

Social Media Resources Named after a Crisis Event

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ABSTRACT

Crisis Named Resources (CNRs) are the social media accounts and pages named after a crisis event. CNRs typically appear spontaneously after an event as places for information exchange. They are easy to find when searching for information about the event. Yet in most cases, it is unclear who manages these resources. Thus, it is important to understand what kinds of information they provide and what role they play in crisis response. This paper describes a study of Facebook and Twitter CNRs around the 2016 Fort McMurray wildfire. We report on CNR lifecycles, and their relevance to the event. Based on the information provided by these resources, we categorize them into 8 categories: donations, fundraisers, prayers, reactions, reports, needs and offers, stories, and unrelated. We also report on the most popular CNR on both Facebook and Twitter. We conclude by discussing the role of CNRs and the need for future investigation.

Keywords

Crisis Informatics, Crisis Named Resources, Social Media.

INTRODUCTION

Individuals and organizations (such as crisis responders, governments, news media, companies, etc.) use social media during crisis events to share event updates, facilitate communication, offer help, express opinions, and show support and solidarity (Palen and Hughes 2018; Palen and Liu 2007; Sutton et al. 2008). Social media allow anyone with an Internet connection to participate in the exchange of information around a crisis event. In this paper, we draw attention to a phenomenon that occurs after most larger crisis events where people spontaneously create social media accounts and pages that are named after the event. We call these social media products Crisis Named Resources (CNRs).

CNRs are important to study for several reasons. First, CNRs appear to be dedicated venues for information exchange around an event, and they easily appear when searching for information about an event. Due to this visibility, these resources tend to attract more attention than other sources of information. Second, CNRs could be mistaken by the public as official sources of information, which could be harmful if these sources then shared false or inaccurate information (Lindsay 2011). Third, CNRs are typically created soon after a crisis occurs which leaves little to no opportunity for assessing the identity or intentions of a CNR's administrator(s) based on past activity. Lastly, most CNRs disseminate information about an event (though some do not), so it is critical to understand what kinds of information they provide and what role they play in a response.

To learn more about these resources, we analyzed the online activities of Facebook and Twitter CNRs created during the 2016 Fort McMurray wildfire. We report on the lifecycle (creation and deletion) of these resources, and how they were used for sharing information around the wildfire. We categorize these resources based on their social media profiles and posted content to understand the different roles these resources played in the crisis response. We also investigate the CNRs with the most number of Facebook likes and Twitter followers to discover why so many people followed them. The focus of this study is to determine the type of information disseminated by these CNRs, understand the role of CNRs in crisis response efforts, and lay a foundation for future analysis.

BACKGROUND

This research lies in the domain of *crisis informatics* (Palen et al. 2007; Palen and Anderson 2016) and is grounded in sociotechnical theory. This perspective advocates that technology and social systems are not only

intertwined, but they also dynamically and recursively shape and influence one another (Orlikowski 1992). We see evidence of this influence in the research literature that describes how social media can empower communities to participate in crisis response (Ling et al. 2015). Members of the public often use social media to provide information, relief assistance, and emotive and evaluative support around crisis events (Palen and Liu 2007; Liu et al. 2008). People also use social media to collaborate during disasters. For instance, in the aftermath of 2007 Virginia Tech Shootings, people worked together online to discover the names of those who had died in the shootings (Vieweg et al. 2008). A similar kind of self-organizing behavior of members of the public was also observed during the response and recovery phase of the 2010 Haiti Earthquake (Starbird and Palen 2011). These emergent uses of social media during crisis events have in turn, shaped social norms around social media use as well as the technical affordances of the different social media platforms.

Though social media have proved useful around crisis events, they have also contributed to the spread of false rumors (intentionally or unintentionally) during crises (Huang et al. 2015). These false rumors can lead people to make potentially life-threatening decisions (Starbird et al. 2016). Therefore, it is important to investigate who is using social media during a crisis event and how.

