



# Lessons Learned: Social Media and Hurricane Sandy

Virtual Social Media Working Group and  
DHS First Responders Group

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**Homeland  
Security**

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**CONTENTS**

CONTENTS ..... 2 &

INTRODUCTION ..... 4 &

PURPOSE ..... 5 &

SOCIAL MEDIA AND SANDY ..... 5 &

ADVANCES IN TECHNOLOGIES AND APPLICATIONS ..... 6 &

MAJOR THEMES IN SOCIAL MEDIA APPLICATIONS IN HURRICANE SANDY ..... 7 &

    Centralization and Aggregation of Information and Technology Support ..... 8 &

        Government Agencies ..... 8 &

        Information Aid and Bridging Organizations ..... 11 &

Multi-Way Information Sharing ..... 17 &

    Government to Public ..... 17 &

    Private Sector to Public ..... 18 &

    Public to Government (ACTIVE) ..... 18 &

    Public to Government (PASSIVE) ..... 18 &

    Public to Public ..... 19 &

    The American Red Cross ..... 20 &

The Role of the Media, Ad Hoc Groups, and Ad Hoc Volunteers ..... 21 &

Rumor Control and Misinformation ..... 22 &

Alternative Utilization of Private Resources and Partnerships ..... 23 &

    Angie’s List ([www.angieslist.com](http://www.angieslist.com)) ..... 23 &

    Airbnb.com ..... 23 &

    SeeClickFix.com ..... 24 &

    WalkScore.com ..... 24 &

Maps and Crowd-Sourced Information ..... 25 &

    Crisis Commons ..... 26 &

    Maryland Emergency Management Agency Reporting Map and Humanity Road ..... 26 &

    Fairfax County, Virginia ..... 27 &

    Additional Mapping Efforts ..... 28 &

    Challenges to Crowdsourcing ..... 28 &

TECHNOLOGY, PROCESS, AND POLICY GAPS REQUIRING FURTHER DISCUSSION ..... 29 &

CONCLUSION ..... 30 &

Lessons Learned - Social Media and Hurricane Sandy: Virtual Social Media Working Group

CASE STUDY: NEW YORK CITY ..... 31 &  
APPENDIX A: FAIRFAX COUNTY [VA] GUIDANCE TO GOVERNMENT PARTNERS..... 36 &  
APPENDIX B: FEMA GUIDANCE TO FEDERAL AGENCIES REGARDING SANDY WEBSITE  
STANDARDIZATION ..... 38 &

## INTRODUCTION

Social media and collaborative technologies have become critical components of emergency preparedness, response, and recovery. From the international response efforts in major tsunamis to hurricane response and recovery in major U.S. cities, many government officials now turn to social media technologies to share information and connect with citizens during all phases of a crisis. Implementing these new technologies, however, requires that responding agencies adopt new communication strategies and engagement methods.

Recognizing the need to address these challenges, the U.S. Department of Homeland Security's Science and Technology Directorate (DHS S&T) established the Virtual Social Media Working Group (VSMWG) in December 2010. The mission of the VSMWG is to provide guidance and best practices to the emergency preparedness and response community on the safe and sustainable use of social media technologies before, during, and after emergencies.

Drawn from a cross section of subject matter experts from federal, tribal, territorial, state, and local responders from across the United States, VSMWG members are establishing and collecting best practices and solutions that can be leveraged by public safety officials and responders throughout the nation's emergency response community. Below is a list of agencies to which the VSMWG members belong.

### VSMWG Members' Agencies as of January 2013

- American Red Cross
- City of Baltimore [Maryland] Police
- Boynton Beach [Florida] Police
- Centers for Disease Control and Prevention, Office of Public Health Preparedness
- City of Charlottesville [Virginia] Fire Department
- Clark [Washington] Regional Emergency Services Agency
- Fairfax [Virginia] County Public Affairs
- Federal Emergency Management Agency (FEMA) Office of External Affairs
- Fort Bend County [Texas] Health and Human Services
- Humanity Road
- New York City [New York] Office of Emergency Management
- Milwaukee [Wisconsin] Police & Department &
- Montgomery County [Maryland] Fire & and Rescue &
- Philadelphia [Pennsylvania] Office of Emergency Management
- Philadelphia [Pennsylvania] Department of Public Health
- Portland [Oregon] National Incident Management Organization, U.S. Forest Service
- Oregon Voluntary Organizations Active in Disaster (VOAD) &
- San Francisco [California] Department & of Emergency Management &
- Show Low [Arizona] Fire &
- Virginia Commonwealth University &
- University of Washington Office of & Global Affairs &

## **PURPOSE**

The VSMWG developed this document with input from the public safety community through monthly meetings, online engagement hosted on the DHS First Responder Communities of Practice portal and through virtual discussions via other social media channels between November 2012 and April 2013. This report serves as a follow-up to all of the previously published VSMWG documents, including the Social Media Strategy, Next Steps: Social Media for Emergency Response, and Community Engagement and Social Media Best Practices.

