at a very real cost and a very real disadvantage to the city moving forward.

Lily: What are some of the challenges of resilience planning in an era of austerity?

Patrick: It's a really tricky one. Resilience planning is the right thing to do when we're faced with measures like that because what it's forcing you to do is get more to the table and be more efficient with the dollars that you're using. It also requires a unique understanding of how silos work. I think there's a good reason for why silos work but I also think it matters because why one creates a silo is because they can't get work done with anyone else at the table. And sometimes that's for a good reason and sometimes it's because people are being lazy and they don't want to include everybody. But it also means that when we're thinking about this given our current economic status on things this is where resilience planning needs to happen. I think cities want/need to be resilient because you're ultimately getting better projects, better design, better priority setting that's happening as a result of being smarter with what limited budget dollars we have.

It's a normal and expected reaction from governments to try and cut items here and there but you have to look at it through the lens of 'what's it really going to cost us' after. In our situation we look at our soft story ordinance: we're requiring over 5,000 properties and these private property owners to spend \$16,000 to \$130,000 per building. That's about a \$500 million program that we're asking the public to fund. We're not even funding it as the government. The way that we're able to do that is we made the demonstrations: if these buildings were to fall down during an earthquake (and we already know they're dangerous) how that is going to negatively impact not only the cities response but also, ultimately, the recovery and the protection of our residents. If you do it in those terms all of it sudden it seems like this program is really a smart move because you're able to demonstrate actual costs after the disaster. So I think our policy direction needs to be that nuanced in our city rather than 'let's just take some money from here because it will help us right now'. I think that's short-sighted.

Lily: San Francisco is known for its unique public engagement policies and a culture of resilience. What is behind this culture and what have you been working on to enhance it?

Patrick: I think it speaks to the activist culture in San Francisco. San Francisco has an advantage because geographically we're very small but very dense and that's forced us to get connected to our neighbourhoods. I think that kind of cohesion is something that I know a city like Los Angeles really struggles with because they're so spread out. So my counterpart Marissa Aho, the CRO in Los Angeles, one of the hardest parts there is attempting to do outreach to all those communities. It's always a challenge but it's not as big as a challenge here because we have very active communication networks throughout our communities. Because of that we've had so many voices clamouring at the table for so long that we've had to be smart with how we design our programs, when we are satisfying a multitude of stakeholders and not just one particular interest and that's how you get good policy. I think you have to be willing to compromise and get something where everybody feels like they gave up a little bit of something but everyone feels like they won at the end of the day.

Lily: What advice do you have for other professionals in this field that are in similar positions trying to achieve a city-wide resilience planning initiative but do not have the RF funding?

Patrick: The framework that RF gives to cities to plan for these things is not necessarily brand new. I think cities can access this type of planning process with some very motivated individuals in-house; they don't need a grant from the Rockefeller foundation in order to do resilience planning. That's my first point.

I think the RF helps us build capacity and helps us to be able to do things maybe faster than we would've otherwise. So I think that's a huge advantage of it but I also think that's part of the responsibility of the member cities. You see San Francisco, Berkeley and Oakland [also members of the RF program] are in the Bay area but we've always said from the very beginning that the last thing we want to do is create a micro-region. Our job is to help the Bay Area just as much as our individual cities so there's a focus on trying to reach out to some of these smaller jurisdictions with less capacity be to be able help them advance their seismic planning programs and hazards planning programs.

Lily: What advice do you have for young people interested in the resilience planning field based on your experience from any part of your diverse background?

Patrick: You have to be authentic regarding the passion you feel for a particular city. And what I mean by that is I would never do this work in any other city except San Francisco and that's because I'm from San Francisco and I love my city and I want to see my city do better.



Golden Gate Bridge. Photo by Jonathon Reynolds



Dr. Atyia Martin brings a diverse set of experiences in emergency management, intelligence, and homeland security to her position. Prior to becoming the CRO for Boston, Dr. Martin was the Director of the Office of Public Health Preparedness at the Boston Public Health Commission, where she helped coordinate services for survivors of the Boston Marathon bombings. Her previous professional experience includes the Boston Police Department’s Boston Regional Intelligence Center; the Mayor’s Office of Emergency Management; the Federal Bureau of Investigations; and active duty Air Force assigned to the National Security Agency. She has a Doctorate of Law and Policy from Northeastern. She lives in Boston with her partner and five children.



Some of our readers will be familiar with Dr. Martin’s research. In our previous issue we published her article called “INCLUSIVE EMERGENCY PREPAREDNESS.” See Vol.6 No.2 Spring 2015 pp. 10-13. www.crhnet.ca

Lily: As a Boston native, who worked for the City for quite some time, how would you characterize the spirit of Boston and how does that play into resilience?

Atyia: The spirit of Boston is really about overcoming, the spirit of Boston is rebellious. I think we saw that after the marathon bombing in “One Boston” and “Boston Strong.” I think that is fundamentally the bigger spirit of Boston. It’s almost like data: when you look at data for an entire city you might say that everything is alright because you’re looking at it for the entire city. However, when you begin to stratify data at different levels and start looking at race and social factors and all those other pieces, then you start to see trends and patterns that you would/could never had seen if you hadn’t gone in for a deeper look. I think that with “One Boston” and “Boston Strong” what we saw was potentially this disparity. The criticism from a lot of community members after the marathon bombing was around the issues of obvious inequity and inequality in the way that services were coordinated after the bombing, in contrast with community stressors and emergency stressors that were occurring immediately afterwards. Within the first 60-65 days after the bombing we had about 67 shootings, so it created this immediate backdrop to draw comparison and in that moment – in terms of communities that are truly disenfranchised - you begin to see a comparison in the way communities are treated differently.

Lily: How do you think the “100 Resilient Cities” process will address these issues?

Atyia: As part of this process we are choosing to focus on social resilience and issues of equity, specifically issues of racial equity. This will allow us to be able to have a thread across Boston that really brings us together to be ‘One Boston’, to feel like every neighbourhood is part of Boston and everyone is able to get what they need and that all of the different stakeholders that are important to the well-being of this city

are awarded the same opportunities. I see this as an opportunity for us to come together as a city. This is not the City of Boston’s plan from the government, it’s the city’s plan across all of these different stakeholders who are working to address these complex issues together because government won’t be able to do this on its own, non-profits can’t do it on their own and so on. It really requires us to put our heads together and create an effort that provides a clear direction towards addressing the inequities in our city. There are a lot of challenges that we face around having conversation about race and racism. It’s uncomfortable, we don’t talk about it openly, and we use a lot of coded language that perpetuates fear from having the real conversation. I think this is an opportunity for us to get right to the heart of these deep disparities that are in this city by addressing the cause of these inequities to be able to truly have the ‘One Boston’ that we aspire to be.

Lily: You have a unique practitioner-academic background. What are some of the core principles that you think will guide your resilience work in this city?

Atyia: The #1 core principle is humility - we are all willing to come to the table to do this hard work together without allowing egos to get in the way of work being/getting done. There are times when organizations feel like they own issue areas and it’s theirs as opposed to this is an issue the community is dealing with and it’s unto us to solve it. Humility is not just for me when I’m facilitating a process, but also in terms of city government, community organizations, individuals, that we are able to have the humility to come together and really work on this and be honest and get to the place we want to be. As a part of humility I also see Boston has so many resources, it’s an amazing city, we have the highest density of hospitals, we have a high number of higher education institutions, we have so many community organizations and foundations, people who are passionate about and committed to the work. The

challenge is collaboration and bringing people together to work on these issues together.

We need to address this great wealth of resources and leverage collaboration as a way to channel the resources into the places where they are needed most.

Related to the principle of humility is collaboration - if this is to truly become our resilience strategy that belongs to the entire city and not just the government, the idea of meaningful collaboration is what drives this and allows us to be respectful of the fact that communities understand the best what their needs are and for us to respect that and work together across different organizations and community members to be able to come to some clear action plan to address how we can work together on these issues.

Finally, recognition of the moral and the economic imperative that is important to the ability of our city to thrive. There's this moral piece that we tend to lean on but there's also this very practical economical reason why we need to do this work this way especially given our population base. When over half of the city are people of colour that means that with these inequities more than half of the city are lost out of the opportunity to move forward together. By tackling these issues we open up the door to be able to build on this, not just from a moral perspective, but an economically competitive city that can be a healthy, innovative, thriving city that our Mayor has talked about and that the people of the city want. In order for us to be competitive we really have to dismantle the issues of inequity.

Lily: What advice do you have for other professionals in this field that are in similar positions trying to achieve a city-wide resilience planning initiative but do not have the RF funding?

Atyia: It's important in public service to remember why we do this – public service exists for the public for people who live in our community and when we frame it that way we begin to look at questions like: What does our community look like? What are the situations that our community deals with on a day to day basis? The reason this is important for emergency managers is because when it is time for them to spring into action we have the tools and the knowledge and the partnerships in place to be able to meet those needs. If we focus on people that we serve then it makes it easier to relate/understand and if we keep equity as a front foundational principle then we make sure that we do it in a way that doesn't perpetuate the inequities. When you start to look at the world from that perspective 'who are we serving' and how can we be equitable it also gives way to 'what about people with disabilities', what about people with 'limited English speaking proficiency', 'what about people with low income' and 'people who have lot of kids', people who live in apartments that are really small - even if they could get [preparedness] stuff they don't have anywhere to put it. So it really helps us think more practically.

Lily: What advice do you have for young people in this field?

Atyia: Understand the community that they're a part of, even if that's not the place they end up doing the work. Learn the language of emergency management in practice through volunteering, internships and other opportunities. I think a big part of the challenge for a young person getting into the field is that what's written on paper and how things play out in real life are so radically different. There are nuances to it, and to understand what some of those nuances are means having real world experience. I see a huge gap between academia and practitioners: there's a ton of research happening in the social sciences, engineering, psychology, psychiatry and social resilience and all of these different areas. People have been researching and doing this for decades, but there is a disconnect between all of those 'lessons learned' on the academic side and how valuable they could be to practitioners. It takes someone who understands both to be able to see the value in academic frameworks/models and the ways they could be tweaked to meet the more practical challenges of the real world.



July 15, 2015 - Children enjoy the new artificial turf and lawn games on City Hall Plaza in Boston. (Mayor's Office Photo by Jeremiah Robinson)

Planning for Resilience: THE DUTCH WAY

Corsmas L.P.M. Goemans (MSc; Bed) is working as senior policy advisor at the NCTV/Directorate Resilience of the Netherlands Ministry of Security and Justice and is also UN National Focal Point DRR and Liaison National Platform DRR.



photo by Lilia Yumagulova

The NCTV was founded in July 2011 and is the only national organization in charge of crisis management, counterterrorism and cyber security - a sort of security triad - in the Netherlands. The goal is to prevent disruption- physical; economical; ecological; social; territorial - on a (sub) national scale.

From
civil protection to
societal resilience in
the Netherlands.

Special focus on risk communication with "Do I Flood" and crisis communication with "NL-Alert"

From protection to resilience and risk management

The Dutch have a long history of mitigating disasters. Due to the persistent threat of water, the Netherlands has always invested heavily in disaster prevention and a matching response capacity to known risks. They have successfully applied this approach and extensive experience to other types of threats. While there have been man-made accidents in the past decades, the negative effects of natural disasters or high numbers of casualties or victims remain rare.

The Dutch all-hazards crisis management approach is based on the Strategy for National Safety and Security of 2007. This approach includes measures taken and provisions

made by public authorities, in cooperation with other organizations, aimed at maintaining national safety and security and based on a national risk assessment. (<http://www.government.nl/issues/crisis-national-security-and-terrorism/national-security>).

National safety and security are considered at risk if one or more of the five distinguished vital interests are at risk due to (the threat of) an actual, or potential, disruption.

