Repurposing an e-newsletter as a crisis communications tool during the High River flood

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Submitted to Dr. Thomas Barker

October, 2014

Table of Contents

Introduction

This paper explores a municipal government's use of a pre-existing communication channel during a flood to determine whether it the public's perception of the reliability and accuracy of information coming from the municipal government during the emergency and to what degree repurposing existing official communication channels is effective in reaching affected citizens. It is hypothesized that forms of communication considered trustworthy and credible prior to a crisis will continue to be accepted as reliable sources of information by individuals during and after the crisis occurs. In the 2013 High River flood, the municipality repurposed a pre-existing e-newsletter, called the *Town Crier,* as a communication channel to reach affected citizens.

Typically private sector companies use e-newsletters as marketing tools and public agencies, such as the Town of High River, use it to share information about municipal government activities, programs and initiative. The *Town Crier* had been one of the main communication tools for the municipality for several years prior to the flood, both as a printed insert in the local paper and as an e-newsletter that was emailed to a subscription list through an online marketing company, Constant Contact. During the flood, the Town's communications staff repurposed it so that updates on the response were being emailed several times a day in the first 48 hours and daily for the four weeks. Prior to the emergency, public opinion about the accuracy and trustworthiness of the *Town Crier* had been high. It had even been a topic in the mayoral debate in the 2012 election campaign where candidates debated the need to increase the size and capacity of the publication.

This provides an ideal opportunity to use the *Town Crier* as a case study that examines whether pre-existing trust in official communication methods can assist municipalities in crisis communication efforts. To what degree did subscribers perceive the repurposed *Town Crier* to be

a trustworthy and credible source of information during the event compared to other sources of information, such as media reports or citizen-generated Facebook pages? Was the *Town Crier* a valuable information tool for officials to reach impacted residents?

A second consideration of this research is to determine the determining factors in individuals' decisions to adopt particular communication channels during a crisis. How do they select which information networks to access? With social media platforms such as Twitter, Facebook, YouTube and Flickr becoming ubiquitous, official agencies must compete with a plethora of unofficial communication methods created during a crisis. The choices can be overwhelming for affected citizens.

Examining how people select their sources during a crisis can help official agencies implement strategies to increase the adoption rate of their risk communication methods. In the case of the High River flood, it is possible to compare the subscription rates of the *Town Crier* before, during and after the disaster because this communication channel had been available as a regular e-newsletter for more than two years prior to the flood. Utilizing Diffusion of Innovation as the theoretical basis for examining the subscription rate of the re-purposed newsletter, this research will explore how it was diffused through the population as an information tool during the emergency.

The first part of this paper will review the events of the High River Flood, with specific emphasis on the communication efforts and challenges experienced by communications staff working in the Emergency Operations Centre (EOC). The next section will review the research on the relationship between trust and credibility and the communication methods affected populations use in a crisis. As well, Everett Roger's theory of Diffusion of Innovation will be examined with a particular emphasis on the adoption of information technologies and the rapid

diffusion of information that occurs in a crisis. The methodology used for the current research will be provided and the results from a survey that was distributed to all *Town Crier* e-newsletter subscribers will be reviewed. A discussion of the results, recommendations for future crisis communication efforts and suggestions for future research will conclude the paper.

By evaluating the effectiveness of using the *Town Crier* during the flood, it may be possible to determine whether repurposing existing communication tools during a crisis will help responding organizations and government agencies maintain the public's trust in the information provided from official sources and increase the rate at which the public adopts (supports) them.

Challenges of crisis communication in a networked world

When an environmental crisis or disaster occurs, effective communication becomes essential in order to manage and respond to the unfolding event. Those impacted by a disaster require current, accurate updates in a rapidly changing situation so that they are able to respond appropriately (Dynes, 2006; Maxwell, 2003; Mileti & Beck, 1975). The degree to which information is shared about an event can directly impact how successful the response will be.

Case studies of crisis events has demonstrated that impacted populations have a variety of preferred methods of communication to meet diverse needs so responding government organizations need to access multiple synchronous and asynchronous communication methods in order to reach the largest number of people (Kapucu, 2006; Maxwell, 2003; Palttala, Boano, Ragnhild, & Vos, 2012). During a crisis people use these communication methods to fulfill three motivations: information seeking, emotional venting/support and uncertainty reduction (Garnett & Kouzmin, 2007; Procopio & Procopio, 2007). Information shared through social networks plays an essential role in helping residents self-organize and help each other respond to an emergency (Jaegar et al., 2007). Social networks can be defined as the social relationships

and networks between the members of a community (Dynes, 2006) and much crisis research has highlighted the importance of the communication flow within social networks in helping individuals make sense of the disaster, assess the level of risk and determine what actions, if any, they will take in response to the event (Dynes, 2006; Jaegar et al., 2007; Procopio & Procopio, 2007).

The accessibility of peer-to-peer online networks offers great opportunities for governments and responding agencies to quickly share information with the public in emergent situations. Studies have demonstrated how tools such as Twitter, Facebook and SMS have been used effectively for distributing information to those impacted by a disaster or crisis (Palen, Vieweg, Liu, & Hughes, 2009; Stephens, Barrett, & Mahometa, 2013; Sutton, Palen, & Shklovski, 2008). "Organizations need to communicate with their stakeholders, and if they can harness the perpetual contact facilitated by personal communication technologies during an emergency, it could save lives" (Stephens et al., 2013 p. 246).

However, as these peer-to-peer forms of communication have become ubiquitous, the ability for citizen-based sources of information to become part of disaster communication has also increased, sometimes superseding the efforts of official information sources. In a world where anyone, anywhere, anytime can create a platform to share information about a crisis, it is becoming more difficult for official agencies to be heard above the din of competing sources. As one individual in High River wrote:

> It was very cumbersome having to go to the Town website, the MLA's website, Twitter, etc. to try and find information that we wanted as we had a lot going on as residents, and didn't have the time and patience to comb through disparate sources of information to get all the info we needed.

With the number of communication choices available to citizens during a crisis, the sources they choose to believe and adopt can have a significant impact on their response. How then do official agencies ensure that their messages continue to be perceived as trustworthy and accurate and are selected as the preferred information source for the affected population? To a great degree success relies on the level of trust and social capital that exist between members of the community and government. Research has shown that social trust and the resulting social capital within a community influences which information networks individuals select to gain insight about a crisis. Maxwell's research (2003) has demonstrated how social networks outside an organization can become key sources of information and both Dynes (2006) and Maxwell (2003) have reported the importance of social networks in helping individuals determine levels of risk and make decisions about how they will respond to an emergency event. Social networks serve as "pathways for communication, sense making and value determination, influencing individuals' understanding and the decisions that they make" (Maxwell, 2003 p. 239). Belief in the veracity of an information source is linked to the social trust within these networks.(Jaegar et al., 2007)et al have reported that trust in the sources of information will impact the level of participation and action taken by those who are impacted and if there is a lack of trust in the "sources of information among various social networks, the information may be ignored no matter how critical it is" (Jaegar et al., 2007 p. 595).

Palen et al (2009) found that the public increasingly relies on peer-distributed information during a crisis, finding it to be more timely and accurate than that coming from official sources. In their research of the 2007 California wildfires Sutton, Palen and Shklovski (2008) found that members of the public leveraged their own social networks to provide information outside the official response effort. Unofficial websites, which had pre-existing audiences, were considered

vital sources of information during the wildfires. In the Virginia Tech shooting crisis, individuals accessed both official and personal networks to gain information, a process that is becoming more common during emergencies. As with both the California wildfires and the Virginia Tech shooting, the information provided by witnesses and those "on the ground" supplemented the information that was being provided through official methods (Palen et al., 2009; Sutton et al., 2008).

However, Haynes et al (2008) have noted that these unofficial messages may also "undermine or deflect official communications, which can propagate opposing views, confusion and distrust in authorities" (Haynes, Barclay, & Pidgeon, 2008 p. 618). The sheer volume of information being created during crisis and disaster events means that officials often find themselves in a competitive situation to gain the attention of impacted citizens. Internet users actively select which sites to visit, what information they read and which applications they will use (Lev-On, 2012).

While several studies have criticized official sources as being slow to provide updates and lacking complete information, (Palen et al., 2009; Sutton et al., 2008) there has been little research on how governments can retain citizens' confidence and ensure that official messages are being positively received by those who are impacted. As Stephens et al (2013) have noted, when the volume of messages is multiplied, some based purely on rumour and/or hysteria, it can become very difficult for individuals to identify useful information in a timely manner (Stephens et al., 2013). General perceptions of risk can also be impacted when unsubstantiated information or rumours are shared among a group. "Shared perspectives are created through communication whether that communication consists of "objective/accurate" information or rumour sharing"

(Holladay & Coombs, 2013 p 452). Therefore, it is very important that official communication methods be one of the sources that citizens select to receive updates about a crisis event.

Peer-to-peer communication methods have increased the pressure on government responders to become more transparent and rapid in their communication strategies since the increase of this new disaster peer-to-peer communication is growing as a means for "supporting additional, often critical and accurate dissemination of information" (Sutton et al., 2008 p. 2). Official agencies need to not only provide the facts, they also need to be able to interpret the situation and explain the consequences to the public (Palttala et al., 2012). This is especially true when trust in these unofficial sources erodes belief in official messages. One of the challenges is the top-down structure inherent in government agencies, where any information must travel through an approval process before it can be released. Governments' use of standard forms of communication gathering and dissemination during a crisis does not function well in the dynamic situations created by the event and can result in inadequate and incomplete information, leading citizens to broaden their search for other sources (Maxwell, 2003; Mileti & Beck, 1975; Palttala et al., 2012). "Extreme events require flexible patterns of communication and coordination; rigid bureaucracies hinder that development of response operations" (Kapucu, 2006 p. 214). Often this delay is filled by unofficial sources who are not constrained by bureaucratic processes. Holloday and Coombs (2013) have found that any information, even if it is unsubstantiated, may be accepted by the public as a way of gaining a sense of control over an uncertain situation.