To better understand the sociotechnical role of social media in crisis response, researchers in *crisis informatics* have sought to identify the kinds of users who post and/or share crisis related information. Crisis informatics researchers have also tried to determine the types of information that these users share, and their intentions in doing so. For example, Olteanu and colleagues (2015) studied Twitter communications around 26 natural and human-induced crises and found that the provided information were mainly about the affected individuals, infrastructure and utilities, donations and volunteering, caution and advice, and sympathy and emotional support. They also reported that the sources of information, comprised eyewitnesses, government, non-governmental organizations, businesses, traditional or Internet media, and outsiders (individuals who are not personally involved or affected by the event). Similarly, Purohit and Chan (2017) studied the online communications around Hurricane Matthew and Louisiana floods, and classified users into three categories (organization, organization-affiliated, and non-affiliated). They also reported how users in each of these categories have unique ways of disseminating information, for example, the organization users are less likely to retweet in contrast to non-affiliated users who are the most likely to retweet. In this research, we take a similar approach as we seek to determine the types of CNRs that were created around the 2016 Fort McMurray wildfires and their purpose.

Prior *crisis informatics* research has also observed the existence of dedicated sources that are created in response to a crisis event. For instance, Shklovski and colleagues (2008) discovered that a community-based volunteer website was a useful information source during the 2007 Southern California Wildfires. Created by a member of a rural community that had been evacuated due to the wildfire, the website played an important role in reconnecting community members and facilitating information exchange about the wildfire status and humanitarian relief efforts in the area. More recently, we examined the online communications of official sources during the 2014 Carlton Complex wildfire (Chauhan and Hughes 2017), and found that many Facebook pages, Twitter accounts, and websites (or CNRs) were created in response to and were named after the wildfire. These resources played an active role in disseminating information around the event. However, in most cases, it was difficult to determine who administered these online resources, which also made it difficult to assess their credibility. In this study, we expand upon the Carlton Complex wildfire research with a deeper examination of CNRs. Our goal is to identify the types of CNRs that appear around an event and to learn more about the different roles they play in crisis response.

EVENT OF STUDY – THE 2016 FORT MCMURRAY WILDFIRE

A wildfire in the southwest of Fort McMurray, Alberta, Canada started on May 1, 2016. On May 3, the wildfire entered the city of Fort McMurray and forced a mass evacuation of 80,000 residents—the largest wildfire evacuation in Alberta's history (Fritz 2016). The wildfire burned nearly 600,000 hectares and destroyed over 2,400 structures (CBC News 2016). Evacuees experienced an extended period away from their homes and were only allowed to re-enter their city under a voluntary phased reentry program from June 1- June 15 (Ramsay 2016a). On June 13, 2016, the wildfire was classified as 'being held' (Giovannetti 2016) and the wildfire was finally considered 'under control' on July 5, 2016 (Ramsay 2016b).

DATA COLLECTION

Our data collection involved two activities. First, throughout the Fort McMurray Wildfire, we periodically looked for new CNRs while continuing to monitor the CNRs we had previously found. Second, we collected all

Facebook posts and tweets from the CNRs we identified during the wildfire timeframe. We discuss these activities in more detail below.

Identification and Monitoring of Crisis Named Resources

We recorded the creation and deletion dates of CNRs on both Facebook and Twitter once a day during the data collection time period (May 1 – July 5, 2016). Using Facebook and Twitter search engines we determined the Facebook pages and Twitter accounts, whose name had any of the following keywords- ‘Horse River Fire’, ‘YMM Fire’, ‘Fort McMurray Fire’, ‘Fort McMurray Wildfire’, ‘Fort mc fire’, and ‘Fort Mac Fire.’ This was done daily to ensure that we did not miss the CNRs that were created over the course of the event. The account creation date for all Twitter accounts was retrieved from their respective account profiles. For Facebook, we considered the date of their first post to be their account creation date since most of the pages did not have information about when they were created. We also recorded the number of CNR Facebook page likes and Twitter followers on the last day of the data collection timeframe.

We revisited all the identified Facebook and Twitter CNRs daily to see if they continued to exist. For the CNRs that were deleted, we recorded the date when we found this information.

Messages posted by Crisis Named Resources

All Facebook posts and tweets by Fort McMurray CNRs during the timeframe May 1- July 5, 2016 (the entire duration of wildfire) were collected using the Facebook Graph API and Twitter Search API respectively. Table 1 gives the number of CNRs and the number of messages posted by these resources on Facebook and Twitter.

	# of CNRs	Total # of Posts (May 1 – July 5, 2016)
Facebook	70	2657 messages
Twitter	13	5011 tweets

Table 1. Total Number of CNRs and Posts on Facebook and Twitter.

DATA ANALYSIS AND FINDINGS

We report the findings of our study in four subsections: (1) life of CNRs, (2) relevance of CNRs, (3) types of CNRs, and (4) popular CNRs. The first subsection reports the time at which the CNRs were created and deleted (if applicable). The second subsection determines if the messages posted by these CNRs were about the Fort McMurray wildfire. The third subsection examines different types of CNRs and the fourth subsection investigates the most popular Fort McMurray CNR on both Facebook and Twitter.