The government's National Manual on Decision Making in Crisis Situations discerns five categories of vital interests: territorial security, economic security, ecological security, physical security and social and political stability. (<http://english.nctv.nl/search.aspx?simpleSearch=manual+decision+making&zoe kknop=Search>)

Based on the risks/threats – that nearly have no single 'owner' anymore -, scenarios have been developed and capacity analyses made to build on a more resilient society. A good example of the shift is the practice nowadays in Europe of Critical Infrastructure (CI) resilience instead of CI-protection. (<https://www.nctv.nl/actueel/toespraken/paul-gelton-spreekt-op-critical-infrastructure-protection-and-resilience-europe-conferentie.aspx?cp=126&cs=65306>)

To face threats, risks, dependencies, and vulnerabilities that affect society all capacities that are within government, private business and citizens are needed, a sort of capacity triad, to build societal resilience instead of the government being monopolist in 'protecting' its citizens.

It is a way of working on resilience (disaster risk reduction) and risk management that has been main stream in the Netherlands and for nearly a decade and has also become main stream in Europe.

In the European Union it is formalised in the directives e.g., regulations of the EU in, among other regulations, the Civil Protection Mechanism.

This Mechanism is the legal base for delivering assistance to each other when one or more of the 28 EU member and other participating states are overwhelmed. Although national authorities solely are responsible for the safety and security of their inhabitants, the European Commission also supports and complements the prevention and preparedness efforts of EU-states. And there is a special focus on areas where a joint EU approach is more effective than separate national actions. These include things to promote disaster resilience, and reinforcing early warning tools. (http://ec.europa.eu/echo/what/civil-protection/mechanism_en)

This way of working on resilience and risk reduction in the Netherlands and European Union became main stream worldwide in March 2015 when it was agreed on by 187 countries with the UN “Sendai Framework of Disaster Risk Reduction 2015-2030”. (<http://www.preventionweb.net/drr-framework/sendai-framework>)

Citizens and risk and crisis communication to support societal resilience

Within the capacity triad of government, private enterprises and citizens, citizens play an important role. Citizens’ trust in the government’s crisis management capacity is relatively high, and surveys indicate that citizens judge the probability of ever getting involved in a major disaster as low to very low. Each crisis and large-scale incident is evaluated and investigated intensely and the national safety & security or civil protection system is subject to constant reform and adaptation. These evaluations suggest that operational response efforts are usually timely and effective. Furthermore, emergency officers appear to be well trained, highly experienced and well-connected, and tend to work around impending reorganizations, recently introduced tools and new protocols.

The legislation in the Netherlands does not specify many formal obligations and responsibilities of citizens in protecting his/her life and property within the broader framework of civil security.

The Safety Regions Act of 2010 (<http://www.government.nl/documents-and-publications/decrees/2010/12/17/dutch-security-regions-act-part-i.html>) stipulates that citizens are obliged to provide government with all technical security-related information that may be essential to adequate crisis management preparation (WVR art 48, 1).

When a crisis or disaster occurs, citizens are obliged to inform the local government of the affected area as soon as possible (WVR art 50, 1).

To strengthen the ‘self-help’-capacity and to raise awareness among citizens about risks and their own responsibilities in terms of risk reduction and coping with crisis situations and the responsibility of citizens the national government launched a major communication campaign in 2007 to support the change from ‘protection’ to ‘resilience’. Development in new ways of communication and in society enables citizens to be more independent and more responsible for their own safety by timely and correct information.



Risk-Communication

Everybody in the Netherlands can find everything about the risks in the neighbourhood on postal code level on risk-map (<http://www.risicokaart.nl/en/>).

“Do I Flood”

However safe Dutch residents feel behind the dikes, it is not 100% safe. And OECD informed the Netherlands’ Cabinet in their report ‘Fit for the Future’ at the beginning of 2014 that citizens and businesses are only aware of the risk to a limited extent. (<http://www.oecd.org/regional-policy/water-governance-netherlands.htm>) This is why the evacuation module for major flooding - MEGO was started. And an awareness campaign about flood risk was launched on September 29, 2014 with the periodic test closure of the Maeslantkering storm surge barriers in the waterway to the port of Rotterdam. An app and a website ‘Do I Flood’ (<http://www.overstroomik.nl/>) are available now for citizens so they are able to look up the high-water levels for their own homes and what to do if flooding should occur. This campaign was supported with a catchy song, which was a major hit in the Netherlands many years ago: ‘should I stay or should I go?’

The Crisis-Communication-toolkit in The Netherlands for public warning consists of a mix of traditional and modern means.

- **ad hoc telephone team for FAQs:** The telephone number 0800-1351 is open 24/7 when a crisis occurs and the government decides that citizens need information. The authority that requests the telephone service feeds the telephone team with answers to FAQ.

- **www.crisis.nl website:** A special website can be launched with extra server capacity to inform citizens on crisis situations. It can be requested for any type of crisis by the government authority responsible for the crisis response (local, regional or national). This authority feeds the website with information.

- **NL Alertcell broadcasting:** Cell broadcasting notifies citizens of a threat in a specific area on their gsm. Cell Broadcast is a one-to-many geographically focused messaging service.

- **Disaster broadcasting:** The local television and radio station have a role in broadcasting government provided information

during emergencies. Citizens are informed that they have to tune in on the local radio channel when the alarms sound.

- **Local Alarm System:** Every municipality has an alarm system ('the sirens'). In recent years, crisis communication experts advocated more specific ways of communicating.

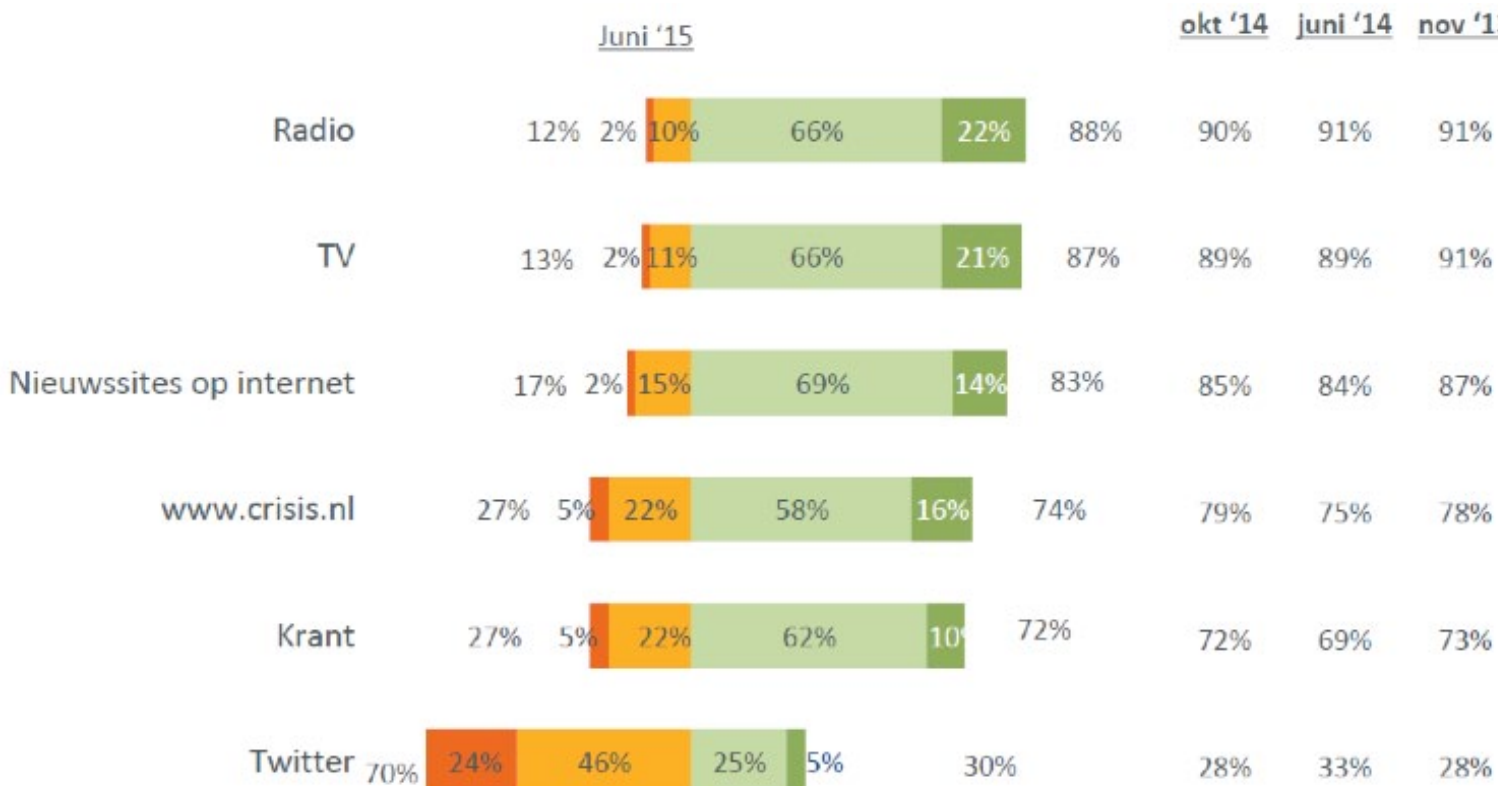
Local alarm systems and disaster broadcasting are perhaps already outdated systems. They were built in the last century on one scenario (world-wide-war) and with the publicly well know slogan "If the siren goes, go inside, shelter and listen to your government on radio and TV what to do."

The other ones are more coping with today's needs of 'all hazards' and not only useful for 'big disasters' but also for more day-to-day 'emergencies'. Here you also can notice the change from civil protection to societal resilience.

A few recent ciphers from the government of the Netherlands with its periodic 'risk & crisis barometer', indicating the societal trust in government and preferences on information sources during a crisis:

(<https://www.nctv.nl/onderwerpen-a-z/risico-en-crisisbarometer.aspx>)

The Dutch trust most – during a (big) disaster - the information sources on radio, TV and news sites on the internet. (N > 15 years age=900, June 2015)



NL-Alert was launched in November 2012 and is the latest addition to the CC-toolkit. NL-Alert allows the authorities to inform people in the direct vicinity of an emergency situation, by sending a text message to their cell phones. The message will describe the situation and advise people what to do at that very moment.

The most important aspect of this message is that it is not an SMS. The messages are sent by means of cell broadcasting (CB). Whereas SMS messages are sent point-to-point (meaning messages are individually sent to a known number), CB messages are sent point-to-area. This can be compared with a radio signal; every handset that is ‘listening’ to a certain CB channel and is within the coverage area of cells that are broadcasting a CB message, will receive this message. An enormous amount of mobile phones can be reached within a very short period of time in the case of network congestion. This is the main reason why NL-Alert uses CB. Furthermore, it is not necessary to register. So there are no privacy issues. This is an important aspect in order to achieve collaboration on a European level.

Although CB is specified in worldwide telecommunication standards, namely GSM (2G), UMTS (3G) and LTE(4G), many devices on the European market were not set up (yet) to receive CB messages. Instructions, how to adjust the settings in the Netherlands, are provided on the website (www.nl-alert.nl).

An increasing number of handhelds are now put on the market with an automatic adjustment; this number will increase over the years to come.

Between November 2012 and July 2015, the system has been used over a 60 times in actual emergency situations; in particular large fires, but also in case of a storm and the detonation of a bomb). Especially in the beginning this was a process of trial and error; nowadays the dissemination of an actual NL-Alert

message goes without significant problems.

Through representative sampling, the direct reach of NL-Alert was measured in February 2013 at 1.4 million citizens. Last June this number has increased to 5.1 million. Until now NL-Alert messages were only sent out by the three Dutch operators on 2G and 3G. The direct reach will grow further when they are all – legally bound - to send out on 4G by the end of 2015.

NL-Alert is a very useful tool for warning the public. More and more countries are using public warning systems that sent messages to mobile phones. For instance, Lithuania, the USA, Japan and Israel use a CB system. Others use a SMS service, like Norway, Sweden and Australia. And some countries are in a pilot phase, like Belgium and the UK.