Another challenge to reaching impacted citizens is the likelihood that many of them have been displaced for extended periods of time due to the disaster. This was the situation in both New Orleans and High River where the entire population was affected and dispersed over a large

geographic area. In High River the entire town was evacuated and residents were blocked from returning to their homes for several days and even weeks. The ability to reach affected citizens when they are dispersed over a wide geographic area increases the challenge for official agencies to share essential information, increasing the potential for citizen-based networks to fill the void.

With the rapid response that these unofficial sources can provide, the public's expectation for a continual flow of information will continue to increase. Future emergency management institutions will be "operating in a world where activity by members of the public generates information on a far more expanded, rapid scale with information production activity happening at even greater magnitudes than what such disruptive events already trigger" (Palen et al., 2009 p. 477). These multiple unofficial platforms can post information that may or may not conflict with official messages and provide venues for extreme views and criticism of the emergency response, potentially aggravating the situation. Official agencies, such as municipal governments, need to adapt their communication processes so that information can be shared rapidly with impacted citizens in ways that are easily accessible and familiar to them.

During the 2013 High River flood, the municipal government communicators experienced many of the communication challenges described in previous research, including the proliferation of unofficial sources of information which challenged that coming from the Town. In an effort to ensure accurate information was being read by affected residents, the Town undertook innovative communication methods to provide official updates on the response to the disaster. One of these strategies was to repurpose the pre-existing e-newsletter, the *Town Crier* into an information bulletin. This newsletter had been especially well-received prior to the flood and had a reputation of providing accurate information. High River's experience in using this

municipal communication tool during the flood provides insight into how official messages can be disseminated and received positively by key audiences in a crisis.

The High River flood June 20 – July 30, 2013

On June 20, 2013 southern Alberta experienced one of the worst flash floods in Canadian history caused by a massive, slow-moving weather system, which generated more than 300 mm of rainfall within 48 hours (Alberta Environment and Sustainable Resource Development, 2013). Although many communities suffered significant damage, the Town of High River was the most severely impacted, with flood waters reaching more than 59% of the town and 70% of all town structures directly impacted by the high water and two fatalities occurring as a direct result.

Approximately 13,400 people from 5,400 homes and 6,300 structures were evacuated (Town of High River, 2014). The first evacuees were not allowed back into the community until eight days after the flood and some areas of town remained inaccessible for several weeks. On June 27 a Provincial State of Emergency was issued for the town, the first time in Canadian history that this had occurred and even after it was lifted on July 11, a State of Local Emergency remained in effect until September. The response to the flood included the Town of High River, the Government of Alberta, the Canadian Forces, RMP, non-government organizations (NGOs), community organizations, businesses, faith organizations, contractors and thousands of volunteers.

Due to the extensive duration of the event, this paper will focus primarily on the initial response phase, which began June 20 – July 30 when the all areas of town were once again open and the recovery phase had begun. However, it is important to note that residents and town officials continued to experience challenges and concerns months after the flood waters receded. It will take years for the town to rebuild infrastructure and complete mitigation efforts.

During the first 48 hours of the disaster, the Town's two-person communications department was responsible for broadcasting official updates to the public. As the Information Officer for the EOC, the researcher was directly involved in disseminating information and emergency updates through all the Town's official communication methods, as well as sending out emergency alerts through the Government of Alberta's Emergency Alert system. The list of communication methods that were used at various times throughout the response period (June 20-July30) included the Town's official website, email directly to the DJ booths at local radio stations, as well as to the general email addresses at local television and national media outlets, Twitter, Facebook, the online *Town Crier* that was repurposed into an information bulletin, personal appearances by the mayor to evacuation centres, daily radio updates by the mayor, public information sessions and press conferences.

When the researcher was originally called into the Emergency Operations Centre (EOC) at 5:30 a.m. June 20, she contacted the second communications staff member and instructed him to remain at home in Calgary. This turned out to be an extremely important decision as communication from the EOC was severely impacted due to a number of issues caused by the flood including the failure of all communication systems, the displacement of the entire population to several evacuation centres and the relocation of the EOC several times during the day of the flood. These are similar challenges experienced in New Orleans during Hurricane Katrina. Both New Orleans and High River experienced extended power outages, the displacement of the population and limited access to electronic methods of communication for an extended period of time (Vanderford, Nastoff, Telfer, & Bonzo, 2007).

High River also experienced the evacuation and relocation of the EOC several times during the first 24 hours of the disaster. At 10:17 a.m. on June 20, the evacuation of the first EOC,

located at the municipal office, occurred. The EOC was re-established in the Fire Hall at the eastern edge of High River but staff were again required to evacuate a second time and set up a third EOC in a neighbouring community when flood waters threatened the fire hall. Due to miscommunication between the Chief Administrative Officer and the Director of Emergency Management, the EOC staff became separated for several hours at this time when several members, including the Information Officer, were redirected to a different site. In total, the researcher moved to four locations over the course of the day, which severely hindered the level of information that could be provided to the public.

As well, the service provider the Town used for internet, cell phones and land lines failed, which resulted in the temporary loss of all communication, essentially cutting off the community from external contact. From 3 p.m. June 20 to 3:30 p.m. June 22 only a single cellular service provider was still functioning and this was not the one used by the municipality. The Town's website crashed, due to the heavy traffic flow, within the first three hours of the flood and continued to experience instability over the next few days. The Town's central servers also went offline for several weeks, which cut access to the municipal email accounts and all municipal information. Because one communications staff member had remained outside High River, the Town was able to continue posting on its Facebook and Twitter accounts. Updates were dictated from the Information Officer at the EOC to the staff member in Calgary over borrowed cell phones from June 20-21.

Failure of communication technologies during environmental emergencies is common. Case studies of other disaster situations have reported limited capacity or inoperative technology that has challenged communication efforts (Procopio & Procopio, 2007; Vanderford et al., 2007). After Hurricane Katrina, for example, much of the New Orleans population was evacuated and

had limited access to internet while cell phones and telephone lines were either not functioning or over capacity (Vanderford et al., 2007). Local media had also been impacted and were not able to provide updates. These are the same challenges faced in High River. Repeatedly in emergency situations, responding agencies are faced with the almost insurmountable task of reaching a population that has been widely dispersed due to the disaster while both responders and impacted citizens may have limited or no access to communication technologies.

In the case of the High River flood, the Town was able to continue using its established social media channels including Twitter, Facebook and the subscription based e-newsletter *Town Crier*, because a member of the communications team remained outside the affected area. Normally the *Town Crier* is a bi-weekly publication that is available both as a flyer inserted into the local paper and online through an email subscription. Individuals can subscribe through a link posted on the Town's website and all archived issues are available on the website. The schedule for emailing the e-newsletter had been coordinated to occur every second Tuesday, the same day as the insert was delivered in the High River Times, the local weekly newspaper.

During the flood, the newspaper outlet was flooded and no issues were distributed for several weeks. Even after the paper began printing again, distribution was limited as many of the residents were not able to move back into their homes for several weeks or even months after the disaster. In the first hours of the flood the e-newsletter version of the *Town Crier* was repurposed to create an information bulletin and continued to be used in this capacity for several weeks.

Between 10 a.m. – 10:30 p.m. on June 20, five information bulletins were published to the email list, which consisted of 360 subscribers. A link to the e-newsletter was also posted on the Town's website and on its Facebook and Twitter feeds. Because of the complete failure of all communication technology, the Alberta Radio Emergency Service (ARES) was called in to set

up radio connections between the two official evacuation centres and the EOC. The Information Officer used this link to dictate updates to the managers of each centre after every EOC briefing, which they shared with residents in the centres. This information was also dictated to the communications staff located in Calgary to post on the social media channels and distribute through the *Town Crier*. Because only one cellular service provider – Rogers - was still functioning, it was necessary for the Information Officer to borrow phones from anyone who used this network. Because no members of the EOC used Rogers, the researcher's ability to relay updates to the other staff member at home in a timely basis was severely restricted and a great deal of time was spent searching for a working telephone.

With no telecommunications, internet access or email in the EOC, it was necessary to arrange updates to the media through off-site staff. Times and locations were organized at the EOC and then relayed to the outside staff member to email to media outlets and post on Twitter. As many media outlets were already in High River, they were experiencing similar challenges with the lack of telecommunication technology and so it was sometimes difficult to alert them to media availabilities being organized by the EOC. Within 48 hours, cell service and the internet had been restored, although both remained inconsistent for several more days.

Due to the extent of the damage, which included the failure of the town's sewage system and limited potable water, as well as dangerous road conditions, access to the town was restricted to emergency personnel. RCMP guarded all entrances to the town so the public and media had no access. This remained in effect for the next 10 days before a staged re-entry was organized. During this time, the Alberta Emergency Management Agency (AEMA), an arm of the provincial government, stepped in to assist High River respond to the disaster. This included bringing in external communication personnel who assumed the leadership position in

communications. Between June 21-25 communication efforts focused on media interviews and personal visits by the mayor to all evacuation centres.

Official evacuation centres had been established in Nanton and Blackie, two neighbouring communities. However, two additional communities (Vulcan and Okotoks) established impromptu evacuation centres due to the large influx of displaced residents from High River. In total the mayor visited all four locations at least twice within the first three days of the event. Key messages created for him were also distributed to residents and posted on the website and through social media channels. He also taped a daily message on the local radio station, which was aired seven times per day with a link posted on the Town's website. During this time the number of page views on the website increased from an average of 1,200 per day prior to the flood to 8,700 on June 21, peaking at 22,400 on June 24. However, no information bulletins were posted through the *Town Crier* e-newsletter from June 21-26. This resumed only after the first provincial communications team was replaced. The four-person provincial communications team was replaced every five days from June 21 – July 11, when the Provincial State of Emergency was lifted. During the State of Provincial Emergency, the Town communications staff continued to work with these external teams to disseminate information to the public through the Town's official online channels, including the *Town Crier*.