Life of Crisis Named Resources

To understand the lifecycle of CNRs, we determined their creation and deletion dates, and analyzed their longevity after the completion of the event.

Creation of Crisis Named Resources

A CNR’s creation date is an indicator of whether a new resource was created or if an existing resource was adapted in response to a crisis event. For an event of prolonged duration, such as the Fort McMurray wildfire, a CNR’s creation date might also correlate with a significant subevent within the event (e.g., an evacuation).

Table 2 gives the number of CNRs created on Facebook and Twitter before, during, and after the wildfire. Our findings show that most Facebook (98.5%) and Twitter CNRs (92.3%) were created during the wildfire. There were, however, 2 resources (1 Facebook and 1 Twitter) created before the wildfire.

Date of CNR Creation	Facebook	Twitter
before May 1, 2016 (before wildfire)	1 out of 70 (1.4%)	1 out of 13 (7.6%)
between May 1 - July 5, 2016 (during wildfire)	69 out of 70 (98.5%)	12 out of 13 (92.3%)

Table 2. Number of CNRs Created on Facebook and Twitter.

First, we look at the two CNRs created before the wildfire. The first CNR is a Facebook page that was created in April 2012 (4 years before the wildfire). According to the page description, it was created to increase safety on

Highway 63. The administrators of this page posted 4 messages during the Fort McMurray wildfire, all of which were relevant to the wildfire. The second CNR created before the wildfire is a Twitter account that was created in May 2014 (2 years before the wildfire). This CNR is owned by a woman who described herself as a proud mom of a UCLA bound student, an Ivy League grad, and an editor. During the fire, she changed her username to 'Support #ymmfire,' which is why the account was considered a CNR in our dataset. Later (on May 26, 2016) she changed her username back to her given name. She posted 27 messages during the data collection timeframe, none of which were relevant to the wildfire. From the data we collected, it is impossible to know why she changed the name of her account. We speculate that it could have been a way to show support for the wildfire affected population. We would have to interview the account owner to know for certain, which was not possible in this case.

Next, we look at the CNRs created during the wildfire. To find possible correlations between the CNR creation dates and the event progression, we determined the number of CNRs that were created each week of the wildfire (see Table 3). Findings show that most of the CNRs on Facebook (68.5%) and Twitter (53.8%) were created during the first week (May 1 – May 7) of the wildfire—the week that saw rapid wildfire growth and forced massive evacuations. Therefore, it appears that the creation of most of the CNRs in the first week of the wildfire reflects the chaos caused by the wildfire during that timeframe.

	May 1 - 7	May 8 - 14	May 15 - 21	May 22 - 28	May 29 - Jun 4	Jun 5 - 11	Jun 12 - 18	Jun 19 - 25	Jun 26 - Jul 2	Jul 3 - 5
Facebook	48	8	7	1	1	1	0	1	0	2
Twitter	7	2	0	0	2	0	0	1	0	0

Table 3. Number of CNRs Created During the Wildfire.

Deletion of Crisis Named Resources

Table 4 shows the number of CNRs deleted from Facebook and Twitter during and after the wildfire. We were surprised to find that a significant number of CNRs were deleted during the wildfire, 16 (22.8%) Facebook CNRs (and none of the Twitter CNRs). When we checked for the existence of these CNRs in the month of March 2018 (just prior to submitting the final version of this paper), we found that an additional 27 (38.5%) Facebook and 2 (15.3%) Twitter CNRs have been deleted, bringing the total number of deleted CNRs to 43 (61.4%) on Facebook and 2 (15.3%) on Twitter.

Date of CNRs' Deletion	Facebook	Twitter
between May 1 - July 5, 2016 (during wildfire)	16 out of 70 (22.8%)	0 out of 13 (0.0%)
after July 5, 2016 (after wildfire controlled)	27 out of 70 (38.5%)	2 out of 13 (15.3%)

Table 4. Number of CNRs Deleted on Facebook and Twitter.

We did not investigate the CNRs that were deleted after the wildfire because the deletion of a CNR after the conclusion of an event is in alignment with the goal of serving as a resource during an event. However, the deletion of CNRs while an event is still happening needs more inspection.