Whatever solution countries may chose, it should not matter where people are on the continent or elsewhere when it comes to public warning in emergency situations.

To come to an end

The society is confronted with complex issues and risks, challenges await us. Unconventional challenges ask for unconventional solutions. Being able to think outside the box is only one requirement. Increasing thinking and striking power is another crucial requirement. This can only be done by combining governmental, public and private capacities. So we need to build in this modern society on a governmental-public-private hyper connectivity to tackle the threats and risks we are confronted with, to manage them. Alerting people when there is an incident in the way the Netherlands is doing it now is a building block for resilience and a nice result of ‘risk-management’ in the 21th century.

The Hague, July 2015.



Dutch Dike: J.M. Zoethout, Waterschap Rivierenland

COMMUNITY RESILIENCE:

One Approach in New Jersey



HURRICANE IRENE moved through New Jersey in late August 2011 as a Category 1 storm. Over two days, up to 10 inches of rainfall led to record-breaking floods on many streams throughout the Garden State (USGS New Jersey Water Science Center), causing major flooding and extensive damage to both private and public property. Just over one year later, Superstorm Sandy, an extra-tropical cyclone, made landfall in New Jersey in late October 2012.

State of New Jersey with 2011 and 2012 storm track

The combination of Irene and Sandy over such a short period of time was a game changer for many New Jersey communities. Prior to the two storms, the concept of “sustainability” to many New Jersey municipalities meant decisions on land use planning with regard to open space, redevelopment of existing brownfield sites or the highly contentious affordable housing debate. Few at the local level were concerned about the impact of climate change and what sea level rise in 2050 or 2100 meant for the coastal communities in the State. Historic inland flooding throughout the State had prompted planners and water resource managers working in riparian

areas to pay focused attention on measures that could be implemented to mitigate high impact flooding from regularly occurring storm events. Yet, even in these cases, projections of future conditions were rarely involved in those planning efforts and were often dismissed as being hard to scientifically calculate. Following Irene and Sandy, the concept of “resilience” became a pressing and operative priority for many New Jersey municipalities. Hurricane Irene and Superstorm Sandy provided a mechanism to begin the tough conversations with communities in New Jersey about how to understand their risks to future storm events.

A highly collaborative effort involving several programs with key skills and expertise, came together with the mission of integrating the latest science and tools to help communities become better prepared and more resilient. Working in partnership with more than 40 diverse public, private and non-profit organizations from throughout the State through a forum called the New Jersey Climate Adaptation Alliance (njadapt.rutgers.edu), the Rutgers team sought to deliver science, tech-

nical information, tools and support to communities throughout New Jersey to help integrate resilience into local planning and decision-making. In partnership with the National Oceanic and Atmospheric Administration (NOAA), the New Jersey Department of Environmental Protection's Coastal Management Program and other non-governmental organizations, the Rutgers team has focused efforts in three general categories:

Development and hands-on deployment of decision-support tools for local officials and community stakeholders.

In 2011, funded through NOAA, Sustainable Jersey, and an EPA Climate Ready Estuaries grant, a team at the Jacques Cousteau Estuarine Research Reserve (JCNERR), which is housed at Rutgers University, enhanced the Getting to Resilience (GTR), an online self-assessment tool that helps communities identify their vulnerabilities to coastal flooding and storms and increase their level of preparedness.

Initially developed by the state's Coastal Management Program, GTR helps a community assess their current and future risks and vulnerabilities, develop a plan of needed steps based on a community's individual priorities, and identify and develop implementation strategies that are designed to reduce overall community risks.

1. Development and hands-on deployment of science-based tools that are practical and are designed to support planning and decision-making by local officials and community stakeholders.
2. Enhancement and expansion of existing tools to provide communities with support to address multiple hazards.
3. Development of communication products that can help municipalities engage their residents and community members in efforts to enhance community resilience.

ENABLING COMMUNITIES TO BE PREPARED AND MORE RESILIENT.



ASSESS 🔍

Use the online mapping tools to help visualize your community's exposure to current and future hazards.

PLAN 🖥️

Complete an online assessment of your municipal preparedness, planning and public outreach activities around flood hazards.

IMPLEMENT ⚙️

Utilize the resilience recommendations to prioritize next steps and future municipal actions.



Union Beach, New Jersey after Superstorm Sandy. Photo credit: FEMA/Patsy Lynch – Nov 07, 2012

A large component of working through the GTR process is the need for a community to first understand their current and possible future risks. Through the development of web-based mapping applications, the team at Rutgers has developed the necessary resources to allow communities access to data about people, places and assets through geospatial technology. The applications allow communities to visualize and inventory data needed for GTR as well as create customized maps that can be used for a variety of activities including public meetings.

Enhancement and expansion of existing tools to incorporate additional climate hazards

With post-Sandy funding, the collaborative team was able to leverage existing technologies developed by NOAA to develop tools focusing on coastal hazards. These hazards included data on projected sea level rise, surge, as well as data on extreme weather events and nuisance flooding. The NJ Floodmapper and Coastal Hazard Profiler were the custo-

mized applications developed to respond to communities needs in response to flood risks. The goal of both applications is to make climate projection data for New Jersey more accessible, understandable, and useable to a variety of end users.

Often the question comes up about what makes the tools Rutgers developed different from all the other tools that are available. The suite of tools developed – Getting to Resilience, NJ Floodmapper, and the Coastal Hazard Profiler fit together as a package to help communities identify current and future risks and vulnerabilities, to work within their community infrastructure to develop a plan of needed steps based on a community's individual priorities and begin the process of identifying implementation strategies.

Development of communication products to support community engagement as well as outreach to the general public and decision-makers.

The development of tools can take communities so far, but working with communities step-by-step through the process has proved to be more effective. Engaging with a community's leadership has helped to distinguish important priorities that may be specific to one community over another, but has also helped identify common concerns across jurisdictions. The creation of a public facing website, NJADAPT.org, has also allowed information to be disseminated to a broader audience to address issues such as impacts of climate change in New Jersey, impacts to coastal communities and resource needs, proximity of senior citizens and socially vulnerable populations to coastal flooding, impacts to the local economies, as well as a depiction of historic shoreline delineation along the Atlantic coast.

Views expressed here are the author's own and do not reflect those of the University or any other organization identified within the article.

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- A technical and academic comprehension of the considerations and the demands of dealing with disasters of different natures and origins.

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- The ability to organize, understand and analyze sources of information and to apply novel forms of technology or new information to different professional settings and tasks

- The capacity to critically analyze problems, think creatively and make sound decisions while considering different sides of an argument
- The skills to collect various types of information, assess them, analyze and incorporate potential linkages from different fields, put them into writing and efficiently convey your message and the goal of your work

Management and Teamwork

- The ability to interpret and analyze information presented by peers and efficiently and constructively support or challenge their proposals, theories, ideas and reports in order to achieve a project's intended and successful end result
- Skills enabling you to work effectively in group situations, partaking in decision-making, leading and contributing in various capacities to the ultimate success of the team and task
- The ability to debate, persuade, mediate and present your thoughts and opinions to others, as well as the capacity to recognize and incorporate other potential solutions or applications to given problems
- The capability to identify priorities and proper courses of action, to plan the execution of tasks and to determine and delegate responsibilities to group members to most effectively carry out projects.

PUBLIC-PRIVATE-NONPROFIT PARTNERSHIPS FOR RESILIENCE

By: Dr. Deanna Schmidt & Dr. Kathleen Garland,
University of Houston - Clear Lake

Public-private partnerships are key tools to enhance resilience. However, there are significant limitations to including nonprofit organizations in public-private partnership. These limitations reduce the capabilities of nonprofit organizations to respond to and recover from disaster, and reduces the resilience of the communities they serve. We recommend investment in building the organizational capacity of nonprofits, disaster preparation programs for nonprofits organizations, and strengthening interfaith networks.

Faith-based and secular nonprofit organizations play an increasingly important role in disaster response, recovery, and resilience. National nonprofit organizations such as the Salvation Army, the American Red Cross, Baptist Men, and the United Methodist Communities in Relief are expected to provide crucial services during times of crisis. In addition, a wide range of smaller nonprofits are drawn into disaster response and recovery when the communities they serve are impacted. Although they have modest resources and little training, their flexibility and unmatched local knowledge mean that community nonprofits are called to mobilize an immediate and effective response to assist the elderly, families in poverty, and other highly vulnerable members of our communities.

In the United States, the Federal Emergency Management Agency (FEMA) officially recognizes community nonprofit organizations in the National Response Framework (NRF). The NRF describes nongovernmental organizations (NGO) such as community nonprofits as “key partners in preparedness activities and response operations” (Department of Homeland Security, 2013, 9). FEMA defines a wide range of NGO contributions including: training and managing volunteer resources; identifying physically accessible shelter locations and needed supplies; providing emergency commodities and services; supporting evacuation, rescue, care and sheltering of animals; providing search and rescue; and providing health, medical, and mental health services. Under FEMA’s Whole Community Approach, local nonprofits are integral to community resilience (FEMA, 2011b).

This article presents results of research examining the role of faith-based and secular nonprofit organizations in disaster response and recovery following Hurricane Ike which impacted the Upper Texas Gulf Coast in 2008 (Quebedeaux 2013). We find significant limitations to effective nonprofit involve-

ment in a key community resilience technique, public-private partnerships. These limitations reduce the capabilities of nonprofit organizations to respond to and recover from disaster, and reduces the resilience of the communities they serve.

Public-private partnerships enhance community resilience by encouraging innovation; sharing specialized, local knowledge; more efficiently allocating pooled resources; avoiding duplication of efforts; and creating a forum for broader participation and preparation for disaster (FEMA, 2011a). Our research identified several public-private partnerships between private firms and corporations on one hand, and governmental agencies on the other hand. For example, the Harris County Office of Homeland Security and Emergency Management (the largest governmental agency directly impacted by Hurricane Ike) created the Business Commodities Plan partnership with retailers to supply basic supplies such as ice, bottled water, and meals ready-to-eat (MRE). We did not identify a public-private partnership including the community nonprofit sector.

This absence of a formal partnership with the nonprofit sector increases the inequalities between the poor and marginalized, who are largely served by the nonprofit sector, and the wider public as it reduces community resilience. The missed opportunities such partnerships would provide for community nonprofits can be significant, including:

- Access to information. This information may include who to contact, data on threats and risks, situation reports, information on needs and where to target volunteer resources, webinars, databases, meetings, conference calls, and email distributions.
- Access to and coordination of resources. Resources may include supplies, expertise, office space, compu-

ting and electronic equipment, and funding. Resource coordination may prevent service duplication.

- **Networking.** Networks allow for broader community support, clarification of roles, improved communication, new opportunities, and greater innovation.
- **Joint training exercises.** By participating in joint training exercises, nonprofits may be better prepared for disaster and may become more effective responders.
- **Advocacy for the communities they serve.** Poor and marginalized populations are least likely to have a voice in shaping the disaster response policies and recovery programs that directly impact their daily lives. Nonprofits can give voice to these populations.

Our findings suggest several key factors that limit the ability of local community nonprofits to participate in a public-private partnership.

- **Lack of flexibility and limited-term funding streams.** The community nonprofits in our study are supported by donor-restricted funding streams that must be directed to specific programs for a specific period of time - for example outreach for diabetic management or vision screening. With extremely limited overhead, many organizations find it difficult to dedicate financial resources to building partnerships with local emergency management offices.
- **Inability to dedicate a staff person.** FEMA identifies the need for a full-time liaison or other staff to manage successful public-private partnerships. This is often an impossible responsibility to place upon nonprofit organizations with limited staff. In addition, the lack of job security and low wages in the nonprofit sector contributes to significant staff turnover, which limits organizational memory and increases start-up time once a disaster strikes.
- **Cultural differences.** Many nonprofit organizations cultivate a culture that prioritizes accountability to people in need versus accountability to bureaucracy. In their orientation to measurable outcomes, some find the

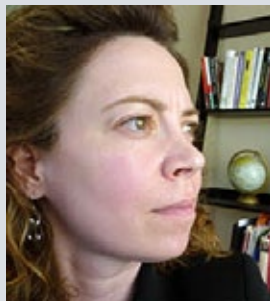
demands of paperwork to be meaningless red tape. In addition, nonprofit organizations may harbor deep skepticism and in some cases distrust of public agencies. This is particularly true of organizations that serve people who are commonly discriminated against based on their citizenship, religion, sexuality, disability, or other identify.