At the same time a number of unofficial social media platforms were created by members of the community. A Facebook page called High River Flood Support was particularly popular, gathering more than 15,000 likes within the first few days of launching. Many residents considered it a valuable source of information on what was happening in High River although the administrator was an evacuated community member and did not have access to information from within the town. As well, the leader of the provincial opposition party was also the MLA

for High River and began to hold unofficial town hall meetings that included information critical of the provincial response to the flood. Research has shown that political motivations often interfere with the information being provided by official responders ((Haynes et al., 2008).

This increase in the number of non-official or "back channel" forms of communication during a crisis is becoming a normal response to disasters. Research has found that these alternative information sources can sometimes provide accurate and more comprehensive updates than what is available on official sites (Sutton et al., 2008). However, they can also create challenges for official organizations when the information is not complete. Ensuring that impacted citizens receive correct, accurate information quickly can be a life and death situation during a disaster. Researchers have identified that credibility and trust are essential indicators in the public's willingness to accept and act on information (Schultz, Utz, & Goritz, 2011; Sherchan, Nepal, & Paris, 2013).

During the High River disaster, the level of credibility and trust that residents felt towards the Town's official information was tested by these unofficial sources. The challenges created by technology failures, repeated relocations of the EOC and the wide dispersal of residents in areas with limited access to internet, television or radio, severely hampered the Town's ability to inform citizens about the unfolding event, which impacted the public's perception of how well official sources responded to it. As well, the bureaucratic nature of the official response sometimes delayed the release of information.

When the provincial government took control of communication in the EOC, messages were being sent to Edmonton for approval before being shared with the public, which significantly slowed the process. As Garnett et al. (2007) have reported, when there are numerous organizational actors in multiple organizational sets or networks, the probability of information

slippage or blockage increases. The approval process for releasing official reports can't compete with the speed with which eye-witnesses or members of the general public can post as unofficial updates on social media sites. One respondent to the survey for this research paper wrote that "It took forever to get any info – most of the time the unofficial Facebook pages were updated quicker than the official pages."

As well, the level of credibility that individuals have in the information source will impact how they respond to the crisis. Holliday and Coombs (2013) have found that when target audiences think there has been no response to the crisis then perceptually there is no response, which can lead to a loss of confidence in the organization. In High River, many residents reported that their level of trust in information from the municipality decreased due to a perceived lack of communication or slowness in updating it. However, pre-existing levels of trust and credibility can positively impact how the public responds to official messages during a crisis. Boyd (2003) found that in situations where trust is strong, it can withstand occasional violations. Therefore, the level of credibility that a public agency maintains with affected citizens could impact the degree to which they will be willing to wait for official messages during a crisis.

The role of trust and credibility in crisis information

Research has confirmed that credibility and trustworthiness are essential elements in individuals' perceptions and judgements about information they receive (Boyd, 2003; Dynes, 2006; Haynes et al., 2008; Mileti & Beck, 1975). Therefore, the degree of trust and credibility citizens have for an organization is an essential component in how they perceive the organization's response to a crisis event and the level of belief they have in the information

provided by that organization, which, in turn, will influence how they respond to the event. (Renn & Levine, 1991).

According to Boyd (2003) the existence of trust enables cooperation in uncertain situations. Trust in the sources of information and the degree to which members of the community believe in the credibility of the message will impact the level of participation and the types of actions residents will take in response to a disaster. (Holladay & Coombs, 2013; Jaegar et al., 2007; Liu, Austin, & Jin, 2011). "Credibility is a fundamental persuasive attribute of crisis communication" (Reynolds & Seeger, 2005 p. 47). If the source of information is not trusted then the information "may be ignored no matter how critical it is" (Jaegar et al., 2007 p. 595). Therefore, trust, and social capital that generates trust, become important factors in order for an organization to achieve successful crisis communications.

Trust is not a generalized concept but varies depending on the type of relationship. For example, the degree and type of trust between close connections within family or friendship networks differs from that experienced with official agencies or within commercial transactions. Trust is context specific. For the purposes of this study, it is important to define the type of trust that exists between municipal government and constituents. Sherchan et al (2013) have described this form of trust as a "measure of confidence that an entity or entities will behave in an expected manner" (Sherchan et al., 2013 p. 47:2). Boyd (2003) describes this as transactional trust which exists between two agents when one has confidence in the reliability and integrity of the other (Boyd, 2003). Renn and Levine (1991) found that all definitions of trust emphasize the importance of information being reliable and that those receiving the information believe it to be complete and accurate. They proposed the following definition (Renn & Levine, 1991):

> Trust in communication refers to the generalized expectancy that a message received is true and reliable and that the communicator demonstrates competence

> and honesty by conveying accurate, objective and complete information" (Renn & Levine, 1991p. 179).

This provides a standard for assessing the level of trust citizens had in the official messages they received during the High River flood and how this may have impacted which information sources they chose to believe. It is also important to note that all the definitions of trust maintain that trust cannot be gained instantly. It develops over time and is the result of repeated interactions and past experiences (Boyd, 2003; Haynes et al., 2008).

Credibility is the result of trust and, like trust, is something that is gained over the long-term, based on previous experiences that have demonstrated the source is competent and consistent in its communication (Renn & Levine, 1991 p. 180). Stephens et al. (2013) have found that stakeholders will feel less skeptical about an organization's messages if the organization has a strong reputation. Conversely, Palttala et al (2012) found that inconsistency in the information being provided from different responding agencies during a crisis increased uncertainty among citizens (Palttala et al., 2012) which can result in official messages being ignored in favour of sources that are considered more trustworthy, regardless of whether the information is accurate. According to Renn and Levine "institutional performance and image color the acceptance and evaluation of a message and influence the reception of the communicator by the targeted audience" (Renn & Levine, 1991 p. 181).

In terms of crisis communication, pre-existing impressions that citizens have about the responding organization will influence the degree to which they believe and respond to information from that source. A lack of faith in the responding agency is one of the motivations for citizens to seek communication elsewhere (Dynes, 2006; Kapucu, 2006; Maxwell, 2003; Sutton et al., 2008). An organization's reputation is developed over time and can be influenced by second-hand information citizens receive about it (Schultz et al., 2011). In an emergency

situation, this second–hand information, often posted through peer-to-peer networks, can supersede official responses if the government does not have a strong reputation prior to the event.

In the High River situation, an unofficial Facebook page, called High River Flood Support, gathered thousands of followers in a very short timeframe. Many of those posting were extremely unhappy with the situation in High River, specifically being denied access to return to the community. Individuals with extreme views used this unofficial communication channel as a platform to criticize the official response to the disaster and the level of social capital within this network may have influenced the general perception of the Town's response to the crisis. Renn and Levine have identified five elements necessary for trust: perceived competence in the source of the message, degree of objectivity, fairness in relaying all the relevant points; consistency in the messages over time and the level of "good will" in composing the message (p. 180). They argue that all five elements are necessary in order for trust to occur, although they do not all to have to be present in the same degree. During a crisis, it would serve official agencies well to consider these attributes in their communication efforts with citizens.

In comparing the High River Flood Support page to the Town's Facebook page, citizens indicated a higher degree of belief in the accuracy of the information being provided on the official source, although the number of followers was significantly lower on the Town's page. This is also true of the Town Crier, which maintained a high level of belief by citizens in its accuracy throughout the event. "In times of disaster and crisis, people tend to gravitate toward the systems and networks that are most relevant and familiar to them. (Potts, 2014 p.11). Dynes (2006) recommends expanding the use of existing communication methods as an effective means of reaching citizens. Therefore, it is possible for existing sources of information used by official

agencies to maintain citizens' trust during a crisis, as demonstrated in survey results from High River residents. An additional challenge for official agencies, such as High River, is to increase the adoption rate of official communication sources so that a significant proportion of the population are receiving accurate updates and information.

Adoption of innovations in technology during a crisis

Research has shown that individuals will seek a diversity of communication methods to meet their information needs during a crisis and will access their own social networks to find and share information outside the official response (Maxwell, 2003; Palen et al., 2009; Stephens et al., 2013; Sutton et al., 2008). Increasingly individuals are using social media in their search for information during a crisis, to answer their questions and gain an understanding of what is happening. "People will use information from any number of sources to satisfy their needs and inform their actions in the face of disaster" (Sutton et al., 2008 p. 7). This quest for information results in the creation of new peer-to-peer communication channels, whose adoption rate often outdistances that of official sources.

Through several case studies of disasters, (Potts, 2014) has demonstrated how, during a crisis, users have become partners in the co-creation of online communication tools and the social networks within them. This is an example of an interactive communication innovation where future adopters influence and benefit earlier adopters in a reciprocal interdependence (Rogers, 2003). Two elements of this type of innovation are relevant in examining the adoption of communication channels during a crisis: the concept of network externalities and critical mass. Rogers (2003) defines network externalities as the increased value that goods and services attain as the number of users increases. When there are enough users that there is a perception that the service is used by everyone, the rate of adoption speeds up and critical mass occurs, at

which point the process becomes self-sustaining (Rogers, 2003). In a crisis, the adoption rate of communication channels is extremely rapid as individuals seek sources of information to make sense of the situation, and critical mass can be reached almost instantaneously as individuals share their choices with their social networks.