We first looked at the number of Facebook CNRs deleted each week of the wildfire (see Table 5). The data show a fairly uniform distribution of the number of deleted accounts during the wildfire, and thus there seems to be no correlation with the deletion of CNRs and event progression. Since these 16 CNRs were deleted during the wildfire, we do not report on the details of these resources and the messages they posted. In some cases, the CNRs were deleted before we could even retrieve their messages.

The deletion of CNRs during an ongoing event prompts the question of why these accounts were deleted. We were unable to find any messages from the deleted CNRs that indicated why they were deleted, thus answers to this question are unknown. Also, since these CNRs left no record of their existence (such as an alternate page or account), questioning the administrators about the reasons for deleting their CNRs is now impossible.

	May 1 - 7	May 8 - 14	May 15 - 21	May 22 - 28	May 29 - Jun 4	Jun 5 - 11	Jun 12 - 18	Jun 19 - 25	Jun 26 - Jul 2	Jul 3 - 5
Facebook	1	2	2	2	0	3	2	0	1	3

Table 5. Number of CNRs Deleted by Week During the Wildfire.

Crisis Named Resources After the Event

Next, we looked at the CNRs that continue to exist in the month of March 2018. We revisited all the CNRs identified earlier in the study and found that of the 27 Facebook CNRs and 11 Twitter CNRs that continue to exist, 18 Facebook CNRs and all 11 Twitter CNRs have not posted anything since the month the wildfire was considered under control, i.e., after July 2016. This means that even though these resources still exist, people are no longer contributing content to them. There were 9 Facebook CNRs that continue to exist and have shown some online activity after July 2016 (see Table 6).

Facebook Page Name*	Page Description*	#Likes and #Followers	# Posts Since July 2016	Content of Posts Since July 2016
Fort McMurray CNR 1	The administrator was saddened by the wildfires and wanted to help in some way with this page.	60 Likes. 52 Followers.	1	Funny Video.
Fort McMurray CNR 2	This page was a place where people shared and collected photos of the event.	28,982 Likes. 28,675 Followers.	4	Post about community gatherings on the anniversary of Fort Mc wildfire, and some photos of wildfire.
Fort McMurray CNR 3	This page aims to help victims by collecting stories, information and offers of help.	160 Likes. 159 Followers.	17	Posts about legalizing marijuana, unemployment, immigration, oil and gas industry workers, B.C. wildfire, and Fort McMurray wildfire.
Fort McMurray CNR 4	-	31 Likes. 30 Followers.	1	Post about Roller Derby.
Fort McMurray CNR 5	This page was created to help Fort McMurray residents and family, but after the fire only posted about flowers and quilts.	40 Likes. 40 Follows.	23	Posts about flowers and quilting.
Fort McMurray CNR 6	A page to keep the pictures of displaced pets and livestock that are not yet claimed as a result of the Fort McMurray fire 2016	45 Likes. 45 Followers.	153	Posts about missing animals and animal care.
Fort McMurray CNR 7	This page took names and numbers of those who need a place to stay, and those that can provide a place.	479 Likes. 454 Followers.	17	Posts about B.C. wildfires, and a few about Fort McMurray fire.
Fort McMurray CNR 8	This page was created by a teen who wanted to help with relief efforts despite being told he was too young to help.	66 Likes. 62 Followers.	1	1 post about the plan of getting horses back to Fort McMurray.
Fort	This page posts information	436 Likes.	1	Posted a video about a dog

McMurray CNR 9	regarding the wellbeing of pets that the administrator is tending or has rescued.	407 Followers.	suffering in a hot car.
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Table 6: Facebook CNRs That Have Posted Since July 2016 (* Page Names and Descriptions have been anonymized).