This document provides an overview on how social media was used in preparation for, in response to, and in recovery from Hurricane Sandy ("Sandy") in late October 2012. It also discusses processes identified by the first responder community as best practices; presents examples, themes in applications, and lessons learned; identifies gaps in technology, process, and/or policy; and offers points requiring further discussion.

The purpose of this document is to:

- Provide an overview of how social media was used by various agencies and organizations before, during, and after Sandy made landfall in October 2012;
- Compare and capture the change in accepted practices involving the use of social media for public safety purposes;
- Capture and discuss best practices and lessons learned from agencies using social media for various purposes throughout the course of the storm;
- Identify and discuss gaps in technology, process, and/or policy; and
- Identify and discuss possible next steps, including further discussion and/or development.

Examples included in this document are not intended to serve as an all-inclusive list, but rather to provide a brief list of agencies that used social media for public safety purposes for Sandy. For more information on these topics and additional resources, please visit the Virtual Social Media Working Group Community on DHS First Responder Communities of Practice ([www.communities.firstresponder.gov](http://www.communities.firstresponder.gov)).

## **SOCIAL MEDIA AND SANDY**

The popularity of social media tools, including social networking, micro-blogging, and video and photo-sharing has increased exponentially in the past several years. Additionally, as access to and understanding of mobile technology have grown, so too has the ability for individuals to share information, opinions, and experiences from anywhere and at any time. These changes in behavior and technology include capturing events such as hurricanes, school shootings, protests, and earthquakes, using video, text, posts, and photos taken from the ground and sharing them through social networks online.

Sandy, however, marked a shift in the use of social media in disasters. More than ever before, government agencies turned to mobile and online technologies before, during, and after Sandy made landfall, to communicate with response partners and the public in order to share information, maintain awareness of community actions and needs, and more. This document discusses major themes and gaps in the application of social media for various purposes throughout the preparedness, response to, and recovery from Sandy, including efforts by government agencies, nonprofit organizations, technology companies, and ad hoc or volunteer groups.

## ADVANCES IN TECHNOLOGIES AND APPLICATIONS

Since its inception in December 2010, the VSMWG has published three guidance documents on the use of social media for public safety. Although technology and behavior have significantly changed and advanced since then, several fundamental concepts have remained the same: the best practices and applications identified by the VSMWG in the following documents continue to provide a roadmap by which agencies can develop their own social media capabilities, tools, processes, and policies.

**Social Media Strategy**<sup>1</sup> – provides a high-level introduction to social media, its benefits for public safety, and best practices from agencies already using social media.

**Next Steps: Social Media for Emergency Response**<sup>2</sup> – serves as a follow-up to the Social Media Strategy document, presents challenges and provides next steps and best practices for public safety agencies developing and implementing social media; and

**Community Engagement and Social Media Best Practices**<sup>3</sup> – shares best practices for public safety agencies and partner organizations on how to use social media to successfully engage community members and stakeholders.

Developed in the fall of 2011 and published in January 2012, *Social Media Strategy* discusses a variety of tools (e.g., Twitter, Facebook, YouTube) and their potential application for public safety. The following table shows the tools and their potential applications from the publication (in black) and juxtaposes them with the tools and their specific applications as used by various agencies (in red) for Sandy in 2012. The table illustrates a shift in how public safety agencies use social media: tools that were not yet popular in 2011 were relied upon by government agencies during Sandy throughout the disaster's lifecycle, often for several purposes, engaging multiple stakeholders across several channels.