This can be seen in the High River situation, where several Facebook pages were created by citizens in response to the event. As the number of followers increased on these pages, the amount of information that could be shared increased, which benefited both the early adopters as well as those who joined later on. One particular citizen-generated Facebook page called High River Flood Support gained more than 15,000 followers within 24 hours. However, the large number of communication sources created during a crisis can also lead to citizens feeling overwhelmed by the volume of information and frustrated in trying to determine which is accurate. This multiplication of messages, some based on hysteria and rumour can increase the difficulty in identifying useful information in a timely manner (Stephens et al 2013). One respondent to the High River survey reported that the information

> "wasn't timely and you weren't able to get consolidated info from all the sources in any one place. That is why the HR Flood Support Facebook page was more successful. Someone was taking the time to pull info from a variety of sources and present them in one place."

The decisions about which communication channels individuals will use to gain information in a crisis are based on a number of factors including the level of trust in the information source, and connections within their social networks. In their study of New Orleans after Hurricane Katrina, Procopio & Procopio (2007) also found that the desire to maintain a geographic connection influenced the selection of communication channels that individuals used to get information and share emotional support (Procopio & Procopio, 2007). The High River and New Orleans crises are similar in that the majority of the population was affected by the disaster,

having to evacuate from the community for a long period of time. In Procopio & Procopio's study users reported that hometown news outlets, geographically connected internet sites and email were the preferred sources of information and that the internet was used to "activate both strong and weak ties" (Procopio & Procopio, 2007 p. 77). Social capital and ties between groups plays an important role in an individual's decision whether to adopt an innovation. When opinion leaders or those with influence in the community adopt some form of innovation, it is more likely that others will do so as well.

In examining the High River situation, the administrator/creator of the High River Flood Support page was the wife of a well-known doctor in town, which may have impacted the level of trust and credibility residents felt in the information that was being posted and could explain why the page gained critical mass so quickly. In determining which communication methods will be the most successful in a crisis, municipalities need to examine how, why and when individuals adopt different information technologies to meet their needs. Rogers (2003) has found that in selecting which innovations to adopt, individuals tend to expose themselves to ideas that are in accordance with their interests, needs and existing attitudes (Rogers, 2003p. 164). It isn't until an individual perceives that an innovation is personally worthwhile that he/she will decide to use it. In a crisis, citizens will use systems with which they are familiar (Dynes, 2006) so having communication networks in place with which residents are comfortable, and consider accurate and trustworthy prior to an event will continue to be viewed as such during an emergency.

In community satisfaction surveys prior to the flood, residents had indicated they valued the information in the *Town Crier* and believed it was accurate. Citizens had also indicated that they felt the Town was being transparent and honest in the information posted in the newsletter. The

value of the newsletter was even a topic in the mayoral debate during the 2011 municipal election, where candidates expressed the need to increase the capacity and frequency of distribution. This demonstrates the degree to which residents displayed a personal connection to, and value in, the publication. This provides a baseline for determining if this pre-existing level of trust influenced how residents perceived the information posted in the *Town Crier* during the 2013 event and whether this affected its adoption rate.

Method

Though there were numerous communication tools used by the High River Communications department during the flood, this paper focuses specifically on a pre-existing newsletter, the *Town Crier*. The newsletter had originally been introduced as a printed insert in the local paper in 2009. It gained wide popularity and became one of the main information tools the Town used to communicate with constituents. In September 2011, an electronic version was introduced in the form of a subscription-based e-newsletter. The software platform the Town selected to create and distribute the newsletter was called Constant Contact. This is one of a variety of online marketing companies whose services are primarily used by private sector industries to build and maintain clientele. This researcher could find no studies that have explored its use as a crisis communication tool and the communication experts brought into High River by the provincial government during the flood had no experience with using an e-newsletter in this way. It provided a new area of research to explore the effectiveness of new types of online communication tools during crisis.

Constant Contact provides a database of all subscribers' email addresses and includes an analytic component, which makes it possible to examine the e-newsletter's rate of adoption and

what percentage of subscribers are actively engaged in reading it. The analytics report provides detailed information about each newsletter including the number of subscribers, the number and percentage of those people who opened the newsletter, the number and percentage who clicked on a link in the newsletter, as well as which linking URLs were accessed and by how many. These embedded analytic tools also provide information on the number and percentage of people who forwarded each email and how many chose to unsubscribe and when.

While these tools are designed to assist for-profit companies track the activities of customers, these same services can be used to gain insight into the rate at which the repurposed newsletter was adopted by the public, which news items were accessed, whether subscribers clicked on embedded links to additional resources and how often it was forwarded. Although it is free, users must complete a subscription process to receive it. It can therefore be assumed that subscribing to the *Town Crier* demonstrates that the individual has a degree of interest and belief in the information provided through the newsletter, just as "liking" a Facebook page can indicate support for the information posted on it. Since individuals can choose to unsubscribe, the rate at which people remain subscribers can also be considered an indicator of the degree of ongoing credibility and interest in the information. Since these analytics exist for every newsletter, it is possible to compare the rate of adoption before and after the flood.

Because the High River crisis extended for several months due to the extreme magnitude of the disaster, one of challenges was to determine a specific timeframe for examining the adoption of the newsletter. There are four stages to a disaster: pre-event, response, recovery, and mitigation. Using this as a basis to define the stages of the High River flood, the response phase began on June 20, when the initial flood occurred, to July 30 when all residents had been allowed back into the community and the flood waters in the Hampton Hills area of town had been

drained. At this point the town had moved into the recovery phase, which was still underway at the time this research was completed.

While these statics provide quantitative data about the rate of adoption, they do not provide insight into the motivation to subscribe and the way that the information in the newsletter was perceived. To some extent it can be assumed that individuals would not subscribe if they did not believe the information had some relevance or value to them. It can also be assumed that those who choose to unsubscribe may have experienced a loss of credibility or sense of value in the information being posted through the newsletter.

To provide a more qualitative analysis of the motivations and perceptions of subscribers, an online survey was developed using Survey Monkey and the link was emailed to all *Town Crier* e-newsletter subscribers, along with an explanation of the research. The email was sent to a total of 1,648 subscribers and remained open from April 13 – May 24. The questions on the survey sought to identify subscribers' motivations to receive the e-newsletter and their perceptions of the credibility of the information provided through it. Because any member of the public can choose to subscribe, there were a number of questions to identify those subscribers who were directly impacted by the flood, as well as anyone from the media and or external subscribers who may or may not have been impacted. To determine whether the level of perception in the accuracy and trustworthiness of information coming from the municipality varied depending on the degree that an individual was impacted, respondents were asked whether they were evacuated and how long before power was restored to their homes. When the flood occurred, the entire town experienced some degree of power failure. As the crisis extended over a long period of time, power was intentionally shut off by the utility company to protect the community from potential electrical fires. Once residents were allowed back to their homes they

needed to request that service be restored. Those people whose homes were most severely damaged would have waited the longest to have power restored. In this way it is possible to determine which subscribers suffered the greatest crisis from the flood.

During the crisis, the Town used a number of other communicate channels, including Facebook, Twitter, regular radio messages from the mayor, personal visits by the mayor to the evacuation centres, printed copies of the *Town Crier* delivered to homes (once residents were allowed to return to the community) and public information sessions. Unofficial sources included media, and citizen-generated internet platforms. Therefore, the survey included questions to determine the adoption rate and level of credibility for these alternate sources so they could be compared to the *Town Crier*. The survey also included a number of opened ended questions that were focused on obtaining information about participants' perceptions about the way the information was shared, why they selected particular communication methods and the level of credibility they felt towards all sources of information. These answers were grouped into specific categories based on relative similarities in the responses (this is explained in more detail in the results). In analyzing why people chose to subscribe the repurposed newsletter, Everett Roger's five attributes of innovations: Relative advantage, compatibility, trialability, observability, and complexity (Rogers, 2003).

Data from other surveys the Town had distributed at public information sessions were also reviewed to provide peripheral information about the public's perception of the *Town Crier*.

Peripheral data from other surveys

Public perception and the importance of the *Town Crier* as a municipal communication tool had been explored through other unofficial questionnaires provided at open houses during the recovery phase. Although there were several public information sessions held during the

response phase of the flood, the first formal information sessions during the recovery phase were held on October 28 and December 3-5, 2013. The focus of these sessions was to provide updates on the status of flood mitigation plans and projects, specifically dike construction. Printed questionnaires were handed to anyone who attended the sessions, with the purpose of identifying citizens' preferred methods for receiving updates and information on the recovery process. Participants were asked to complete the questionnaires on-site and drop them into boxes.

The questionnaire included questions on how individuals were receiving information about flood mitigation work, their preferred sources for obtaining information and which sources they considered the most useful to them personally. The questionnaire distributed at the earlier session in October included an additional question that specifically addressed which sources of information were considered the most, and least, trustworthy. This was not included in the questionnaire handed out in December.

The results from these informal surveys provided ancillary data to this research project since the public's perceptions of the *Town Crier* were recorded in the results of both surveys. During the October 28 session, 57 people completed the survey and in Dec 3-5 sessions 160 surveys were submitted. Not all questions were answered by respondents and it is not possible to determine whether the same individuals completed surveys for both the October and December sessions. The results are also not representative of the community demographic as the majority of those who completed both questionnaires were over 60 years of age: 89.8% in October and 58.1% in December. According to the 2011 Statistics Canada census, High River's total population was 12,920 of which 25.9% were over the age of 60 while the median age was reported as 41.8 years (Statistics Canada, Government of Canada, 2014).

The other important variable with these surveys is that they did not provide information on whether it was the printed or online version of the *Town Crier* the respondents used, although both versions have identical content. At the time of the two information sessions, the printed version of the *Town Crier* had resumed as an insert in the local newspaper. The frequency had increased from the twice monthly schedule, which had been in place prior to the flood, to a weekly delivery. Therefore many of the respondents may have been referring to the printed version rather than the online form of the newsletter.