- **Public agency disengagement.** From the perspective of many public governmental agencies, the flexibility and local knowledge of community need may be at once regarded as minor to their work and a challenge to status quo resource allocations. There is an inherent tension within public agencies to defend existing resource allocations despite apparent need. Engagement with nonprofit organizations demands engagement inequality.

In conclusion, FEMA promotes public-private partnerships as a key tool to enhance community resilience. By providing a 'seat at the table', partnerships can provide significant benefits to community nonprofits and the people they serve. Unfortunately, our findings reveal significant limitations to public-private partnerships that include nonprofits. These limitations can be addressed using several different approaches. First, the public sector, as a portion of their investment in community resilience, may invest in resources and training, not only in disaster preparedness, but also in building organizational capacity in the nonprofit sector. This investment could be annual training and networking conferences that provide a small stipend to participants or modest grants to provide ongoing involvement. Second, small nonprofit organizations can implement their own disaster preparedness programs. Resources directed to disaster-oriented public-private partnerships can be justified to funders as a key necessity for sustainable outcomes. Third, all public, private, and nonprofit organizations can strengthen the capabilities of organizations such as disaster interfaith networks and voluntary organizations active in disaster (VOAD).

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Flyover: THE STRAIGHT OF GEORGIA

By: Christopher J. Carter and Stephanie E. Chang
School of Community and Regional Planning (SCARP), University of British Columbia

IN EARLY MAY 2015, we had the opportunity to take a low-altitude flight over the Resilient Coasts UBC study area - the Strait of Georgia in Southwest British Columbia.

Photo: Natural capital and residential development along the Sechelt coast

With a volunteer pilot and aircraft provided by LightHawk, the 2 ½ hour flight delivered unique and unparalleled perspective over a dozen coastal communities in our study area from small island hamlets to mega delta cities. From the plane, we were able to gain visual connections not apparent from remote sensing, numerical data or maps. From the flight, we draw a few reflections:

1. Natural Capital: While urban development has had major impact on natural systems, many estuarine, riverine and wetland ecosystems remain in the region. These will play a critical role in coastal adaptation to environmental change.

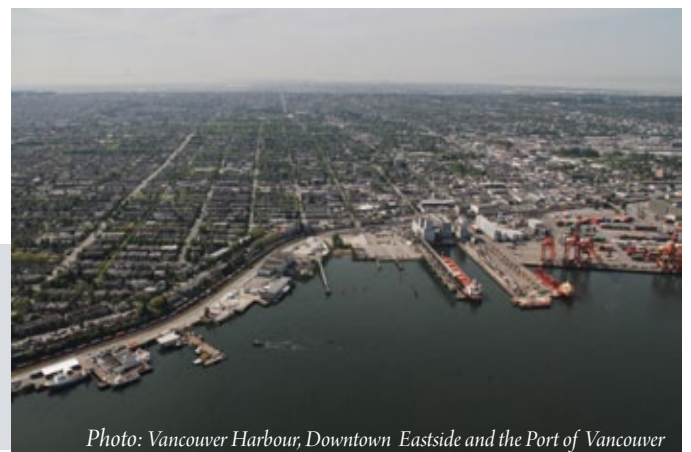


Photo: Vancouver Harbour, Downtown Eastside and the Port of Vancouver

2. Physical Vulnerability and Exposure: The flight enabled us to get an aerial appreciation for the physical characteristics of towns and cities, their geographic settings, and their relationships to the coast and waterways - as well as similarities and contrasts between communities in our region. From the air, we were able to see the connections between high water levels, existing infrastructure and human settlement. In some cases, this combination was rather concerning.



Photo: Industrial development along the south fork of the Fraser River



Photo: Tidal channel and residential development north of Nanaimo



Photo: Boundary Bay Tidal Zone and the Imajar highway

3. The Power of Aerial Images: Images taken from the flight helped our research on Coastal Hazard Vulnerability Indicators in ways beyond groundtruthing. Compelling images and video captured will help us to communicate connections, similarities, juxtapositions, and contrasts between places to potential users of our research, such as municipal planners. We aim to use these images in the software platform - tentatively called SEALINK'D - that we are developing to help connect coastal community planners in coastal risk and adaptation planning.

The SEALINK'D platform is a regional planning tool that takes a similarity-based approach to vulnerability, using available data on local capitals (Social, Economic, Natural, Built Environment, and Institutional) to connect local communities to share knowledge, practices, and resources. Our team hopes to contribute to building a more disaster-resilient region through this network of well-connected local planning institutions. A beta version of the platform is expected to be released in late 2016.

Website: www.resilientcoasts.ubc.ca

All images by Christopher J. Carter | LightHawk and Resilient Coasts UBC

Christopher Carter is a regional planner and documentary filmmaker from the Greater Yellowstone Ecosystem. He holds a B.Sc. in Interdisciplinary Studies from Montana State University and a recent M.Sc. in Regional and Community Planning from the University of British Columbia. His current work focuses on coastal flood risk planning and indigenous youth photo programs in British Columbia as well as the Warsaw International Mechanism for Loss and Damage with the UNFCCC.

Stephanie Chang is a Professor at the School of Community and Regional Planning (SCARP) and the Institute for Resources, Environment, and Sustainability (IRES) at University of British Columbia. Dr. Chang is particularly interested in issues of disaster recovery and resilience, urban infrastructure systems, and cities of the Pacific Rim.



RESILIENCY BEYOND THE EARTHQUAKES

By: Desiree (Desi) Matel-Anderson

AS THE WRANGLER OF THE FIELD INNOVATION TEAM (FIT), I empower humans to create cutting edge disaster solutions. In wrangling, my team and I discover gaps where we can optimize response and recovery efforts in some of the most challenging disasters from mudslides, tornadoes, and earthquakes, to hurricanes and humanitarian crises. We deployed to Nepal after the 7.8 and 7.3 magnitude earthquakes struck on April 25th and May 12th (1). The damage was enormous with 8,000 fatalities and more than 23,000 injured. Amidst all the devastation, and rising from the rubble, were hundreds of disaster survivors who built resilience in the face of catastrophe (2).

During our deployment, the FIT team discovered a large gap in the country's demographics, where a lot of young men in Nepal left their country to work in surrounding countries in order to support their families. This left women, children and the elderly in Nepal to maintain the homesteads. A UN Women "Gender Alert" noted in May 2015 that of the over two million people in eleven of the most devastated areas in the Kathmandu Valley, 284,144 female-led households (3). We were able to conclude from this and several other statistics that in order to empower community resilience after the earthquakes we needed to empower Nepali women through education and rebuilding efforts.



We partnered with an organization called WomenLEAD Nepal (4) that focuses on building leadership skills in young women. We began with virtual trainings on May 4th, utilizing telepresence technologies to communicate across the globe with our empowered women Nepali survivors along with our FIT trainers located across the United States. After four weeks of training our women leaders, we physically deployed to Nepal on June 2nd, focusing on the current survivor needs which included rebuilding efforts for education centers, creating games to teach public health lessons, and raising greater awareness of human trafficking.

50,000 classrooms were destroyed and damaged during the earthquakes, thus our first mission was to build better infrastructure for schools and ultimately for the children. We traveled to the Kavre community where FIT members negotiated for bamboo for the structures. Our Nepali women volunteers rolled up their sleeves to build the foundation, and with All Hands Organization we performed the build-out of these centers. During our building efforts the area experienced a 4.5 magnitude aftershock; however, all of our team was safe and able to finish our activities for the day(5).

Our second mission was to educate youth by empowering the young Nepali women to lead the mission of developing games on health and sanitation with Sweta, our epidemiologist from Chicago at the helm. At the time, monsoon season was just a few short weeks away and the infrastructure within the Kathmandu valley was damaged, if not destroyed, in many districts, amplifying the need to bring public health education to avoid the spread of disease (6). We trained hundreds of children aged 5-17 utilizing games that included art, engineering, science, improvisational theater, dance, and storytelling. One of our Nepali women leaders, Anjali, led us to her district where our trainers educated youth, instilling resilience with the Nepali women leaders and the children.

Finally, we carved out an awareness campaign in Hari-siddhi City led by our Nepali women leader, Tara. Our FIT members directly worked with Nepali performers who had experienced trafficking firsthand and had built performances to raise awareness of the issue. Once again hundreds of children joined us watching performances by our partners Circus Kathmandu, while providing important messaging on the uptick in Nepali children trafficked to India for slavery (7).

Resilience can come in many forms in disaster response; it's important for us to diagnose the challenges by focusing in on the community needs and then taking action to empower survivors to exponentially grow empowerment. In this case, the women of Nepal are the untold story, and our team discovered this incredible survivor workforce bridging the gap of needs, which led to the action of rebuilding classrooms, public health gaming to educate on the looming monsoon season, and spread awareness of human trafficking to reduce numbers of children sent to slavery after the earthquakes. Namaste, Nepali Women, for building resiliency within yourself, your families, and your communities.



Desi Matel-Anderson is the Chief Wrangler of the Field Innovation Team (FIT), 501(c)3, and CEO of the Global Disaster Innovation Group, LLC. Desi is the first and former Chief Innovation Advisor at FEMA and Think Tank Strategic Vision Coordinator. During her tenure at FEMA, she led the first innovation team down to Hurricane Sandy to provide real-time problem solving in disaster response and recovery and ran think tanks nation-wide to cultivate innovation in communities. Her emergency management experience began when she volunteered in Northern Illinois University's Office of Emergency Planning.

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COMMUNITY BASED PRE-DISASTER RECOVERY PLANNING

City of Port Coquitlam

By: Tara Stroup,

Emergency Program Officer, City of Port Coquitlam

PoCo Trail Dyke - photo by Lilia Yumagulova

IN DECEMBER OF 2014 the City of Port Coquitlam embarked on the endeavor of pre-disaster recovery planning. This process was started to determine recovery awareness in order to provide a framework for business continuity planning, insight into collaborative networking, and to review the benefits of cost recovery initiatives. A report outlining what the process would entail was submitted. A committee was struck and was comprised of local organizations, partnering non-government organizations (NGO's), community groups, members of the public, university students and provincial ministry representatives.

Two meetings have occurred thus far which have provided an understanding of the participants' roles, what resources are available and what the concerns are for the three different phases of recovery. The three phases of recovery were determined as follows: short (immediate needs), medium (up to two years) and long term recovery (two years and beyond). The initial meeting provided insight into the groups thoughts on recovery by taking part in a brainstorming session.

Brainstorming Session

Meeting 1

Short Term

(immediate needs)

- Reduce suffering
- Bring back to a normal state as quickly as possible
- Have resources in order to respond efficiently
- Provide basic needs (water, food, fuel)
- Determine communication abilities

Medium Term

(up to 2 years of recovery - items deemed important)

- Evaluate & eliminate economic losses
- Get the community back to where it was pre-disaster
- Provide psycho-social support to residents and first responders
- Implement temporary and permanent repair of infrastructure
- Provide resources and inventory for re-construction
- Identify critical resources
- Marketing of the City

Long Term

(2 years and beyond - items deemed important)

- Evacuate and eliminate economic losses
- Get the community back to where it was pre-disaster
- Provide psycho-social support to residents and first responders
- Implement temporary and permanent repair of infrastructure
- Look at resources and inventory for reconstruction
- Identify critical resources
- Marketing of the City
- Look at ways to enhance the community
- Build back better opportunities
- Review of community vision
- Re-assess community status
- Possible changes to bylaws and zoning
- Sustainability measures

- Economic recovery plan in place
- Flexibility (population displacement, investment utilization, construction support)
- Establishing and adapting to the new normal

Scenario Based Meeting 2

This meeting used a scenario based on a 7.3M earthquake that occurs in the Metro Vancouver area 30km west of Vancouver. Questions asked of committee members prior to the meeting consisted of:

- Is there a plan in place?
- What are we (and aren't we) prepared for?
- What kind of resources will be needed?
- What kind of help will I need and from whom?