Table 6 shows that 4 of the 9 CNRs have generated only 1 post since the wildfire was under control. One of these resources (Fort McMurray CNR 8) was created by a teen, who felt that this Facebook page was the only way he could meaningfully help. His single post following the fire talked about how he still plans to continue his efforts in getting the displaced horses back to Fort McMurray and that he is still concerned about helping around the event. We also found that 1 CNR (Fort McMurray CNR 2) has posted only 4 messages. All these messages were about the Fort McMurray wildfire, so this resource is still being used for the wildfire response. Another CNR (Fort McMurray CNR 3) has posted 17 times after the wildfire. All these posts were about the issues and challenges at the local (public inquiry on Fort McMurray wildfire, mental health challenges and increased unemployment of wildfire-affected oil workers), state (increase in the unemployment rate of Alberta), and national level (immigration, use of toxic Bromine in British Columbia (B.C.), and the B.C. wildfire). Furthermore, we found one CNR (Fort McMurray CNR 5) that was created on May 2, 2016. The administrator(s) of this CNR posted on May 4, 2016, after which this resource became idle for a while. The page became active again during August – September 2017, when the administrator(s) of this resource posted 23 times. All of these posts were related to flowers and quilting; none were related to the wildfire. After this activity, the page has once again become idle. We also found 1 CNR (Fort McMurray CNR 6) that has expanded its mission of reporting on the animals affected by the wildfire to missing animals and animal care, in general, with 153 posts following the wildfire. Another CNR (Fort McMurray CNR 7) has been sharing information about a wildfire in the southern Cariboo region of B.C. Even though this CNR is informing (or hoping to inform) people about a recent wildfire in B.C., it is unclear how people, ones who are not following this resource, would come to know that it could be useful in getting information about the B.C. wildfire. The online activity shown by these CNRs demonstrate how after the completion of an event CNRs sometimes broaden their goals (e.g., by putting their efforts towards animal safety on a broader scale, or by informing people about surrounding wildfires) or change their goals (e.g., by talking about quilts).

Relevance of Crisis Named Resources

After identifying the Fort McMurray named resources on Facebook and Twitter, we assessed whether they were posting about the wildfire. We read each message posted by the CNRs that existed throughout the wildfire and marked each message as on-topic (event-related) or off-topic (not related to the event). Examples of on-topic posts included messages about the fire size, evacuations, fire containment, re-entry, etc. Off-topic posts included posts about other local and national wildfires, Canada Day, etc. We did not mark the messages posted by the CNRs that were deleted before July 5 (the day the wildfire was classified as ‘under control’) as on- or off-topic due to terms-of-service obligations that require consumers of this data to remove deleted social media posts (Maddock et al. 2015).

Table 7 shows that the majority of the messages posted by these resources on Facebook (99.3%) and Twitter (99.2%) were related to the wildfire. However, there were a few resources (12 (of 54) on Facebook and 3 (of 13) on Twitter) that have no posts, not even posts irrelevant to the wildfire. We include these resources because these resources can still potentially be seen as sources of information about an event (even if they have no posts). Among the remaining 42 Facebook and 10 Twitter CNRs that posted information about the wildfire, 35 Facebook and 7 Twitter CNRs had less than 100 on-topic posts. This means that there were only 7 (12.9%) Facebook and 3 (23%) Twitter CNRs that were heavily used during the wildfire.

	Total Number of On-Topic Posts
Facebook	2639 of 2657 posts (99.3%)
Twitter	4974 of 5011 tweets (99.2%)

Table 7. Number of On-Topic Posts by CNRs on Facebook and Twitter.

We compared the number of on-topic posts per week during the wildfire timeframe to see if there is a correlation between the number of on-topic posts and event progression. Figure 1 shows that the highest number of on-topic messages on Facebook and Twitter were posted during the first two weeks of the wildfire. This finding indicates most of the online chatter about the event fell on the days when mandatory evacuations were in place.

To identify the administrator(s) of these CNRs, we analyzed the CNRs’ names, their descriptions, and the

messages they posted. We could only identify 9 (16.6%) CNR administrators on Facebook (1 via the CNR's description and CNR's posts, and the remaining 8 only through post content) and 2 (15%) CNR administrators on Twitter (1 via through the account description and the other via tweet content). The administrators for the other CNRs (i.e., 84% on Facebook and 85% on Twitter) are unknown.