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<sup>1</sup> [https://communities.firstresponder.gov/DHS\\_VSMWG\\_Social\\_Media\\_Strategy\\_Formatted\\_May\\_2013\\_FINAL.pdf](https://communities.firstresponder.gov/DHS_VSMWG_Social_Media_Strategy_Formatted_May_2013_FINAL.pdf)

<sup>2</sup>

[https://communities.firstresponder.gov/DHS\\_VSMWG\\_Next\\_Steps\\_Social\\_Media\\_Strategy\\_Formatted\\_May\\_2013\\_FINAL.pdf](https://communities.firstresponder.gov/DHS_VSMWG_Next_Steps_Social_Media_Strategy_Formatted_May_2013_FINAL.pdf)

<sup>3</sup>

[https://communities.firstresponder.gov/DHS\\_VSMWG\\_Community\\_Engagement\\_Formatted\\_May\\_2013\\_FINAL.pdf](https://communities.firstresponder.gov/DHS_VSMWG_Community_Engagement_Formatted_May_2013_FINAL.pdf)

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Tool	Info-Sharing (one-way)		Info-Sharing (two-way)		Situational Awareness		Rumor Control		Reconnection		Decision-Making		Donations		Volunteer Management	
Twitter	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Facebook	X	X	X	X	X	X	X	X	X	X		X		X	X	X
SMS	X												X	X		
Photo-Sharing	X	X	X	X	X	X		X				X	X			
Video-Sharing	X	X	X	X	X	X		X				X	X			
Websites	X	X		X				X	X		X				X	X
Mapping			X		X	X		X		X	X	X				X

Most of the uses for social media in public safety that were discussed in the VSMWG's previous documents also applied for Sandy. These include:

- Facilitating direct agency engagement within a community;
- Maintaining situational awareness about emergency events and partnership opportunities;
- Providing an additional method for disseminating emergency public information;
- Providing a method for evaluating public information;
- Providing a means for the community to engage in problem solving;
- Providing a means to meet and manage public expectations;
- Engaging individual connectivity and promote community resources;
- Building and promoting agency or organization credibility;
- Promoting and encouraging efficiency, credibility, and transparency;
- Encouraging multidirectional sharing of essential information; and
- Encouraging behavioral change.

Each of these benefits and applications has been categorized thematically to help in understanding the full spectrum of social media uses for public safety, with specific regard to events that occurred during Sandy and to better direct development and use of social media tools in the future. Each theme is clearly illustrated by several examples of government agencies, nonprofits, and response partners, as noted in the next section.

### MAJOR THEMES IN SOCIAL MEDIA APPLICATIONS IN HURRICANE SANDY

Throughout the course of the storm, including the days prior to landfall and for several weeks following, government agencies, response partners, utilities, nonprofits, ad hoc groups, and individuals leveraged various social media tools for a variety of purposes. Many of these instances represent the first time a government agency officially used social media for response activities. The following section highlights several key themes in the applications of social media by various entities and for various purposes, and discusses various gaps in technology, process, and/or policy when identified.

### **Centralization and Aggregation of Information and Technology Support**

Response and recovery efforts to a major disaster involve many players, each with responsibility to their respective stakeholders, missions, constituents, etc. Without coordination across communications channels and platforms, information may become so dispersed that it is difficult to navigate through multiple resources. For example, in Hurricane Katrina, separate websites were used to share information for evacuees, friends, and families and to publish lists of names; blogs were used for posting location, status, etc. So many websites sprang up that it became difficult to find the specific website for the information, resources, or reconnection one needed.

Since Katrina, various nonprofits and volunteer groups have developed websites that conglomerate as many resources and as much information as practicable in one place. In Sandy, social media made it possible for many agencies, nonprofits, and volunteers to aggregate information and resources and publish them in one place. These central hubs of information often cited and/or linked to other related (or official) websites. In the absence of government-provided information (or a cohesive approach to providing information from multiple government agencies in one place), nonprofit and volunteer organizations stepped in to assist, developing and combining information resources and making them available for the public and for response stakeholders.

This assistance—provided by the nonprofit and volunteer sectors, sometimes pre-established and/or organized, sometimes in an ad hoc manner—helped alleviate some of the strain experienced by government agencies that were focused on response operations. In the future, relationship building and pre-organized processes for sharing of information responsibilities will be necessary to ensure information is verified, accurate, and comprehensive and available immediately or even prior to the onset of the disaster. **For more information, see Technology, Policy, and Process Gaps Requiring Further Discussion (page 29).**

#### **Government Agencies**

During Sandy, many government agencies aggregated and published information through a centralized portal as well. For example, the New York City Mayor's Office provided information via only one website ([www.nyc.gov](http://www.nyc.gov)) during both response and recovery from the storm. The website offered information on volunteer opportunities, where to find prepared food, and availability of resources including open gas stations, pharmacies, hotels, restaurants, etc. The city provided the information that was used to populate these sites; additional information came from individuals reporting on outages, resources available and/or open, and more through Twitter and other channels.<sup>4</sup>