Internal perspectives for the City included a review of critical infrastructure, daycare services, and ESS response support. Items deemed critical were comprised of water, paper forms, staffing and communication issues. There was further conversation over long-term planning considerations.

External City perspectives included debris management, usage and commandeering of fuel, liability coverage, water/sewer capabilities, communication challenges, the use and need for portables along with plan preparedness and awareness. There were immediate concerns for emergency response capabilities including rapid damage assessments of residential homes and infrastructure. The topic of psycho-social impacts to the community and the well-being of residents were also discussed.

The local youth association felt comfortable with their level of awareness and with the resource acquisition of emergency preparedness supplies. We learned through the briefing that the group had the ability to move their members by bus and that the fleet of buses on hand were stocked full of resources. One item of concern however was emotional support for their members.

Considerations for residents will include: family re-unification planning, the use of a cell phone to contact loved ones, prioritizing an out-of-province contact, and an awareness of the 72-hour provisions and timelines established by the province. Another concern noted was the availability of resources through local businesses in the community for day-to-day living following an event.

Non-government organizations stated that they would be working alongside the province to perform needs assessments. Service items they would provide included: help with fundraising, counselling, staffing a call center, managing walk-in volunteers and taking part in an "un-met needs" committee. One

organization noted that they already had equipment in place at different sites in various locations and that they could provide a stocked emergency response unit.

The need for acute care hospitals, along with providing for home health and residential care clients will be a priority for health organizations. Concerns included staffing, facility assessments, road clearing for vendors in regards to the collection of supplies, and ensuring the flow of information from reception centres. Plans are in place for the first 72 hours of a disaster but generators and electrical supply may be a concern after this time.

Where do we go from here?

At this time a draft recovery plan has been completed that embodies the thoughts and considerations of committee members, but the work itself is not complete. Comprehensive, tangible outcomes need to be completed in order to validate the time and efforts of committee members.

From the initial concept of recovery planning, two main projects will be started: the City will be inviting the business community to a workshop which is being conducted to determine the benefits of third party networking, and will compile information for a business recovery directory. This workshop will include information on business continuity planning, and will provide tools to help start the process for the business community.

The City has also taken part as a contributing member to a critical infrastructure tool initiative. This process included a thorough review of critical resources based on interdependencies that were both internal and external. This work was completed and a report has been provided outlining needs based on operational capacities and resources. A list of items have now been identified that will have a higher profile for future purchases and initiatives.



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USING EMERGING TECHNOLOGIES TO IMPROVE COMMUNITY RESILIENCE

By: Gregory P. Nichols, MPH, CPH

Introduction

10 YEARS AFTER THE DEVASTATION of Hurricane Katrina seems to be an appropriate time to discuss the future of disaster preparedness and how communities can become more resilient. Resilience minimizes vulnerability (Ministers Responsible for Emergency Management 2011, p. 8). The greater a community has the capacity to reduce vulnerability, the greater the likelihood of surviving a catastrophe. Unfortunately, the adoption of new technologies in the practice of public health is often slow, and research typically does not always focus on the feasibility of implementing new technologies to improve the efficiency of public health practice. There are numerous emerging technologies that could be used to reduce vulnerability and improve disaster preparedness and response, but three technologies stand out as being extremely relevant for building community resilience.

Nanotechnology

Nanotechnology is the creation of particles on the nanoscale. The nanoscale involves matter ranging in size from 1 to 100 nanometers (nm). A nanometer is one-billionth of a meter. To put this into perspective, a common type of nanomaterial is a carbon nanotube, which measures 1 nm in diameter, whereas the width of a human hair is 80,000 nm. Over 2,000 different types of these particles exist, and many of them have highly prized properties that make them useful for a variety of applications. One of the highly touted uses for nanomaterials is as sensors (called nanosensors).

Nanosensors have the potential to detect a variety of threats, including chemical, biological, radiological, nuclear, and explosive threats (CBRNE) (Koedrith and Thasiphus, 2015). In addition, nanosensors can detect tiny changes in pressure and movement, thus they would be ideal to use in monitoring critical infrastructure such as bridges, dams, and tunnels. Early detection of unusual stress or strain could be investigated immediately and potentially prevent catastrophic failure. Nanosensors could also be attached to goods so they could be

tracked during transport and monitored for safety (i.e., detect tampering, suspected terrorist attack, etc.). Transportation routes, such as railroads and rail cars, could be monitored for suspicious activity to prevent tragedies such as the Lac-Mégantic rail disaster in 2013, which killed 47 individuals and created a one-kilometer (0.62 mi.) blast radius. Nanotechnology is also being used to develop alternative energy sources, improve battery technologies, and create next-generation photovoltaic cells used for solar power. Energy technologies that could be used off the grid would obviously provide a significant advantage for recovery efforts.

A variety of emerging technologies can be utilized to improve community resilience and minimize the impact of disasters.

Internet of Things

The Internet of Things (IoT) is the network of sensors and data communications technology built into physical objects that enable those objects to be tracked and controlled across a data network or the internet (McKinsey & Company 2013, p. 53). These objects can be bridges and dams as mentioned above, or they could be battery-powered and mobile devices. Many of these objects already have the capacity to connect with each other using radio networks and are not connected with the power grid. They could also be used as a communications network in a power-outage, and it has been suggested that the IoT could become a default architecture during a disaster (Petersen and Baccelli, 2014).

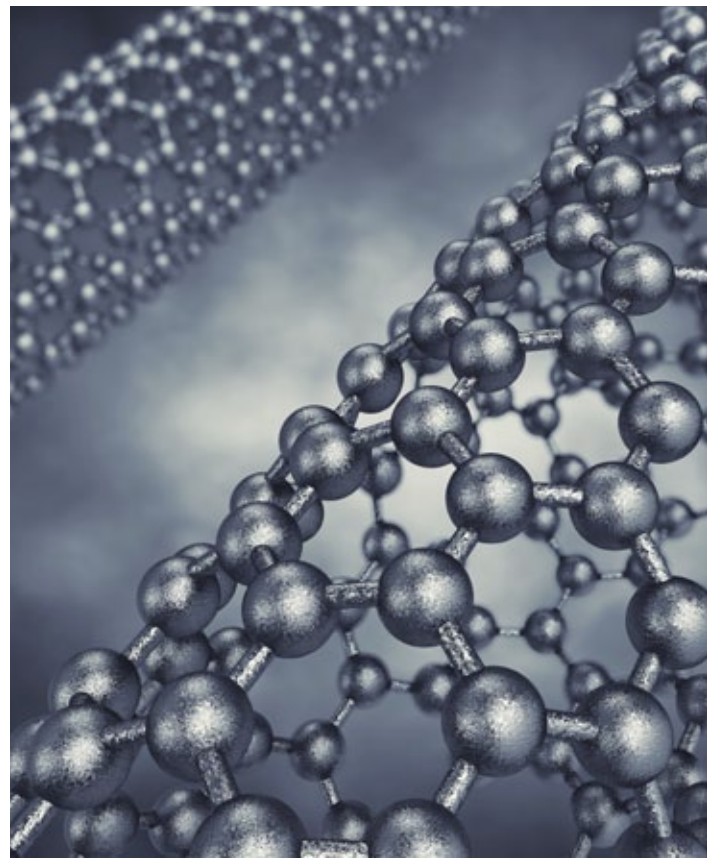
Aside from acting as a blackout network, data could be collected from the sensors of various devices, stored, and analyzed in real-time on a cloud platform, such as in the case of nanosensors used to monitor surrounding areas for potential chemical or biological releases. This information would be constantly transmitted back to a central area and evaluated. Anomalies even at small scales would potentially be detected and could lead to quicker investigation and even evacuation if necessary.

3-D Printing

The World Economic Forum named 3-D printing one of the top 10 emerging technologies for 2013 (World Economic Forum 2013). This technology is a type of additive manufac-

turing in which a product is built from the bottom up using small pellets of polymer composite materials or fine metal powders. A design of the product is created using software and downloaded into a special machine that acts as a giant printer. The polymer or metal powder is sprayed into the machine one layer at a time. This process is repeated until the final product has been created. Printing an object like this is much faster than typical manufacturing processes. Less material is used, which reduces waste, and products can be created on demand in the area of need and do not have to be shipped from distant manufacturing plants.

A variety of products (e.g., tools, medical supplies, and materials for shelters) that would be needed by first responders and affected individuals following a disaster could easily be created by a 3-D printer. Printers with pre-downloaded plans for a variety of objects could be staged at pre-selected sites along with the materials needed to print them. This would reduce the amount of space needed to store supplies, it would reduce waste by creating a significant amount of resources on an as-needed basis, and it would eliminate waiting time for certain critical resources. 3-D printers can also be used to make selected parts for equipment in isolated areas used to detect and track potential natural disasters, such as storms (USAID, 2015). Having the availability to print resources on demand could be a game-changer in remote areas that have limited infrastructure.



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Summary

A variety of technologies are rapidly emerging as significant players in changing the way communities face disaster leading to a reduction in vulnerability and improving their capacity to prepare for, respond to, and endure catastrophic events. An initial wave of technologies such as social media, SMS, and GIS helped pave the way for better disaster response, and now it is time to capitalize on a new generation of technologies. Technological research and development needs to be better matched with opportunities, and public health professionals need to take better advantage of addressing issues utilizing emerging technologies. The future of vulnerability reduction is here, and it is time to act.

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ENHANCING RESILIENCE IN THE EOC

By: Anastasia Ovodova

Our experiences and training shape our thoughts and beliefs, in turn influencing our decisions and actions. For Emergency Operations Centre (EOC) personnel, this could mean that their reactions and actions can make or break their response processes, while their critical thinking skills may shape decision making. To build a resilient community, the personnel responding to a crisis must be resilient themselves.

THE PURPOSE OF THE RESEARCH on “Assessing strategic thinking in police and fire personnel in the Burnaby EOC” was to make the EOC a stronger team through: building resiliency and professional comfort in first responders and other EOC workers; increasing the strategic thinking know-ledgebase in disaster management; and, making recommendations for the EOC and first response agencies on increasing capacities in personnel and bridging gaps between agencies. The results of the first responder interviews indicate that there are gaps in training and collaboration within and between the agencies and departments that are represented in the EOC. This research showcased that change is needed to create a functional EOC capable of responding to all levels of disasters based on adequate levels of preparedness. In other words, the EOC needs to be resilient just as the rest of the community. This research proposed that strategic thinking is the key to becoming resilient in the EOC.

Strategic Thinking

During disasters, agencies have a “whatever it takes” attitude (Donahue, 2006, p. 142) because “real events have socially mobilizing effects” (Berlin & Carlstrom, 2008, p. 183). EOCs show that personnel need to build strategic thinking capacity to help them succeed in their EOC roles. A command and control background may not be as fitting for disaster and emergency management when the latter is based on collaboration and coordination (Heaton, 2013). A strong EOC member needs to understand several disciplines and have both first response and project management experience (Heaton, 2013),

whereas the current situation in EOCs shows that it is usually either one of the above. Unlike tactical thinking which directs actions to solve immediate problems, strategic thinking is the basis of creating strategic decisions and plans in order to implement change, thus directing current actions in improving future performance (Wootton & Horne, 2010).