Of the 57 people who completed the original questionnaire in October, 93.8% (48) indicated that they read every issue of the *Town Crier* and 82% (46) indicated that they preferred to have the information delivered through the *Town Crier*. The results from the December information sessions were slightly lower in response to the question: "Where do you typically look for information related to flood recovery, flood mitigation, facilities and support services etc.?" with 63.8% indicating the *Town Crier*; Newspapers (61.3%) and the Town's website (36.3%) were the other preferred choices. In response to a question that asked respondents which sources of information they considered to be most helpful to them personally, the *Town Crier* was chosen by 24% (8) of those in October and 43.9% (68) in December. The local newspaper was rated equally important in October and slightly higher at 51.6% in December. It is interesting to note that word of mouth was a source of information for 49.2% of respondents in October and 32.5% in the December survey.

This reflects the degree to which social connections within the community are valued as sources of information. The questionnaire in October also included a question that asked participants which information sources they considered the most trustworthy and those they considered the least; eight of the 29 people who answered this question indicated that word of

mouth was the least trustworthy and six people indicated that the *Town Crier* was the most trustworthy. While these results are not scientific, they do provide another indicator of the public's perception of trust and value that is placed in the information provided through the *Town Crier*.

Results

Demographic representation

There were 1,648 subscribers who received the link to the online survey for this research paper and 255 (15.4%) completed it. During the disaster, the number of subscribers increased by 391% from 368 on June 18 (the last issue emailed prior to the flood) to 1,459 by August 2, at which point the town had entered the recovery phase of the disaster residents and business owners had returned to the community. Because this was a self-selecting survey, it is important to determine whether those who completed it adequately represent the community's demographics.

The following table compares the demographics of respondents to the results of the 2011 Stats Canada Census for High River (the most recent data available). It is important to note that the town's demography may have changed since the flood. The disaster destroyed an assisted living facility for seniors and re-construction is not scheduled to be completed until 2016. As well, residents in the Wallaceville and Beechwood subdivisions were offered buy-outs by the provincial government so these areas can be restored to a natural state. The effect on the population due to these changes is unclear and, at the time of this research, a new census was underway to determine the current population and demographics of the community. The respondents in this survey primarily reflect the attitudes, impressions and opinions of older citizens.

The majority of those who responded to the survey represent the population over the age of 25 with a median age of 35-44. In the 2011 Canadian census the median age in High River was 41.8 years. In the survey, there were a higher percentage of women (58.5%) over men (41.5%) compared to the census, which reported that the town's population was almost equally split between men and women at 49.1% and 50.8% respectively. The opinions of residents between the ages of 18-34 are least represented in the survey results.

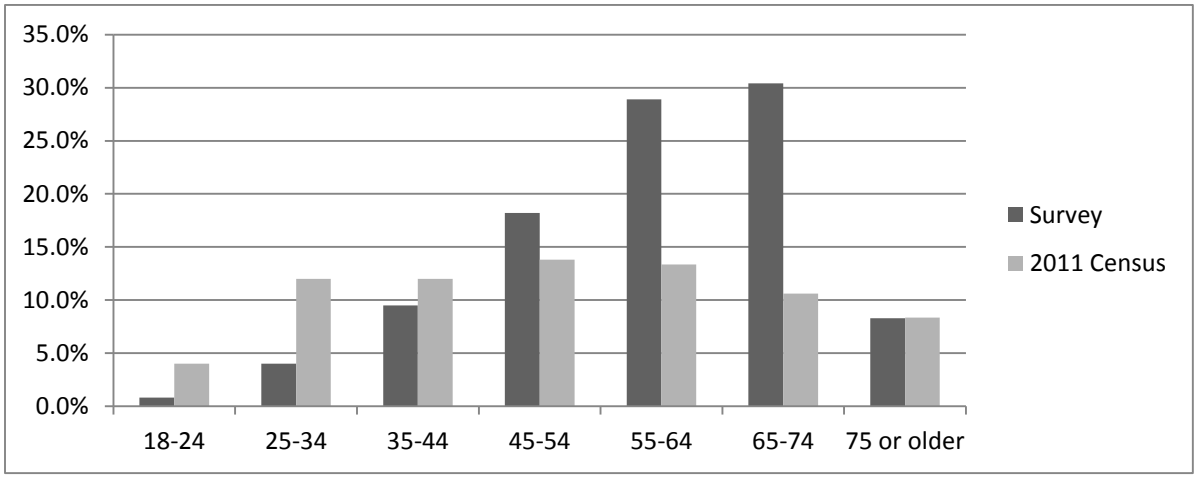

Figure 1: Comparison of survey demographics to 2011 Canada census for High River

The majority of respondents (55.9%) were evacuated from their homes for 1-2 weeks, while 20.5% indicated that they were evacuated for 3-4 weeks and 19.7% reported that they were out of their homes for more than four weeks; 26 chose not to answer. Because the event lasted for a protracted time period, (by August 2014, many residents were still not able to return to their homes due to the extent of the damage. Many businesses were also unable to re-open) this research focused primarily on the time period from June 20, 2013, when the initial flood occurred, to July 31, 2013 when residents in the hardest hit areas of town: Wallaceville, Sunshine and the Hamptons, were able to access their homes, although this did not mean they were habitable.

Adoption rate of repurposed e-newsletter

There were two innovations that occurred with the *Town Crier*. The first was in 2011, when it was introduced as an online/electronic version of the pre-existing printed newsletter. The print version of the *Town Crier* was distributed twice monthly as an insert in the local paper and when the online version was introduced, it was emailed concurrently. This provided residents with a choice in how they received the information. Typically e-newsletters are used as marketing tools for private sector companies. The Town of High River used its e-newsletter to increase public awareness about municipal initiatives, council decisions and construction projects, as well as a tool to market community programs and events. While the paper version was automatically distributed to all residences, the online version required individuals to subscribe through a link on the front page of the Town's website and the newsletter was sent as an email. Users could choose to unsubscribe at any time.

The Town marketed this innovation to the public through a banner ad in the printed newsletter and through posts on all social media platforms. However, subscription numbers remained low and the adoption rate was slow to increase. From September 2011 – June 18, 2013, subscriptions had only grown from 3 – 368. The second innovation occurred on June 20, the first day of the disaster, when the *Town Crier* was repurposed into an information tool and five bulletins were created and emailed on the same day. The following is the first information bulletin sent out on June 20 and illustrates how the newsletter appears in subscribers' email message boxes:

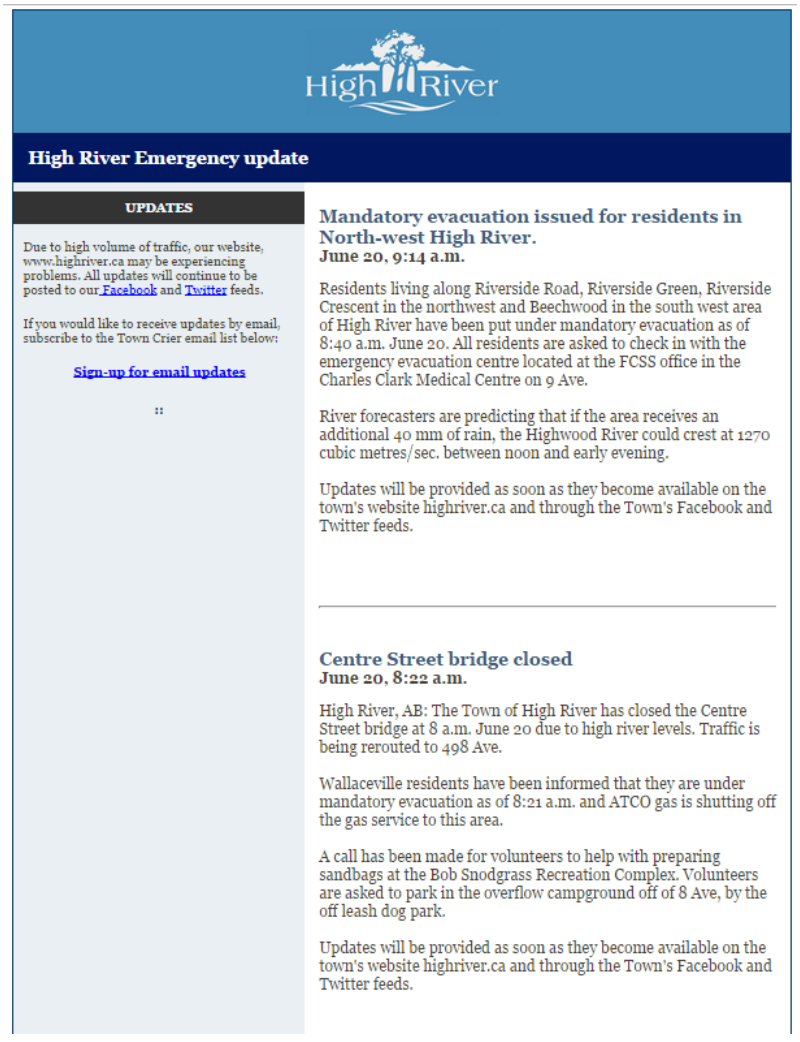

Figure 2: Repurposed e-newsletter sent out at 10:30 a.m. June 20.

Throughout the day the number of subscribers increased with each bulletin. By June 22, there were 507 subscribers. At this point the first provincial communication team had taken control of information coming from the Emergency Operations Centre (EOC) and no further bulletins were emailed until June 26 when the municipal communications staff were able to re-establish the use of the e-newsletter. Even without the daily updates the subscription rate from June 22 – 26 increased to 742. This trend continued throughout June and July, reaching a total of 1,459 subscribers by July 30. The following graph demonstrates the slow pace of adoption prior to the flood and the sharp increase from June 20-August 8, when the town had reached the recovery phase and the rate of new subscribers had slowed, although the number of subscriptions steadily increased in the year following the flood.