#### **FEMA and Federal Sandy Website Standardization**

On October 31, 2012, the web manager for FEMA issued guidance to all U.S. government agency websites (per Emergency Support Function 15 of the National Response Framework).<sup>5</sup> In this guidance, FEMA requested four things:

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<sup>4</sup> For more information on New York City's activities in Hurricane Sandy, See Case Study: New York City (pg. 31)

<sup>5</sup> National Response Framework at Fema.gov; <http://www.fema.gov/library/viewRecord.do?id=7371>



- Creation of a [www.\[agency\].gov/sandy](http://www.[agency].gov/sandy) landing page on their respective site. On this page, agencies were requested to place information only FROM THEIR AGENCIES (to stay in their "lane" of communication) and to not cross-post information from other agencies. If one agency had information that would be appropriate to place on another agencies website, the agency web managers were asked to coordinate directly. A request to create a URL for both English and Spanish content (if appropriate) was also made.
- Once the [www.\[agency\].gov/sandy](http://www.[agency].gov/sandy) landing page was created, the agencies were asked to notify the USA.gov web manager at the U.S. General Services Administration (GSA) that the page was active and provide under which general "lane" of information the page fell:
  - " Health and Safety;
  - " How to Get Help;
  - " Find Friends and Family;
  - " Donate/Volunteer; and
  - " What the Government is Doing.
- Once the [USA.gov/sandy](http://USA.gov/sandy) page was created, all agencies were then encouraged to cross-link from their agency homepage and their [www.\[agency\].gov/sandy](http://www.[agency].gov/sandy) page back to the [www.USA.gov/sandy](http://www.USA.gov/sandy) page and/or embed the USA.gov Hurricane Sandy widget on their agency websites.
- Once the [www.\[agency\].gov/sandy](http://www.[agency].gov/sandy) pages were created, FEMA also requested that all agencies notify the FEMA web manager of the page status and also include whether or not the following information was included on the page:
  - " Statistics;
  - " Situation reports;
  - " Blog posts;
  - " Press releases;
  - " Safety/recovery tips; and
  - " Other (details).

This information was then shared with FEMA's Strategic Communications Division within the Office of External Affairs.

The goal of this effort was to drive visitors looking for Sandy information back to one authoritative source for information. FEMA, working with GSA, consolidated all U.S. government web content related to Sandy onto [www.USA.gov/sandy](http://www.USA.gov/sandy), with specific relief and recovery information being consolidated onto [www.FEMA.gov/sandy](http://www.FEMA.gov/sandy). A widget was then created that directed the public to the five identified lanes of communication (identified above) on USA.gov.

From October 22 through December 31, 2012, the Hurricane Sandy page on USA.gov was viewed over 71,000 times, with the Hurricane Sandy widget being viewed over 2.8 million times. The Spanish version of the page was viewed over 3,600 times and the Spanish widget was viewed over 10,000 times.

### ***FEMA's Sandy Landing Page***

On the [www.FEMA.gov/sandy](http://www.FEMA.gov/sandy) landing page, FEMA provided all of the specific relief, response and recovery information related to Sandy. Information for disaster survivors included how to get immediate help, how to locate a shelter, how to locate a FEMA Disaster Recovery Center, and access to the state-specific disaster declarations. This information was also ultimately provided in 18 languages aside from English. Links were provided to all applicable state and local websites, and information was provided for those who want to help (donations and volunteering).

As a direct response to lessons learned from Hurricane Katrina, the [www.FEMA.gov/sandy](http://www.FEMA.gov/sandy) page also contained two features that were part of a concerted effort to increase transparency around the U.S. government's response to Sandy. The first was a timeline page, which provided a detailed chronology of the U.S. government's response activities from October 22 through November 18, 2012. The second was a "Hurricane Sandy: By the Numbers" widget, which presented how many FEMA personnel were deployed in response to the disaster, how many assistance registrations had been received, how much had been approved in assistance dollars, and how many disaster recovery centers were open and their locations.

From October 22 through December 31, 2012, Hurricane Sandy pages on FEMA.gov were viewed over 740,000 times, with over 7 million visitors coming to the site as a whole.

### ***FEMA Innovation Team<sup>6</sup>***

The [FEMA Think Tank](#) has played an important role in developing new approaches to emergency response. Prior to Sandy, it was used as a means to discuss and generate solutions among community members to help boost the field of emergency management and related solutions. Through its [online forum](#) and monthly conference calls led by Deputy Administrator Richard Serino,<sup>7</sup> the FEMA Think Tank helped identify short- and long-term projects, connecting the right people to work towards corrective action, and then producing recommendations for emergency managers at all levels.