Strategic thinking also allows people to continue leading in disasters when others may not (Wootton & Horne, 2010). It consists of other types of thinking, such as predictive, critical, reflective, creative, ethical and visual thinking, and it involves “getting difficult things done in difficult times” (Wootton & Horne, 2010, p. i). As well, strategizing includes forward thinking, capacity building, goal identification or achievement, and professionalization, all of which are mirrored in great leadership (Choi, 2008). Collaboration and collaborative incidents are the types of events that allow strategic thinking to strengthen since the collective thinking makes strategizing more powerful with the inclusion of a variety of expertise and ideas (Choi, 2008). Understanding how strategizing differs from tactical thinking will allow for better EOC operations and decision-making.

Creating a Stronger EOC

The five key research themes found from the study findings are: training perseverance; personal characteristics; adaptation; trust and collaboration; and, courage and belonging. When these themes are nurtured in an EOC through strategic thinking improvements, the specific disaster management community becomes more resilient to critical incidents.

The key study recommendations:

Training perseverance:

- Strengthen the training system
- Train more staff
- Offer more courses
- Provide different learning methods
- Cross train personnel in other roles
- Strive to be the best, train always, do not stop

Personal characteristics:

- Choose the correct personnel for the job
- Train the weaknesses, use the individual strengths

Adaptation:

- Roll with the punches and be flexible in your decisions
- Enhance the EOC with technology and tools to increase communications and situational awareness
- Seek support from superiors

Trust and collaboration:

- Do your job, let others do theirs, and work with others; have two way conversations
- Know your neighbour, collaborate with and learn about other agencies
- More of the same scenario, exercise together
- Trust yourself and others; EOC supports the site

Courage and belonging:

- Become a team, let EOC staff get to know each other
- Provide briefings and debriefings, even for small events



The most advanced EOC personnel in the research study identified courage as one of the main characteristics required for EOC staff. Emergency Operations Centre work requires personnel to put aside fears and concerns about ongoing personal and major emergencies, which is another way of strengthening strategic thinking and building capacities (McGuire & Schneck, 2010). Boyd (2011) notes that “we as humans are limited in our ability to recognize and analyze information, especially under stressful conditions” and even more so when dealing with group dynamics such as in an EOC (p. 56). EOC staff, no matter what agency they could be from, must trust one another, themselves, and site personnel to do their jobs. Through a focus on addressing the gaps in training, personal development, adaptation, collaboration, and a team environment, the EOC can increase capacities, and thus strategic thinking, while becoming a stronger and a more resilient system. Have courage in what you do, and always strive to reach your potential.

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Resilience Policy - Practice Gaps: NEW OPPORTUNITY OR BUSINESS AS USUAL?

By: Liza C. Kurtz

COMMUNITY RESILIENCE as a concept has exploded into the academic literature in recent years (e.g., Adger et al., 2005; Barrios, 2014; Cutter et al., 2008; Cutter, Burton and Emrich, 2010; Fois and Forino, 2014; MacKinnon and Derickson, 2013; Matyas and Pelling, 2015, etc.), providing researchers with a complex theoretical structure for examining disasters. It is also of increasing importance to international agendas, such as the 2005 Hyogo Framework for Action, and national disaster management policies, including the United States' 2010 National Security Strategy and Canada's National Dis-

aster Mitigation Strategy. These policies can be considered a mandate for emergency and disaster management professionals to consider resilience in their work (Cutter, Burton and Emrich, 2010), yet little research has examined how theories of resilience are used by these professionals, or how community resilience is identified and produced 'on the ground' (Aldunce, Beilin, Handmer and Howden, 2014). This article presents preliminary results from an ongoing qualitative study investigating how resilience theory and policy are changing (or not) the practice of disaster mitigation, response, and recovery.

ed open-ended questions on the definition of community resilience and queries about how the informant's organization increased resilience in their area of jurisdiction.

Results

The diverse professional roles in the sample meant that a variety of approaches to community resilience were represented in the data; however, despite the distinct experiences of the informants, several themes emerged from these interviews:

Resilience is a hot topic, but how are disaster management professionals using it for planning and operations? Interviews explore the gap between policy and practice.

Research Methods

The author conducted nine semi-structured interviews with emergency preparedness and disaster management professionals, as well as those in related professions, in the state of Tennessee, USA. The final sample included emergency managers, an emergency management planner, a city manager, an urban planning director, persons in managerial positions with disaster relief organizations, a deputy fire chief, and a public health official. Recruitment took place through email; a response rate of 43% was achieved after follow-up. The interviews took approximately 60 minutes, and includ-

- Informants couched their discussions of resilience-building in language that was already relevant to the responsibilities of their organizations: thus, for many of them, community resilience was conceptually linked to pre-existing demands for preparedness or continuity of operations. The increase of resilience language in research and policy was not disruptive to the standard model of management - instead, resilience was subsumed into 'business as usual';
- Resilience is often conceptualized in the academic literature as spanning a broad range of domains, including economic and social capital, environment, and governance. Four informants touched on these topics briefly, but only one respondent substantively engaged with them by outlining how their organization meshed with these larger structures. Community demographics, a potentially vital part of measuring resilience (Cutter, Burton and Emrich, 2010), was mentioned by all respondents, but these demographics were framed in terms of vulnerability and preparedness rather than resilience per se;
- When asked who was tasked with stewarding resilience in their organization, all informants responded that it was the responsibility of "everyone" to foster resilience, but added that there were no formal organizational roles that they were aware of assigned with creating or sustaining community resilience explicitly;

- Similarly, when discussing how their organizations monitored their community's capacity for resilience, informants were unaware of any programs in place to assess resilience. This research gap also extended to other areas they identified as related, including preparedness. One informant indicated that, in the current climate of funding scarcity, their organization chose to spend their limited resources on priorities other than data-gathering;
- Eight of the nine informants, in response to an open-ended question about how community resilience should be prioritized among competing organizational demands, suggested that organizations should be paying more attention to community resilience.

Resilience “On the Ground”: Discussion and Implications for Practitioners

The interviews with this small sample of professionals problematize prior community resilience research: the cohesive, holistic nature of resilience, as defined in the literature, seems to be inaccessible to or simply outside the purview of most emergency and disaster management organizations. The disconnect between theory and practice manifested most when informants were discussing how they addressed community resilience within their organizations. The increasing prominence of community resilience was not perceived as a paradigm shift in the approach of these organizations; instead, informants understood resilience as a secondary function of a more explicit requirement already being fulfilled (such as preparedness). This siloed interpretation is at odds with much of the resilience literature, which emphasizes a highly integrated framework that crosses boundaries between civic life and social capital, environment, and economic structures (Aldunce, Beilin, Handmer and Howden, 2014; Cutter et al., 2008; Murphy,

2007; Norris et al., 2008). Overall, it is clear that, for these informants, resilience-building often takes place after the fact, amidst a patchwork of related strategies, but it is rarely pursued by name. Without further research with practitioners, it is impossible to tell if this fractured approach is due to a conservative, response-based paradigm, or if there are structural barriers - a lack of funding for more extensive programs being the most obvious of these possible barriers. The willingness of informants to prioritize resilience, however, may demonstrate a desire for greater engagement with a broader definition of community resilience in their planning and operations.

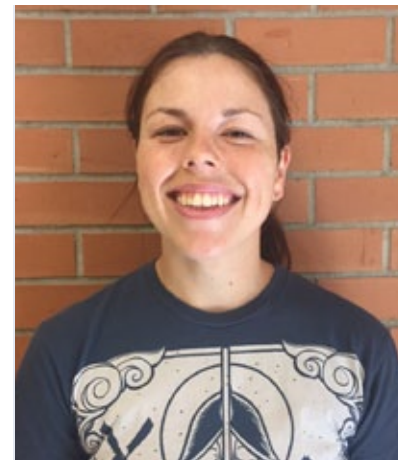
Conclusion

Although preliminary, these results provide a glimpse of the contrasts between academic understandings of resilience and the work of disaster management. It is easy to be critical of this academic-practitioner gap, but the divide may create opportunities for collaboration and collective knowledge generation. Problems of practical application and measurement are acknowledged in the community resilience literature (Bruneau et al., 2003; Chang and Shinozuka, 2004; Cutter, Burton and Emrich, 2010; Rose, 2011; Singh-Peterson, Salmon, Goode and Gallina, 2014), and further research with embedded practitioners could help delineate what forms an applied knowledge of resilience might take. Likewise, community resilience's prominence in policy and research could provide funding, and political will for a reworking of the resilience idea within professional disaster management organizations. In either case, bringing professionals and practitioners into the resilience dialogue is a critical first step in expanding and solidifying understandings of community resilience.

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LINKING PEOPLE AND COMMUNITIES TO RESILIENCE

By: Julien A. Rubin

There is often discussion about physical mitigation as a way to reduce risk such as seismic upgrading to school buildings, and this is clearly very important. However, physical upgrades are not the only important aspect of the resilience process: engaging people in sustainable thinking and resilient processes can build capacities and strengthen communities in the long term. Therefore, the purpose of this study was to better understand the link between resilience education and strengthened individual and community resilience. This link may prove pertinent as education attempts to ensure that this link is useful and relevant for learners in today's complex and changing world.

This study examined how resilience education can be one approach that supports these objectives and contribute to processes and understanding that support community resilience. Elementary school teachers were interviewed about their understanding and perceptions of resilience education in a school context and its potential connection to strengthening individual and community resilience. This small sample interviewed 8 elementary school teachers in a flexible semi-structured format from four school districts located in or near the lower mainland of British Columbia.

Participants were asked if they felt there was a place for resilience education elements to be taught in elementary schools. Seventy-five per cent of participants felt that there is a place for these ideas to be taught in schools. Responses indicated that there is a need for creating an overall "umbrella" definition of "resilience education" that could assist users in establishing a clearer understanding of what resilience activities and processes are and what the potential benefits may be. Participants raised some concerns and suggested that too many good ideas are already expected to be introduced through schools and that an already packed curriculum and often stressful environment may hinder resilience learning. It was suggested that establishing a more shared responsibility from all community members about sustainability and resiliency would be beneficial.

Participants suggested that resilience learning should be broad and comprehensive to cover the diversity of risk, vulnerability, sustainability and resilience issues present in society. When asked what teachers felt were the most important elements of resilience education, 38% felt that citizenship was most important, another 38% felt sustainability and resilience was important, followed by 13% for environment and 13%

capacity building. The majority of teachers interviewed recognized that many of these ideas were interconnected among people, communities and society. Therefore, in order for resilience learning to be effective there are opportunities that need to be taken up as well as challenges and improvements that must be addressed. The majority of teachers interviewed believed that schools were important places in communities to act as a starting point for resilience ideas to influence individual and community capacity. However, it was further discussed that in addition to a shared responsibility for societal resilience, a more collective process and collaborative approach was viewed as important to avoid the perception that all of societal values solely come from curriculum, teachers or schools. The study findings suggest that the endorsement of sustainable social processes between all members of the community were important to the resilience process. As a result, the majority of teachers interviewed believed that resilience education and resiliency were important to society and that teachers and schools do play an important role. However, there are often "linkages of understandings" within society that are required for resiliency to be effective. According to the participants interviewed, one of these linkages that were viewed as often missing from the resilience process was mutual and shared support. This support was considered important to individual capacity building and people's ability to be effective in their roles, which in turn affected the systems they engaged.

The study recommendations:

Develop resilience education curriculum in collaboration with all stakeholders for schools as a new field of study to engage people in processes that build individual and community resilience.

Engaging the public was viewed as an important step in the resilience process. Empowering people to be part of the community may help build resilience and community capacity through connection making, solution building and understanding sustainable vision. Learning resiliency in schools can be shared by family and community members and therefore developing resilience education as a new field of study may help to bring people within communities together.

Facilitate resilience education that is holistic, all-encompassing and broadly defined in consideration of sustainability, long term vision and the collective good. From the data collected, resilience learning was viewed not only as learning about natural hazards, safety and risk reduction but also about social process and engagement, encouraging critical thinking and connection making among people and systems and supporting confidence and capacity building.