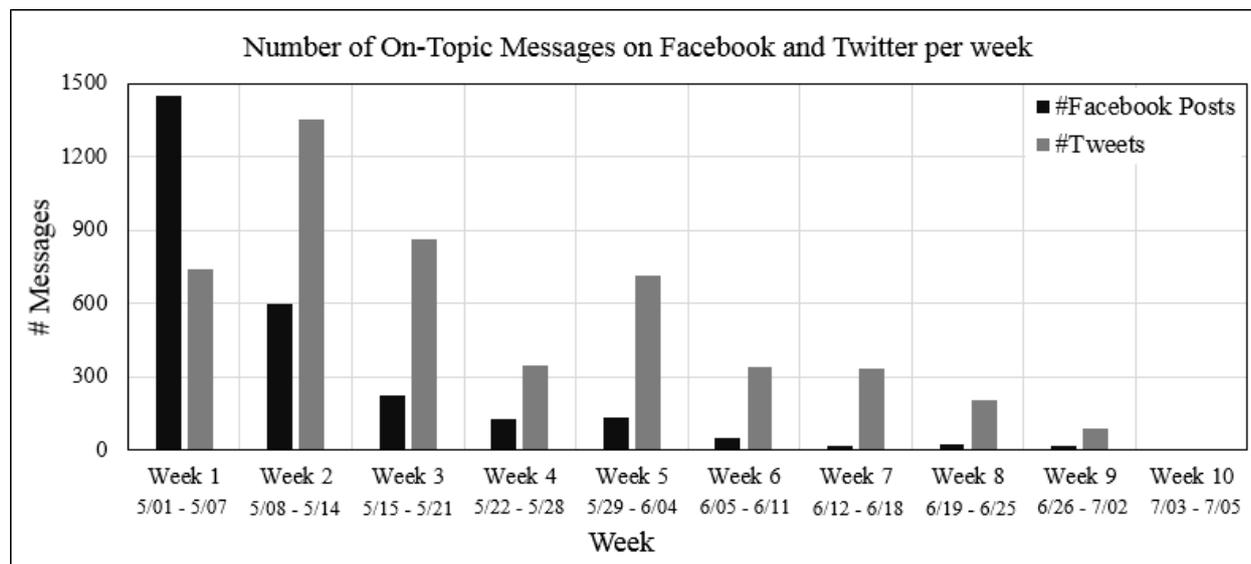


Figure 1. Number of On-Topic Messages Posted by CNRs over the Data Collection Timeframe.

Types of Crisis Named Resources

To better understand the different types of CNRs people create around a wildfire, we categorized each CNR by its content. We report only on the 54 Facebook and 13 Twitter CNRs that existed throughout the wildfire timeframe.

CNRs Categories	Definition	# Facebook Pages	# Twitter Accounts
Donations	Resources asking for money or items for the Fort McMurray wildfire victims.	8	0
Fundraisers	Resources used for selling or auctioning items, money of which was/would be used for the benefit of wildfire victims.	13	1
Prayers	Resources used for sending best wishes and messages of hope for wildfire victims.	1	2
Reactions	Resources used to express personal views and opinions about handling of the Fort Mac wildfire.	1	1
Reports	Resources used for reporting on the Fort McMurray wildfire event.	18	7
Needs & Offers	Resources used by people to ask for or provide help.	15	2
Stories	Resources that were asking for stories from individuals about their individual experiences, regarding evacuations, cheating, etc.	4	0
Unrelated	Resources that were named after the event but did not post about it.	0	1
Unclassified	Resources that lacked enough information to classify; ones with generic names (such as Fort McMurray wildfire), no self-description, and no posts.	3	2

Table 8. Types of CNRs.

We identified 3 parameters—the CNR 1) name, 2) description, and 3) message content—that could be used to categorize a CNR. We found that 8 (14.8%) Facebook pages and 6 (46.1%) Twitter accounts, in our dataset, had a generic name (such as “Fort McMurray Wildfire 2016” or “Fort Mc Fire”). Also, 15 (27.7%) Facebook pages and 6 (46.1%) Twitter accounts had no page or account description. Additionally, 13 (24%) Facebook pages and

2 (15.3%) Twitter accounts posted no messages. Thus, none of our three parameters were sufficient by themselves to categorize a CNR. As a result, we included all 3 parameters to categorize a CNR. We looked for purpose-defining keywords (such as recovery, support, fundraiser, etc.) in the name and description of the CNRs. We also read the on-topic messages posted by the CNRs to see if there were any posts from the CNR administrators that reveal their purpose for creating these resources, or if there are themes around the posts. Once we found a consistent theme around each CNR in its name, description, and/or messages, we assigned a brief description, such as ‘collecting donations.’ Over time, after a number of discussions between the authors, we grouped our CNRs into 8 categories. Table 8 lists these categories and the number of Facebook and Twitter CNRs that fit within each category. Note that a CNR could fall into multiple categories.