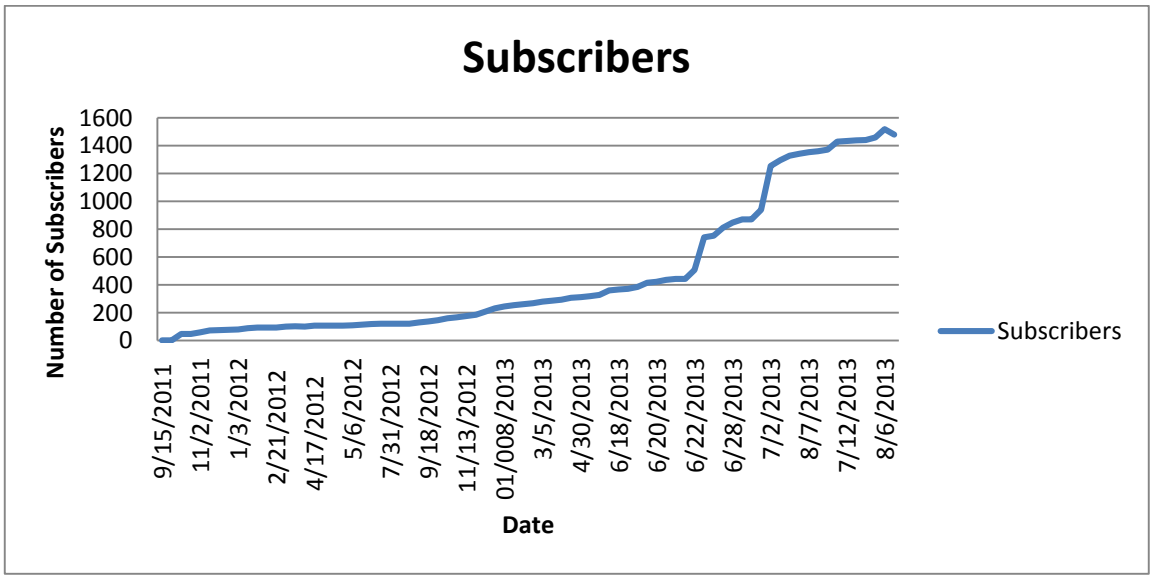

Figure 3: Rate of adoption of the e-newsletter

The subscription rate of the repurposed newsletter provides an opportunity to examine the diffusion of communication during a crisis. This rapid type of diffusion has become a specific study that focuses on "tracing the spread of spectacularly important news events" (Rogers, 2003)

Chapter 2 p. 10). The standard for studying this type of diffusion was established by Paul Deutschmann and Wayne Danielson who created a "firehouse research" design (Rogers, 2003) that provides a way to gather data very quickly. By planning a questionnaire in advance of significant events, training grad students as interviewers and being prepared ahead of time, they were able to contact sample audiences as the event unfolded and while the memory was fresh in people's minds. Through this method, they were able to track the extreme speed of this type of diffusion, which is completely different from the slow-paced adoption of technological innovations in agriculture, medicine and education. Their research highlighted the role of mass media in increasing the speed of diffusion as people shared what they heard on the news with their social groups and sought additional information to confirm the media accounts and obtain more details about the event (Rogers, 2003).

With the advent of embedded analytic tools in current software, such as Constant Contact, it is now possible to trace this rapid information and confirmation seeking behaviour in the adoption rates of the *Town Crier*. The following table demonstrates the accelerated subscription rate that occurred during the day of the flood:

Table 1: Subscription rates during the first day of the flood

Time of information bulletin (June 20)	Number of subscribers	Percentage that opened the email
10:20 a.m.	373	50.7%
11:25 a.m.	387	52.0 %
3:15 p.m.	416	48.3%
4:00 p.m.	422	51.2%
10:30 p.m.	436	48.3%

The largest increase in subscriptions occurred between June 30 and July 2 when 316 people subscribed. This coincides with the staged re-entry of residents, which began June 29 with

residents from the NW area of High River. Before the flood the average number of new subscribers was seven per issue. During the flood (June 20 – July 30) this average increased to 37 per issue. When the newsletter was repurposed during the flood, updates were sent several times a day during the first 48 hours and a minimum of once daily after that (with the exception of the gap between June 22-26) until August.

Respondents to the survey were asked when they subscribed to the e-newsletter; 43% reported that they had been receiving it prior to the initial flood event on June 20; 23.4% subscribed between June 20-July 7, when the majority of residents were able to return to town and 33.6% subscribed after July 7 when only the hardest hit neighbourhoods of Wallaceville, Hamptons and Sunshine still remained inaccessible. The responses were also filtered to determine whether there was any correlation between the degree of severity to which individuals were impacted and the rate at which they adopted the online newsletter. There were 55.9% of respondents indicated they were evacuated for one-two weeks, 20.5% who indicated they were out of their homes for 3-4 weeks and 19.7% who reported that they were unable to return home for more than four weeks. Results indicated that the majority of those who were most severely impacted subscribed to the *Town Crier* during and after June 20.

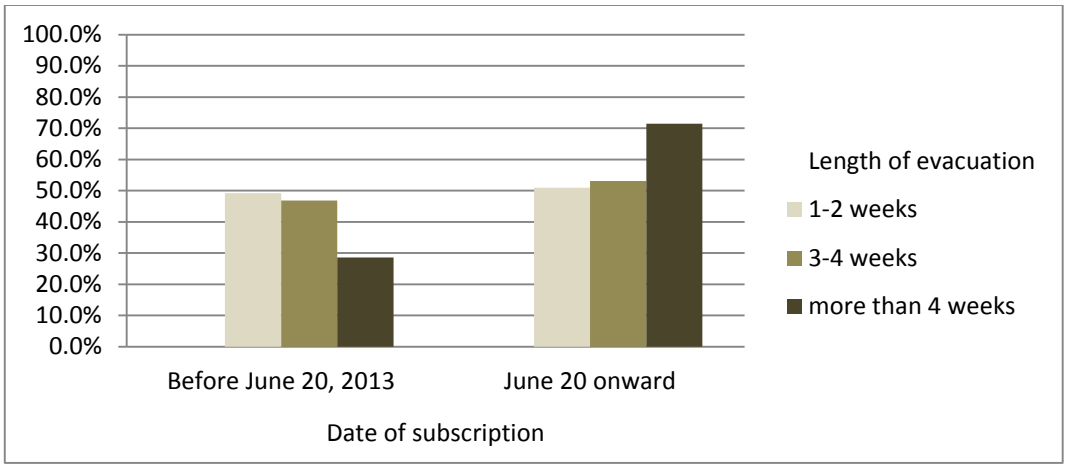

Figure 4: Subscription rates based on severity of impact

Individuals were also asked why they chose to subscribe to the e-newsletter. These open-ended responses were compiled into categories using Everett Roger's five attributes of innovations: Relative advantage, compatibility, trialability, observability, and complexity. (Rogers, 2003). Relative Advantage refers to the degree to which an innovation is considered better than the idea it supersedes, Compatibility refers to the degree that an innovation is compatible with the past experiences, needs and values of adopters; Complexity refers to the degree of ease that an innovation can be understood and used; Trialability refers to the degree to which a user can experiment with an innovation on a limited basis; and Observability refers to the degree to which the results of an innovation can be observed (Rogers, 2003). A total of 241 responses were collected and grouped into these categories based on similar language. Although inter-rater reliability was not used to confirm the distribution of responses into the following categories, the researcher was confident in the accuracy of the groupings based on the definitions provided by Rogers (2003).

Responses grouped under Relative Advantage included the following phrases:

- The e-newsletter was superior to the paper version of the Town Crier

- A preference for online services
- It was more efficient than the paper version.

Responses grouped under Compatibility included the following answers:

- A desire to save paper,
- Time spent away from the community or living outside High River,
- A general desire to receive town-specific information.

Responses grouped under Complexity indicated the following:

- The online version was easy to use,
- It was convenient.

Responses grouped under Triability included:

- One of many channels to receive information

Observability was not readily apparent in the analysis. Only one respondent indicated that he/she had received the e-newsletter because it had been available through work. One response did not meet any of the criteria and was excluded from the results. Based on these criteria, the following table demonstrates the main reasons why people chose to subscribe to the *Town Crier*:

Table 1: Motivations for subscribing to the e-newsletter

	Number of responses	Percentage
Relative advantage:	83	34.4%
Compatibility	132	54.8%
Complexity	16	6.6%
Trialability	8	3.3%
Observability	1	0.4%

The analytics embedded in the e-Constant Contact platform also made it possible to identify the percentage of subscribers who opened the newsletter and the items in each issue that received the most clicks. This type of embedded analytics can provide valuable information to communications teams during a crisis as it identifies the information individuals are seeking. This can better inform official agencies on how to fulfill communication needs of impacted populations during a crisis. In the *Town Crier* e-newsletter, the largest degree of activity occurred on June 30 with more 244 people clicking on the link to an image of the town map that indicated how the community had been divided into sectors for the staged re-entry. At this time the first residents were finally being allowed to return to their homes after the entire population had been restricted from entering High River for nine days by the municipal and provincial governments.

When asked how respondents learned about the e-newsletter prior to the flood, 45.1% indicated that they had seen the information in the printed version of the *Town Crier*, 45.6% said they had seen the link on the website, and 9.3% indicated that friends or family had told them about it. Of those who subscribed during or after the flood, 83.1% indicated that they had learned about the e-newsletter through the link on the Town's website and 11.2% learned of it through friends or family. Very few subscribers forwarded the email newsletter; the highest number occurred with the June 27 issue with only three forwards. However, the percentage of individuals who opened the email remained consistent throughout the event ranging from 48% on June 20 at 10:30 a.m (the first information bulletin) to 71% on June 26. The median value was 60%.