Ensure resilience learning is ongoing, inclusive, begins at an early age, is age appropriate and relevant to people, culture and community. Resilience process emerges through continuous participation. Therefore, learning should begin at an early age, be provided in an age-appropriate manner, continue throughout the K-12 years and occur in multiple settings. These characteristics were viewed as important to ensuring understanding of sustainability and resiliency, and as a way for children to complete their educational years, with greater empathy.

Establish a resilience education coordinator to act as a teacher resource to work with schools, teachers and students focusing on building sustainable processes and resilience ideas. Individual capacity building was viewed as an important connection to community strength. Establishing a resilience education coordinator who understands the people and culture of communities can work with schools, teachers and students to share sustainability and resilience ideas and processes.

The study conclusions are that engaging in resilience education and its related processes can increase individual awareness and understanding of ideas that contribute to community resilience. This includes building people's understanding and awareness of human behaviour and interconnectedness, citizenship and empathy, risk and vulnerability, proactive versus reactive thinking, social processes and capacity building, and sustainable long term common vision. It is suggested that there is a need for greater shared responsibility and understanding of the linkages within society that support community resilience.

Adapted from Julien Rubin's study Resilience Education: An Exploration of BC Teacher Attitudes. To download, please search "resilience education" at <https://teachbc.bctf.ca/>



Julien Rubin is a teacher and interested in how sustainability and resiliency can help strengthen individual capacity and community resilience. Julien enjoys running, the outdoors, traveling and learning other cultures. He is an avid supporter of children who live with developmental challenges, illness or other difficulty.

40 YEARS OF DISASTER RESEARCH

In 1976, the University of Colorado-Boulder opened the Natural Hazards Center, a pioneer in studying hazards and disasters. Watch this plenary presentation from the Annual Natural Hazards Research and Applications Workshop reflecting on four decades of knowledge in the field (recorded by the American Planning Association).

https://youtu.be/dtRNcM_S_Wo



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**HUMANITARIAN
STUDIES**



NEW RESEARCH EXAMINES RESILIENCY IN CHILDREN AND YOUTH FROM 2013 SOUTHERN ALBERTA FLOODS

When southern Alberta was overwhelmed with flood waters as rivers and creeks breached their banks spilling into streets and homes in June 2013, flood waters forced Melissa Palmer from her home and her community.

She was worried for her two children, both by the catastrophe that was unfolding around them, and the uncertainty of their futures. Drs. Robin Cox, Julie Drolet, and Caroline McDonald-Harker are hoping to better understand the resiliency of children in order to bring peace of mind to families like the Palmer's and strengthen communities when disaster strikes.

A new research project supported by Alberta Innovates - Health Solutions (AIHS) at the University of Calgary, Mount Royal University, and Royal Roads University aims to help children and youth during times of disaster. The Alberta Resilient Communities project (ARC) will work with children, youth and their communities to inform and strengthen child and youth

mental health and enhance disaster preparedness, reduce risk and build resilience in southern Alberta. ARC will help better understand the social, economic, health, cultural, spiritual and personal factors that contribute to child and youth resiliency while empowering them, their families and communities to build resiliency.

“We are very aware that children and youth can effectively contribute to their own recovery and that of the people and places around them, but that they often lack the opportunities to do so,” notes Dr. Cox. “Youth are uniquely positioned to contribute to disaster risk reduction and resilience as conduits of information to family and peers, as early adopters of new technology, and as current and future leaders in their communities. As part of the ARC project, we will partner with youth to enhance their leadership and research skills, and to support their capacity to innovate real-world resilience strategies in their communities.”

This guide is a collaborative effort by the CRHNet Young Professionals to help facilitate more effective connections between research and practice in ‘resilience’ research in Canada. Resilience is a burgeoning research area. In Canada there are a growing number of projects in this field hosted at institutions across the country from coast to coast to coast. However, this research is fragmented with no mechanism which synthesizes and provides access to this research in one location.

Over a period of two months a team of volunteers compiled resilience research projects from across Canada, varying from

Aboriginal to Rural to Transportation to Infrastructure resilience. The next step is to create an online tool that can evolve continuously and organized thematically and geographically.

We welcome contributions to this tool from all researchers and practitioner in Canada. This is a preliminary, crowd-sourced index, and is not yet comprehensive. Please send us your entries, expanded information, corrections and thoughts.

Email: editorhaznet@gmail.com

with ‘Resilience Research Index’ in the subject line.

B

Brock University

Program:

Environmental Sustainability Research Centre

Theme: Pursuing innovative and transdisciplinary research concerning the environment, sustainability, and social-ecological resilience.

Description: water resources innovation and resilience; meanings and measurement of sustainability; climate change, adaptation, and transformation; science and public policy; social justice, development, and health.

Contact: Ryan Plummer, PhD

email: rplummer@brocku.ca

Link:

<https://brocku.ca/environmental-sustainability-research-centre/>

C

Carleton University

Program:

Infrastructure Resilience Research Group

Theme: Promoting interdisciplinary knowledge-building initiatives regarding risks and vulnerabilities pertaining to critical national infrastructure in an all-hazards environment

Contact: Felix Kwamena, PhD (Director)

felix.kwamena@carleton.ca

Link: <https://carleton.ca/irrg/>

Program:

Infrastructure Protection and International Security (IPIS) program

Theme: brings together the core principles of critical infrastructure engineering and multi-hazard threat risk assessment with an awareness of the policy framework and options for protection of national critical infrastructure (NCI) systems

Contact: Jenelle.Williams@carleton.ca

Link: <https://carleton.ca/irrg/>

D

Dalhousie

Program:

Critical Infrastructure Protection Institute

Description: The CIP Initiative is a hub for citizens, industry, NGOs and governments to engage with questions and ideas about the management of Canada’s critical assets.

Contact: Kevin Quigley, Principal Investigator.

email: kevin.quigley@dal.ca

Link: <http://cip.management.dal.ca/>

Program:

Resilience Research Project

Theme: Resilience from a socio-ecological approach.

Contact: Dr Michael Ungar, Director

email: rrc@dal.ca

Link: <http://www.resilienceproject.org/>

Defence Research and Development Canada

Program:

Canadian Safety and Security Program

Description: federally-funded program led by Defence Research and Development Canada’s Centre for Security Science (DRDC CSS), in partnership with Public Safety Canada.

Contact: css-info@drdc-rddc.gc.ca

Link: <http://www.science.gc.ca/default.asp?lang=En&n=5B5BE154-1>

Program:

District of North Vancouver: Earthquake Ready Action Plan

Theme: Community earthquake resilience.

Description: Designed to strengthen earthquake resiliency in four key areas — mitigation, preparedness, response, and recovery, by focusing on the people, buildings, infrastructure, and systems that are most vulnerable. UN Resilient Cities award recipient.

Timeline, funding: District of North Vancouver

Link: <http://www.dnv.org/programs-and-services/earthquake-ready-action-plan>

J

Justice Institute of BC

Program:

Aboriginal Disaster Resilience Planning

Description: A guide to developing resilience in First Nations, Metis, and Inuit communities

Link: <https://adrp.jibc.ca/>

Program:

Rural Disaster Resilience Planning Project

Theme: Community-centred research project promoting disaster resilience in rural and remote communities

Description: Remote and Rural communities are resilient in many ways but are constrained by lack of resources and access to risk mitigation and planning tools. RDRP provides tools and resources for remote and rural communities to undertake disaster planning and preparedness.

Link: <http://wp-rdrp-dev.jibc.ca/>

Program:

SIMTEC Project

Theme: Training and Exercises

Description: researching and developing tools on enhancing psychosocial capacity and capability management.

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

M

Mt Royal University

Program:

Centre for Community Disaster Research

Theme: A transdisciplinary hub for research, education, and outreach related to natural, social, technological and economic disasters.

Description: The CCDR generates knowledge about disasters and involves end-users of research as meaningful partners.

Timeline, funding: established 2013; SSHRC Aid to Small Universities Fund; Calgary Foundation New Initiatives Program

Contact: Timothy Haney, PhD

email: thaney@mtroyal.ca

Link: <https://www.mtroyal.ca/ProgramsCourses/Faculties-SchoolsCentres/Arts/CommunityProjects/CCBDR.htm>

Program:

Neighbourhood Disaster Pilot Project in High River, Alberta

Theme: Facilitating neighbourhoods level design and implementation of disaster programs through engaging and effective approaches.

Description: Developed to address the gap in emergency preparation at the community level and the shortage of resources at the municipal level in High River, Alberta. Being prepared for emergencies and having the knowledge and resources to respond adequately is important because it can reduce confusion and distress, prevent injury and save lives, and minimize or avoid damages.

Timeline, funding: Funding provided by CCDR at MRU

Contact: Eva A. Bogdan PhD Candidate, University of Alberta *email:* ebogdan@ualberta.ca;

Contact: Stephanie Sodero, PhD Candidate Memorial University

Link: <http://www.mtroyal.ca/ProgramsCourses/Faculties-SchoolsCentres/CentreforCommunityDisasterResearch/About/People/index.htm>

R

Royal Roads University, Mt Royal University, University of Calgary

Program:

Alberta Resilient Communities Research Project

Description: ARC Youth Research explores how young people and communities become more resilient in the face of increasing disaster and climate related risks. It is part of a larger research project on community resilience involving three universities – the University of Calgary, Mount Royal University and Royal Roads University.

Findings: Participants receive credit towards 2 labs out of 8. Participating in the ARC Resilience Innovation youth pilot will involve them as co-researchers and future resilience innovators. Participants who complete all 8 labs receive a Resilience Innovation Skills Certificate from Royal Roads University, Continuing Studies.

Contact: resiliencebydesign@royalroads.ca

Link: www.resilienceinnovationchallenge.splashthat.com

Program:

Youth Creating Disaster Recovery and Resilience Project

Theme: youth resiliency

Description: Youth Centered Disaster Recovery

Timeline, funding: Social Sciences and Humanities Research Council of Canada

Contact: Dr. Robin Cox email: robin.cox@royalroads.ca phone: 250.391.2600 ext.4855

Link: <http://research.royalroads.ca/research-projects/robin-cox-youth-centered-disaster-recovery>; <http://shs.royalroads.ca/robin-s-cox>; <http://www.ycdr.org/>

Program:

Transport Canada

Theme: Economic Analysis Group

Description: Studies supply chain disruptions in terms of labour, global supply, capacity and demand

Link : <https://www.tc.gc.ca/eng/policy/aca-menu.htm>

Program:

Transport Canada

Theme: Northern Transportation Adaptation Initiative

Description: Given the rapidly changing climatic conditions in the Arctic, there is a focus on melting permafrost and increases in navigable water, as well as assessment of three northern airports to identify those components of the specified airport infrastructure that are/may be at risk of failure, damage, loss of service and/or deterioration from extreme climatic events.

Contact: NTAI-IATN@tc.gc.ca

Timeline, funding: Ongoing, Government of Canada

Link: <https://www.tc.gc.ca/eng/innovation/ntai-menu-1560.htm>

S

Statistics Canada

Program:

Survey of Emergency Preparedness and Resilience in Canada (SEPR)

Theme: community resilience

Description: The purpose is to better understand community resilience in Canada by examining how Canadians prepare for and respond to emergencies or disasters, and how they fare on other social and economic factors related to resilience.

Link:

<http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5208>

T

Program:

Transportation Association of Canada

Theme: Transportation Systems' Resilience to Extreme Cold Weather

Description: Article provides an overview on how climate change impacts transportation system

Findings: Increasing resilience in transportation systems will first require a commitment to reduce greenhouse gas emissions. This can be achieved by implementing behavioural changes and fuel conservation measures and adopting new technologies. Risk and vulnerability assessments, examined through future climate scenarios, can also help organizations better understand climate change impacts.

Contact: Terry Zdan, Policy Consultant, Policy and Service Development, Manitoba Infrastructure and Transportation

**Program:**

Transport Canada

Theme: Transport Canada is broaching the topic of resilience broadly, as well as within the context of climate change.