Table 8 shows that most creators of Fort McMurray CNRs reported information about the event (reports), sought and/or provided resources (needs and offers), and raised money for victims (fundraisers). The most frequent CNR type was the ‘reports’ category. Reports in our dataset, were mostly about wildfire updates (such as fire size, fire containment, etc.), evacuation notifications, alerts and advisories, or re-entry information. Reporting found in these CNRs was done through rebroadcasts (sharing or retweeting a web link), status updates, and links to other sources of information. The next most frequent CNR type was ‘needs and offers,’ the resources used by people to ask for things they needed, and to provide offers of help such as rescuing pets, building restoration, providing temporary accommodation, fuel, and other necessary items. Offers of help, in our dataset, were provided from individuals, families, and businesses. The third most frequently appearing type of CNR was ‘fundraisers.’ Fundraisers for this event included live auctions and the selling of items (such as sea salt scrub, hoodies and tanks, sports memorabilia, etc.).

Popular Crisis Named Resources

We define the most popular CNRs as those that received the highest number of Facebook likes or Twitter followers. A large number of page likes or Twitter followers indicates what resources people were paying attention to during this wildfire. ‘Fort McMurray Evacuee Open Source Help Page’ and ‘YMMHelps’ were the most popular CNRs in our dataset on Facebook and Twitter respectively (see Table 9).

	Most Popular CNR	CNR Description	#on-topic posts	#likes/#followers (MAX)
Facebook	Fort McMurray Evacuee Open Source Help Page	This is an open source page to help Albertan's Evacuating from Fort McMurray wildfires. Albertan's are encouraged to post offers of help. Website: https://ymmhelp.com	932 out of 932 (100%)	41,428
Twitter	YMMHelps (@YMMhelp)	Fort McMurray Evacuee Open Source Help Page - Crowdsourcing support for evacuees, and all subsequent volunteer/community rebuilding efforts. ymmhelp.com	950 out of 951 (99.9%)	1,446

Table 9. Most Popular CNR on Facebook and Twitter.

Looking at the self-descriptions for these resources (see Table 9), it appears they were administered by the same entity (the administrator of ymmhelp.com). To take a deeper look at these CNRs, we analyzed the messages they posted. Both Facebook and Twitter CNRs used the social platforms heavily to share wildfire-related messages with a rate of on-topic posts of 100% and 99.9% respectively. Also, both these CNRs are of the ‘needs and offers’ type i.e., they contained posts regarding the resources needed and resources available (known through offers of help). Both accounts acquired a large number of likes/followers, though the Facebook page had many more followers than the Twitter account (41,428 followers versus 1,446 followers).

Next, we looked at the distribution of on-topic posts for both of these CNRs over the wildfire timeframe, and also the number of likes/followers they gained over time. We found that both our most popular CNRs posted messages only in the month of May. The most on-topic posts on both the Facebook page (811 of 932; 87.0%) and Twitter account (616 of 951; 64.7%) were posted during the first week of the wildfire (May 1 – May 7). To break that down, the most number of on-topic posts on both the Facebook page (718 messages) and Twitter account (339 tweets) were posted on May 4, 2016 – a day after the massive evacuations (mass evacuations were forced on the night of May 3). Also, both of these accounts were created on May 3, 2016. The similarities

between the accounts is not surprising given these resources appear to be managed by the same party.

We also looked at their follower counts in March 2018 and found that the Facebook page has 38,764 likes and the Twitter account has 1,244 followers. These findings reflect a small decrease in the number of followers on both these resources after the wildfire was controlled.

DISCUSSION

In this paper, we examined the online behaviors of the 2016 Fort McMurray wildfire CNRs. Findings show that these CNRs primarily posted wildfire-related information and tried to help the wildfire-affected public in different ways. We also found that a large number of these CNRs were created during the wildfire, most of which became inactive or were deleted after the wildfire. Additionally, we discovered that most of the CNRs' owners did not explicitly disclose their identities, which raises questions of credibility. Below, we discuss these findings in more detail and offer broader implications and future directions for this research.

The CNRs in this study covered a diverse range of topics around the wildfire, from information dissemination (reports), to offers of help (donations, fundraisers, needs and offers), to expressions of solidarity (reactions, stories, prayers). We would expect to see more of these behaviors on a larger scale for larger events. We did not see any fake or malicious CNRs for the Fort McMurray wildfire, though that does not mean that they do not occur in other events. The list of categories developed in this work was specific to this event and would likely vary based on the context of the crisis event. Nonetheless, it does serve as a starting place for further investigation.