Assessing credibility and trust in official communications

The survey included several questions to determine subscribers' perceptions about the credibility and accuracy of the information posted in the *Town Crier* during the crisis. The results

were also filtered to determine if there was any difference in the perception of trust and credibility for those that were most severely impacted (evacuated for 3-4 weeks or longer) compared to those who were less impacted. The level of credibility was also tracked to see if it changed. The results indicate that the severity of the impact did not significantly affect the level of belief in the trust and accuracy of the information published in the *Town Crier.*

Before the flood the level of belief in the accuracy and trustworthiness of the e-newsletter was very high before the event. However, all respondents, regardless of the degree to which they were impacted, reported a significant decline in their level of belief from June 20-July 30. This represents the period when the flood first occurred and the entire community was evacuated until the time when the final residents regained access to their homes. After this, the perception in the *Town Crier's* accuracy and trustworthiness rebounded to almost pre-flood levels. (see Table 2).

Table 2 – Level of belief in the accuracy and trustworthiness of the Town Crier

	Always (A)	**More than 50% of the time (M)**	**Combined responses (A+M)**	**Less than 50% of the time (L)**	**Never (N)**	**Combined responses (L+N)**
Before June 20, 2013	53.1%	41.3%	94.4%	5.0%	0.6%	5.6%
Between June 20 - July 30	37.0%	43.6%	80.6%	16.6%	2.8%	19.3%
After July 30	47.6%	44.2%	91.8%	7.8%	0.4%	8.2%

This is significant since the June 20-July 30 period represents the critical time for official responders to communicate with residents. For the majority of this period (June 22 – July 14), the Government of Alberta had taken control of the communication efforts regarding the disaster. It is unclear whether this was related to the decline in perception. However, in a subsequent question that asked respondents to indicate which information sources they perceived as being

the most trustworthy and accurate, the government was considered the least trustworthy at 7.9% while the municipality was rated the highest at 39.8% (see Figure 5).

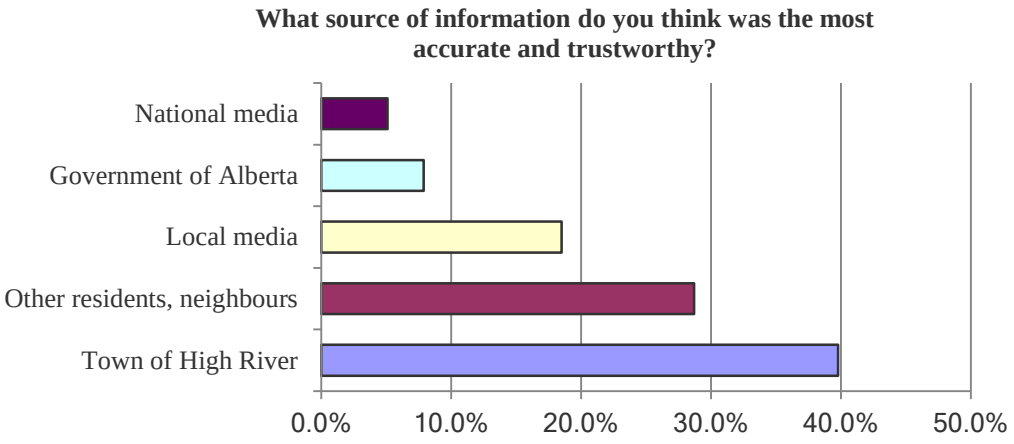

Figure 5 – Public perceptions of information sources

The Town of High River utilized a number of different communication methods, in addition to the *Town Crier*, to share information with residents. These included both online platforms such as the Town's website, Facebook, and Twitter, as well as personal visits by the mayor to the four evacuation centres and a dedicated mayor's message on the local radio station every day during the first week after the disaster. Several information sessions were also held with speakers from the provincial government, technical experts and the mayor providing updates and answering questions.

To determine whether the perception about these alternate sources differed from the *Town Crier*, the survey asked respondents to rate their level of belief in the accuracy and trustworthiness of these communication channels between June 20 to July 30. Overall, respondents indicated the greatest degree of belief in the Town's website with 26% reporting that

they always believed the information to be trustworthy and accurate and 47.2% indicating that they believed it was trustworthy and accurate more than 50% of the time. The lowest rating was for the personal visits by the mayor with only 9.9% of respondents indicating they believed he was always truthful and accurate and 12.3% reporting that they believed he was truthful and accurate more than 50% of the time. However, 66.1% of respondents reported that they had never attended the visits at the evacuation centres. These visits were intended for residents who were staying at the evacuation centres and were not advertised, which explains the low participation rate. Once again, there was no significant correlation between the length of time people were out of their homes and the level of belief they had in the accuracy and trustworthiness of the information provided by the Town through these communication channels.

There were also a plethora of external sources providing information about the disaster, including local and national media and citizen-generated social media sites. To provide a comparison between perceptions of official information presented in the *Town Crier* to these external sources, respondents were asked to rate how accurate and trustworthy they perceived these external communication channels. Most respondents reported that local TV news was the most accurate and trustworthy with 17.4% reporting that it was always accurate and 66.8% indicating that is was accurate more than 50% of the time. Local TV news was also the source of information most respondents accessed with only 4.1% indicating they had never used it. National TV and local radio followed in significance. Emails from personal friends and family were given a high degree of accuracy and truthfulness with 54.4% reporting that it was either always accurate or accurate more than 50% of the time. A citizen-generated Facebook page called High River Flood Support fell somewhere in the middle with only 8.3% of respondents

reporting that it was always accurate, although 28.6% believed it was accurate and trustworthy more than 50% of the time.

Although the level of belief in the accuracy and trustworthiness of the *Town Crier* decreased between June 20-July 30, the perception in the level of accuracy remained at the same level as that recorded for external sources such as the media. In rating internal communication channels, 80.6% of respondents rated the *Town Crier* highly accurate and trustworthy during the response phase of the disaster. The Town's website was also rated as highly accurate and trustworthy with 26.5% of respondents reporting that it was always accurate and 44.9% reporting that it was accurate more than 50% of the time. This is comparable to the ratings of local television news where 17.9% of respondents reported that it was always accurate and 68.8% who indicated that it was accurate more than 50% of the time. (see Table 3)

Table 3: Perceptions of accuracy and trust in official and unofficial communications channels

Official communication channels	Always	More than 50% of the time	Less than 50% of the time	Didn't use it
Town of High River website	25.5%	43.2%	19.8%	7.8%
Town of High River Facebook page	12.3%	25.9%	9.9%	28.4%
Town of High River Twitter feed	7.0%	10.3%	2.5%	49.4%
Mayor's minute on the radio	14.0%	18.1%	9.9%	31.3%
Personal visits by the mayor to reception centres	7.0%	8.6%	8.2%	46.5%
Open houses and information sessions (held between June 20-July 30, 2013)	13.6%	22.6%	17.3%	30.5%

Unofficial Communication Channels	Always	more than 50% of the time	Less than 50% of the time	Didn't use it
Local TV news	17.4%	66.8%	8.7%	4.1%
National TV news	10.4%	60.2%	12.9%	5.0%
Local radio (AMll40, SunCountry, Eagle)	10.0%	43.2%	5.8%	21.6%
Other radio stations	5.4%	37.8%	10.8%	21.2%
High River Times	13.7%	40.2%	10.0%	19.5%
High River Times website	12.4%	29.5%	8.7%	24.5 %
Other newspapers	8.3%	41.1%	10.8%	19.5%
Media Twitter feeds	2.1%	12.9%	2.1%	51.9%
Twitter feeds of residents and local businesses	2.1%	10.4%	2.9%	52.3%
Facebook pages of friends and family	3.7%	31.1%	14.1%	26.1%

High River Flood Support Facebook page	8.3%	28.6%	12.0%	27.4%
Personal email with friends and family	13.3%	41.1%	14.5%	11.2%
Alberta Gov't website	7.9%	31.5%	19.1%	19.9%
High River online/Okotoks online website	12.0%	38.6%	9.5%	19.1%

As well as assessing communication methods, respondents were also asked to indicate which information sources they considered the most accurate and trustworthy during the flood including the Town, provincial government, local and national media, and personal connections. The Town garnered the highest degree of belief in regards to the accuracy and trustworthiness of the information with the Government of Alberta only slightly higher than national media (see Table 3).

Respondents were also given the opportunity to identify other sources of information. However, of the 46 alternate responses, nine identified personal connections, which adjusts the percentage for this category to 32.8%, two identified Town of High River and one reported the Government of Alberta. Four respondents indicated that the most accurate and trustworthy information came from a regular phone in "town-hall" meeting organized by the leader of the opposition, who was also the MLA for High River. Eight indicated that they did not believe anyone. One respondent wrote:

> None of the above were reliable cos (sic) the info they were receiving and dissemination was inaccurate and thus unreliable. Newspapers etc can't be accurate when the Mayor gives misleading confused information.

Table 3- Perceptions of accuracy and trust in all information sources

Information sources	**Response Percent**
Town of High River	39.8%
Other residents, neighbours	28.7%
Other (please specify)	21.3%
Local media	18.5%

National media	5.1%
Government of Alberta	7.9%

There were recurring themes in the respondents' written responses regarding the factors that influenced their level of belief in the accuracy of official communication channels. One issue was the perception that information was contradictory and many noted a perceived delay in the time when information was updated. Approximately 30 respondents indicated that outdated information on Town communication channels and differing messages were reasons for the decrease in their level of belief. One respondent wrote:

> I also found you had to be paying attention everywhere at all times as there was not one source of information that you could choose and count on finding everything you needed there.

Conclusions and Recommendations

This study addressed the question of whether repurposing existing communication methods can assist municipal governments maintain credibility with constituents during an environmental crisis. The flood that occurred in High River in 2013 has been used as a case study to examine the way municipal communicators repurposed an existing online newsletter to reach impacted residents. The research also examined how citizens select the communication channels to receive updates about the response to the crisis by tracking the rate that impacted residents subscribed to the repurposed e-newsletter. The hypothesis is that that methods of communication considered trustworthy and credible prior to a crisis will continue to be accepted as reliable sources of information during and after the crisis occurs. This section summarizes the results of the research, which included a review of the analytic tools within social media platform used to create the e-newsletter and through an online survey emailed to all subscribers.