Description: A nation-wide assessment of risks and adaptation practices in the transport sector is being developed, organized by region and with a chapter dedicated to urban issues.

Findings: Anticipated publication date of March 2016

Timeline, funding: Ongoing; Government of Canada



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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."

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

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

Program:
Transport Canada

Theme: To reduce these potential impacts, Maritime Commerce Resilience (MCR) planning seeks to ensure that the maritime sector has the tools, resources and knowledge to prepare for and respond efficiently and effectively to disruptions. Resilience planning improves the marine industry's ability to recover following a disruption, and helps enhance Canada's global competitiveness and marketability as a reliable and strong trading partner
Description: Maritime Commerce Resilience plans help to ensure that maritime commerce continues or resumes as quickly as possible after a disruption; Maritime supply chain stakeholders are aware of emergency and communication processes and protocols; and Maritime operations and trade recover to their pre-disruption state after a terrorist attack, emergency or natural disaster.

Findings: To help the marine industry (including ports, terminals, shipping lines, labour associations, pilotage authorities, chambers of shipping and utility providers) develop resiliency plans, Transport Canada has developed a MCR Getting Started Guide, which includes information, tools and resources to begin organizational or regional-level resilience planning.

Contact: mcr-rcm@tc.gc.ca

Timeline, funding: Ongoing; Government of Canada

Link :

<https://www.tc.gc.ca/eng/marinesecurity/initiatives-234.htm>

U

University of British Columbia

Program:

Crisis Resilience Alliance (University of British Columbia)

Themes: 1) Sense-making and crisis management; experimental design; 2) Urban and regional resilience; comparative resilience policy analysis; 3) Public outreach and risk communication.

Description: The Crisis Resilience Alliance (CRA) aims to produce, gather and disseminate important research on crisis management and resilience. The primary objective of the Alliance is the continuous development of interdisciplinary and inter-institutional collaborations on crisis and resilience research.

Contact: info@crisisresilience.ca

Timeline, funding: Social Sciences and Humanities Research Council

Link: <http://www.crisisresilience.ca/>

Program:
Marine Transportation Disruption

Theme: Knowledge and tools to enhance the resilience of coastal communities to maritime transportation disruption

Description: Developing resilience strategies for marine transportation systems in the event of emergencies, with a focus on the needs of marine-dependent coastal communities

Findings: Integrated assessment is being developed.

Timeline, funding: 2014-2017 MEOPAR NCE

Contact: *Stephanie Chang, PhD*

email: stephanie.chang@ubc.ca

Link: <http://www.resilientcoasts.ubc.ca/marine-transport/>

Program:

Collaborative for Advanced Landscape Planning

Theme: Bridging research and practice bringing rigorous science and modeling, visualizations, innovative environmental design and participatory practices.

Contact: *Stephen Sheppard, PhD*

email: stephen.sheppard@ubc.ca

Link: <http://calp.forestry.ubc.ca/>

University of Calgary

Program:

International Institute for Infrastructure Resilience and Reconstruction

Description: International consortium of interdisciplinary experts providing leadership in natural disaster related mitigation, resilience enhancement, and reconstruction projects.

Contact: *SJanaka Ruwanpura, PhD (Convener)*

email: janaka@ucalgary.ca

Link: <http://www.iiirr.ucalgary.ca/>

University of Manitoba

Program:

Disaster Research Institute

Theme: Disaster research including resilience

Description: Building a knowledge resource on disaster management, fostering interdisciplinary links within the University.

Timeline, funding: established 1990

Contact: *Emdad Hacque, PhD*

email: haquece@ms.umanitoba.ca

Link: http://umanitoba.ca/institutes/natural_resources/dri/dri.htm
http://umanitoba.ca/institutes/natural_resources/dri/dri_faculty.htm

University of Montreal

Program:

Oeuvre Durable: The Disaster Resilience and Sustainable Reconstruction Research Alliance

Theme: resilience through environmental design and researching vulnerabilities

Description: Analyzes living environments in light of the theoretical and empirical approaches of vulnerability and resilience in the context of major disruptions (such as natural catastrophes and climate change, socio-political conflicts, or threats to existing economic stability the University.

Link:

http://www.grif.umontreal.ca/observatoire/index_EN.html

University of Toronto

Program:

Centre for Resilience of Critical Infrastructure

Theme: Understanding how to enable successfully resilient communities.

Description: An initiative of the University of Toronto's Faculty of Applied Science & Engineering to advance the field of infrastructure engineering and the understanding and practice of infrastructure resilience.

Findings: CRCI looks at dependencies of municipal infrastructure and services as an extension of operational resilience.

Contact: Alec Hay *email:* alec.hay@utoronto.ca

Link: <http://www.crci.utoronto.ca/>

Program:

Institute of Environmental Studies

Theme: Behaviour, Resiliency, Climate Change

Description: "Vulnerability, Resiliency and the Collapse of Society Publications"

Link:

<http://www.ilankelman.org/miscellany/Timmerman1981.pdf>

University of Victoria

Program:

Water, Innovation, and Global Governance

Theme: Improving water governance through social and technological innovation.

Description: Situated in the Centre for Global Studies,

WIGGlab researchers look at social-ecological challenges in watersheds around the world.

Contact: Michelle-Lee Moore, PhD

email: wigglab@gmail.com

Link: <http://www.wigglab.com/>

Program:

Polis Project on Ecological Governance

Theme: Working to make ecological thinking and practice a core value and practice in all aspects of society.

Description: A centre for research and action situated in the Centre for Global Studies at the University of Victoria. Focus on transdisciplinary research education, and advocacy oriented to defining and cultivating ecological governance.

Contact: Kelly Bannister, PhD (co-director)

email: kel@uvic.ca; gmail.com

Contact: Oliver Brandes (co-director)

email: omb@uvic.ca

Link: <http://www.polisproject.org/>

Program:

Pacific Institute for Climate Solutions

Theme: A dynamic knowledge network to study the impacts of climate change and to develop positive approaches to mitigation and adaptation.

Description: Created with an endowment from BC Ministry of the Environment, PICS applies a multi-disciplinary approach to climate change research, focusing on solutions and relevance to BC.

Contact: pics@uvic.ca

Link: <http://pics.uvic.ca/>

University of Waterloo

Program:

Centre for Ecosystem Resilience and Adaptation

Theme: Addressing impacts of global change through collaboration

Description: CERA helps decision-makers develop better policy and governance relating to ecosystems.

Contact: Dr. Stephen Murph

email: stephen.murphy@uwaterloo.ca

Link: <http://www.era.uwaterloo.ca/>



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- Communication in Disaster [EMGT1220]
- Dangerous Goods Related Legislation and Strategies [EMGT1230]
- Business Continuity Planning [EMGT2330]
- Planning for Environmental Disasters [EMGT2350]
- Disaster Health [EMGT2454]

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Program:

Environmental Change and Governance Group

Theme: ECGG undertakes collaborative, methodologically creative and applied research to overcome the disconnect between nature and people, and foster governance strategies for conditions of rapid change and uncertainty.

Description: Adaptive co-management and governance; adaptation and vulnerability; social-ecological systems; knowledge co-production and social learning

Contact: Derek Armitage, PhD
email: derek.armitage@uwaterloo.ca

Contact: Pradeep Nayak, PhD
email: pnayak@uwaterloo.ca

Link: <http://ecgg.uwaterloo.ca/>

University of Western Ontario

Program:

Institute for Catastrophic Loss Reduction

Theme: Multi-disciplinary disaster prevention research and communications

Description: ICLR established by Canada's property and casualty insurance industry as an independent, not-for-profit research institute affiliated with the UWO.

Contact: Paul Kovacs, Executive Director
email: pkovacs@iclr.org

Link: <http://www.iclr.org>

ICLR; Environment Canada; Adaptation to Climate Change Team

Program:

Coastal Cities at Risk

Description: Developing the knowledge base and enhance the capacity of mega-cities to successfully adapt to and cope with risks posed by the effects of climate change, including sea level rise, in the context of urban growth and development

Findings: developing new integrated knowledge on climate change adaptation and disaster risk reduction strategies, including health and socio-economic implications; developing integrated interdisciplinary simulation models; transferring knowledge and capacity intern

Timeline, funding: 2011-2016

Contact: Anond Snidvongs; Gordon McBean
email: iriacc@idrc.ca

Link: <http://coastalcitiesatrisk.org>



Wilfrid Laurier University

Program:

Geography and Contemporary Studies

Theme: risk and resilience issues in rural communities using transdisciplinary, community-based research approaches

Contact: Dr. Brenda Murphy
email: bmurphy@wlu.ca

Emerging Resilience Researchers

Memorial University

Program:

Navigating Disruption: Mobile society and
 Hurricanes Juan and Igor

Theme: The purpose of this doctoral research is to contribute to an understanding of how severe weather events impact transport networks, simultaneously acknowledging the role the transport sector plays in exacerbating climate change.

Description: Through a qualitative comparative case study approach, I examine the interface of social-ecological flows. minimizing market disruption to critically questioning societal reliance on carbon intensive transport; change, adaptation, and transformation; science and public policy; social justice, development, and health.

Findings:

- a summary of transport measures aligned with the phases of the disaster cycle;
- a reorientation of transport resilience from -the development of original theoretical contributions (i.e. mobility webs, charismatic (im)mobility, ecopolitics of mobility, climate routing) that incorporate the role ecological flows play in transport flows and larger societal resilience/vulnerability

Timeline, funding: 2014-2016 SSHRC

Contact: Stephanie Sodero, Doctoral Candidate,
 Memorial University, *email:* sbs105@mun.ca

Link: <http://stephaniesodero.weebly.com>

University of Alberta

Program:

Flooding Discourse: Perceptions and Practices of
Flood Management in High River, Alberta

Theme: Understanding local-level responses to natural disasters, which are expected to intensify with global climate change, and of how these responses are facilitated or inhibited by social and political factors.

Description: Exploring perceptions and responses to the 2005 and 2013 floods in High River, Alberta through case study method, media analysis and interviews with decision-makers.

Timeline, funding: SSHRC

Contact: *Eva A. Bogdan (PhD Candidate), University of Alberta, email: ebogdan@ualberta.ca*

Link: <http://www.rees.ualberta.ca/Alumni/EvaBogdan.aspx>

Royal Roads University

Program:

Pre-Disaster Recovery Planning

Theme: This study conducted in rural Hope, BC, asked couples how they would build their community back following a disaster. Using a mixed-methods approach, male-female couples from Hope participated in semi-structured interviews exploring whether opinions on disaster recovery varied between men and women.

Description: PDRP is the pro-active process of anticipating future recovery issues, developing a scenario-based recovery plan, and building the capacity to improve recovery outcomes.

Findings: The answers provided by the women were not very distinct or divergent from their male partners. Nearly all the women who had children living in their household had envisioned what the long-term disaster recovery process would look like.

The majority of the research participants stressed the importance of the economic indicators that directly reflected the success of local businesses.

Contact: *Shaun Koopman*

email: shaunkoopman21@gmail.com phone: 604-615-9047

Project leads:

John Chapman and Lilia Yumagulova

We would like to thank Ernest MacGillivray, Stephanie Sodero, Anastasia Ovodova, Sarah Thompson, Shona van Zijll de Jong, Louis Conway, Shaun Koopman, Eva Bogdan among others for their contributions.

Become a CRHNet Member ...

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;
- (2) inform practitioners; and
- (3) reinforce the lessons of the past.

How do I benefit from becoming a Member in CRHNet?

- Discounted registration fee for the annual CRHNet
- Symposium and access to presentations
- Regular magazine with current disaster research topics
- Access to disaster case studies and reports
- Access to CRHNet members to exchange hazards knowledge

How can I join and support CRHNET?

It's easy! Just access the CRHNet website www.crhnet.ca and you will find the membership information to complete on line.

JOIN, AND HELP US
MAKE A SAFER CANADA
AS WELL AS A SAFER WORLD.

www.crhnet.ca



Low coastal topography at Qualicum Beach
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