Most of the CNRs were used to post wildfire related information, but there were some resources that were never used to share anything. This is interesting because if someone creates a CNR, it implies that s/he intended, at some point in time, to post event-related content or something that would potentially be found by those looking for information about the event. Because the owners of these CNRs never posted or shared anything, it is difficult to evaluate the roles that these CNRs played in wildfire response efforts. We speculate that there could be multiple reasons for not posting. For instance, the owners of these resources may not have felt skilled enough to use their CNR, or they may have been directly affected by the wildfire leaving no time to use their resource.

While the majority of the Fort McMurray CNRs were created during the wildfire, we did find two CNRs that were created long before the wildfire but were adapted for the event. The owners of these two CNRs never stated reasons for changing the names of their accounts/pages, but there are likely many possible reasons for this behavior. First, changing the name to something related to the Fort McMurray wildfire could be a way to show support to the wildfire-affected public. Researchers saw similar behavior during the Virginia Tech Shootings of 2007, when Facebook users changed their profile picture to an image that demonstrated their support for the Virginia Tech community (Hughes et al. 2008). Second, it could be a way to publicly let people know they are participating in the wildfire response efforts. Third, it could be a tactic to gather more attention for their account/page. Fourth, the CNR owner may want to build on their current network instead of starting a new CNR as a way to share their wildfire-response efforts with a broader, already-familiar audience. Lastly, it could be a way for a CNR owner to build trust by letting everyone see their past activity, especially if they have prior experience in crisis response. Findings also indicate that many of the CNRs became inactive after the wildfire. However, a few CNRs are still in use, some of which continue to report on the Fort McMurray wildfire, while the others have either broadened their goals or have moved on to a new cause. This implies that the owners of these CNRs have found the social media platforms to be useful in working toward their goals.

Many of the CNRs created during the event were later deleted. Deleting a resource after an event concludes might be understandable, but it does make one wonder whether these resources should be curated to preserve a history of how people have responded to past events. Such archives might be useful for future crisis events. Most puzzling was the large number of CNRs that were deleted during the event. Unfortunately, we were unable to discern why these resources were deleted with the data we collected. Investigation of upcoming crisis events could provide opportunities to explore this phenomenon, though researchers would have to act quickly to collect the information before it disappears.

CNRs are named after events and thus are easier to find on social media when someone searches for information about a particular crisis event. Because of their naming convention, they also have greater potential to be mistaken as official sources of information. Surprisingly, we were unable to identify most of the administrators of the CNRs in our dataset. We were also unable to identify the intentions of CNRs that had a generic name, no account description, or had very limited to no posts. This finding is consistent with the findings of our previous study, where we studied the CNRs created in response to the 2014 Carlton Complex wildfire (Chauhan and

Hughes 2017). A similar finding was also reported in a study conducted by Zhao and colleagues (2008). The researchers in this study examined the identity construction of 63 Facebook accounts and found that the majority of these users did not provide explicit self-descriptions, and rather chose to present themselves indirectly by sharing their pictures, posting wall posts, and/or stating their interests and hobbies. The unknown administrators of these CNRs and the unknown intentions behind creating these CNRs could make it difficult to judge the veracity of the information provided by them. Further, there is cause for concern, because these anonymous resources could potentially spread misinformation or false rumor with little accountability, especially if they later delete the social media page or account. This concern is at least partially validated by Oh and colleagues (2013) who report that information with no clear source is the most important rumor causing factor on Twitter in crisis situations. Because CNRs are highly visible sources of information with potential credibility issues, emergency responders will likely want to quickly identify and monitor CNRs during a crisis event for potential misuse.

Limitations & Future Work

The data in this study is limited to publicly available Facebook pages and Twitter accounts and does not include CNRs found on websites, blogs, or other social media. To continue investigating CNRs, we plan to compare the roles played by CNRs in crisis response across different events. We also plan to interview the owners of CNRs of future crisis events to determine ‘who’ creates CNRs and ‘why.’ These interviews will also determine ‘what’ approach (if any) the administrators of these CNRs take to ensure the veracity of information that they share. Additionally, we plan to interview and survey people about how they perceive CNRs. The aim of these activities will be to determine the factors that people consider when evaluating the trustworthiness and usefulness of these resources.

CONCLUSION

This paper offers empirical insight into the lifecycle of CNRs, the relevance of CNR content to the events they are named after, and the types of informational content CNRs can offer. While the study revealed much about CNRs and their activity, it also raised many new questions for future investigation, such as: Why do people delete accounts about a crisis event while the event is still occurring? Why do some accounts named after a crisis event never post any information? What are the intentions of CNR administrators? This study lays the foundation for this future investigation.

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