Question 1: What the determining factors in individuals' decision to adopt particular communication methods during a crisis?

One of the challenges that this study addressed was the diversity and quantity of information sources and methods that are available to the public. The research focused on determining why individuals choose to adopt a particular communication method during a crisis. Official responders compete with citizen-generated portals, as well as the media, to provide accurate information so that citizens will be able to respond appropriately to the situation. As with other crisis situations, the number of competing and sometimes contradictory messages that occurred during the High River flood and the sheer volume of information that was being generated about the flood, it is not surprising that one respondent wrote:

> It seemed as though whatever information was supplied, changed very quickly – so how long was the info relevant. Does that make it trustworthy? No. There was very little trust after information kept changing and all onus was put back on residents to interpret information.

In the High River flood, there was additional political influence in the communication being presented to the public since the provincial government assumed control of information from the Emergency Operations Centre and another stream of messages about the crisis was distributed by the leader of the official opposition party who was also the local MLA. Several participants in the survey wrote that they believed the Town Hall meetings run by this MLA provided the most accurate and trustworthy source of information.

While the members of the public can feel overwhelmed by the sheer volume of information being produced during a crisis, they also require a certain degree of redundancy to process the message (Stephens et al., 2013). Therefore officials need to "optimize redundancies to both underscore urgency and minimize overload" (Stephens et al., 2013 p. 233). Studies have found

that a blend of asynchronous and synchronous communication methods during a crisis have been the most successful at imparting a sense of urgency and degree of the severity of the crisis to the public (Stephens et al., 2013). This finding was demonstrated in the survey results, where the *Town Crier* was one of many sources of information that individuals used to access updated information. Respondents indicated that the Town's website was also considered an important and trustworthy communication channel and the majority of respondents indicated that they learned of the *Town Crier* through the website. The embedded analytics within the e-newsletter indicated that subscribers clicked on the links to the Town's Facebook and Twitter platforms that were embedded in every issue of the e-newsletter. This indicates the importance of creating an interconnection between official communication methods so citizens can easily access the same information from multiple platforms. This supports Dyne's (2006) findings that official responders need to be aware of the plurality of networks to convey important messages to the public.

Question 2: How can a municipal government increase the rate that the public adopts a repurposed communication method during a crisis?

This study also explored how an innovation in a communication method was adopted by the affected population. Although the Town of High River used a variety of methods to provide updates to the public, this study specifically examined the re-purposing of an existing e-newsletter, the *Town Crier*, and how subscribers learned about it. It is not enough to provide a variety of communication methods if no one knows about them or accesses them. Determining the ways in which members of the public gain knowledge about official communication methods may help future responders increase the percentage of affected citizens who adopt official sources of information in a crisis.

In High River, very few people learned about the e-newsletter through friends and/or family members, which indicates that the municipal government cannot rely on word-of-mouth referrals to gain subscribers to its communication methods during a crisis. However, the results do support previous research that has shown how individuals prefer to use communication methods that are familiar to them. The pre-existing perceptions of accuracy and credibility that the Town had established with the *Town Crier* prior to the flood provided a trusted platform for the municipal government to inform the public about response efforts and the changing situation.

It is interesting to note that some of the responses in the survey equated the *Town Crier* with other media sources. The newsletter's format had always followed the same style as news reporting, with stories being written in the third person and using direct quotes from spokespeople. It may be that the way in which information was presented influenced the level of credibility with subscribers and their decision to subscribe to it. Paul Deutschmann and Wayne Danielson's (in Rogers 2003) research revealed the connection between the media and the rapid diffusion of information during a crisis. In the case of the *Town Crier*, its adoption rate was more dependent on subscribers seeing the link on the Town's website. The survey results did not indicate how users selected this initial communication channel, which led them to subscribe to the *Town Crier*. However, all information, such as news releases, interviews etc. from the municipal government directed the public to the website, which could indicate the role of the media in increasing the public's awareness of the Town Crier, via the Town website. While the *Town Crier's* subscription rate rose substantially during the flood, it did not match the rapid adoption experienced by a citizen-generated Facebook page called High River Flood Support. Results from the open-ended questions in the survey support Everett Roger's theory that individuals adopt an innovation only when there is a relative advantage to them to do so and that

it is compatible with existing needs, past experiences and values. Results of the survey indicate that the main reasons individuals subscribed to the repurposed *Town Crier* fall under these two attributes. Those who were most severely impacted by the flood were not subscribers until after June 20, when their need to gain town-generated information increased. These results can help to inform municipalities' efforts to increase subscription rates prior to a crisis. Creating communication methods that align with Roger's research on the adoption of innovations may help to increase the number of followers prior to a crisis. One strategy may be to inform residents ahead of time of communication methods that would be repurposed during a crisis, which could widen public knowledge and interest in subscribing to them. Additional research should be undertaken on ways in which official organizations can increase followers on pre-existing communication channels prior to a crisis. It is important to explore how to use these platforms in ways that will maintain and build a sense of trust with users prior to a crisis.

Responses to the survey illustrated two main issues that negatively impacted the public's trust and credibility in official sources of information: a perceived lack of information and delay and/or lack of new information. Once the provincial government had assumed control of communications in the response to the High River flood, information had to be vetted through the Provincial Operations Centre (POC) in Edmonton before it could be published, which created delays. This has been reported in other case studies where the bureaucratic nature of government agencies hindered the rapid dissemination of new information (Kapucu, 2006; Maxwell, 2003; Palttala et al., 2012; Sutton et al., 2008). As well, the government's process of rotating new provincial communication teams into the EOC every five days meant that the new individuals were unaware of the Town's communication methods and so information was either slow to be posted or not posted at all. This is what occurred between June 22-26 when no information

bulletins were emailed to subscribers. As one respondent wrote "It took forever to get any info - most of the time the unofficial Facebook pages were updated quicker than the official pages."

The other issue was the perception that information was not consistent or lacking entirely. With the rapidly changing situation created by a crisis and the speed with which it can be reported through social media, official responders need to not only "give the facts but to interpret the situation and explain the consequences to the public" (Palttala et al., 2012 p. 8). In High River, there were a number of instances where situations changed more than once, specifically with the staged re-entry of citizens and businesses. Information about the conditions of roads, restoration of infrastructure and accessibility of areas in the community changed constantly so that plans for allowing residents to return had to be altered. This was perceived as the government's ineffectiveness at responding to the crisis and caused confusion and frustration for residents. If the target audiences think there has been no response to a crisis, then perceptually there has been no response and this leads to a loss of confidence in the organization (Holladay & Coombs, 2013 p. 452). The High River situation illustrates the importance of providing regular open communication throughout the crisis and to explain the reasons whenever information changes. Governments have a tendency to be over-concerned with creating panic and this leads to their vetting how information is released but in reality "the public's reaction to crisis is resilient and in some cases may be derailed…by overly paternalistic handling of emergency communications" (Maxwell, 2003 p. 251).

The generally positive perception of the *Town Crier* supports the assumption that re-purposing pre-existing communication methods is an effective tool to reach residents in an emergency. The hypothesis that methods of communication considered trustworthy and credible prior to a crisis will continue to be accepted as reliable sources of information by individuals

during and after the crisis occurs was confirmed in the survey results where the overall level of trust that subscribers had for the e-newsletter was higher than for other sources of information and communication methods. However, it is important that a variety of communication methods be used and that they are inter-connected and provide the same information if responding agencies are to remain credible with affected populations. This is also important in improving adoption rates of repurposed communication methods since it provides multiple ways for the public to learn of these sources for information. Developing the public's trust in the information source prior to a crisis can help officials maintain credibility in the eyes of the public during the crisis and support an increase in the public's use of official communication methods. Developing strategies for increasing adoption of communication innovations should be part of risk communication plans.

While much recent crisis communication research has lauded the value of social media tools to rapidly diffuse new information to the public, in many cases this technology is not available for hours and even days. New Orleans and High River both experienced extensive periods without internet or cell phone service and local media outlets were also impacted. In High River the evacuation centres were located in rural settings with limited internet access and many people had lost their computers and tablets in the flood so were dependent on cell phones, whose service had been disrupted. This created additional challenges for officials to communicate with impacted residents. As one resident explained in the survey:

> Not always readily and easily accessible. We were staying in our motor home in Vulcan. Limited TV and media resources so finding out what was happening was not always easy or timely. After about a week the town of Vulcan installed WiFi at the camp ground. This helped immensely. Prior to that it was radio coverage and smart phone coverage (e-mail/voice contact with friends) that kept us informed.

Crisis communication plans should therefore balance a reliance on technology with strategies for reaching residents when no technology is available.

An area for future research is the value and use that embedded analytic tools can have for determining the public's crisis communication needs. Most crisis research has depended on traditional methods of gathering data to assess the effectiveness of crisis communications. However, the depth of the analysis that is now available through social media platforms can provide insights on how the public accesses and uses information on these platforms during a crisis. Palttala et al (2012) have identified the need to monitor the public's perceptions in order for communication efforts to be effective. For example the *Town Crier* provides information on how many subscribers opened the email, forwarded it and which links were clicked on in the newsletter. Through this it is possible to determine what information the public is seeking, which can aid in communication efforts and diminish the gaps between what affected residents want to know and what the government feels is appropriate to release.

While there were many lessons learned in the High River situation, like Hurricane Katrina in New Orleans, the massive flood that affected the town illustrates how impossible it is to prepare completely for disasters "rendering extensive preparations inadequate" (Vanderford et al., 2007 p. 23).

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