Response efforts and lessons learned during the response to and recovery from Sandy helped to propel the vision of the FEMA Think Tank, bringing innovative solutions, recommendations, and guidance to the community. From this vision, the (FEMA) Innovation Team was born— a multi-sector, cross functional group made up of members who assisted relief efforts with various activities, including finding generator power for the disaster recovery centers, helping to set up a mesh network to provide Internet connectivity in Red Hook [NY], and connecting residents and volunteer workers to shelters and kitchens.

The FEMA Innovation Team's efforts continue to help redesign FEMA's Disaster Recovery Centers and create processes that can be repeated with future emergencies. The team will continue to collaborate with partners, including the DHS Virtual Social Media Working Group, Humanity Road, Geeks Without Bounds, and many others on innovative solutions, challenges, technologies, and procedures to address policy gaps and other deficiencies identified in the response to the storm.

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<sup>6</sup> <http://www.fema.gov/fema-think-tank>

<sup>7</sup> Deputy Administrator Serino's Blog on the Innovation Team: <http://www.fema.gov/fema-think-tank>

### **Information Aid and Bridging Organizations**

For Sandy, nonprofit and ad hoc organizations brokered information and provided help within communities affected by the storm, sometimes directly in support of government agencies or in addition to official response operations. Ultimately functioning as an information aid or bridge, these organizations posted, shared, searched for, found, reported, and provided information and resources via various tools to and from response organizations and the public.

Organizations like Humanity Road, National Voluntary Organizations Active in Disaster (NVOAD), Geeks Without Bounds, Occupy Sandy, and others provided support to response agencies by connecting information, resources, partners, and the community through various means. Additionally, organizations like the American Red Cross empowered previously trained volunteers to assist in relaying information to and from the public. **For more information, see Multi-Way Information Sharing: American Red Cross (page 20).**

Although many organizations maintained relationships with response organizations and government agencies prior to the storm, many were established during the response in an ad hoc manner. In these instances, many relationships were secured after the hurricane made landfall through various network points of contact or operated completely on their own.

#### ***Humanity Road***

Humanity Road, a nonprofit organization dedicated to educating the public with critical information before, during, and after a catastrophic disaster, aggregated and published a centralized list of aid providers and social media resources following Sandy's landfall. The Sandy Situation Report, published on Humanity Road's website, provided information on national, regional, and state-level resources for people and animal owners, as well as volunteer opportunities for eastern seaboard states affected by Sandy. Working with the FEMA Innovation Team and Crisis Clean Up ([www.crisiscleanup.org](http://www.crisiscleanup.org)), Humanity Road also provided referrals for complex cases to assist residents in New Jersey with finding aid and needed resources.

#### ***Disaster Tech Lab<sup>8</sup>***

Disaster Tech Lab has been involved in the post-Sandy disaster response effort since October 29, 2012, working together initially with members of the CrisisCommons organization from across the globe, responding to data gathering and mapping requests. One result, the "Hurricane Sandy Communications Map" (right) mapped locations of public Wi-Fi available in areas hit by Sandy as well as telephone outages. The map, powered by the Ushahidi platform, was partially crowd-sourced with people on the ground reporting locations and details of services.



<sup>8</sup> <http://disastertechlab.org/deployments/hurricane-sandy-response/>

### ***Disaster Distress Helpline***

The Disaster Distress Helpline (DDH), a program of the Substance Abuse and Mental Health Services Administration (SAMHSA), is the first national hotline dedicated to providing year-round disaster crisis counseling. This toll-free, multilingual, crisis support service is available 24/7 via telephone (1-800-985-5990) and SMS (text "TalkWithUs" to 66746) to residents in the United States and its territories who are experiencing emotional distress related to natural or human-caused disasters. Prior to, during, and in the short- and long-term aftermath of Sandy's impact, DDH staff reached out to partners in the projected path of the storm, including numerous VOAD chapters, American Red Cross chapters, State Disaster Mental Health Coordinators, to offer support to individuals and communities affected by the storm.

The DDH saw an 87% increase in unique visitors to its website and significant follower growth on the program's Facebook and Twitter accounts. Calls to DDH increased by 2000% and texts increased by 600% during the peak of the storm. Even as response has shifted to long-term recovery, most of the DDH calls are still coming from New York and New Jersey.

### **311**

311 can be useful for diverting non-emergency issues away from 911 to save and best allocate resources during an emergency while maintaining responsiveness to the community. In Sandy, 311 systems helped to track and deploy resources to non-emergency issues like downed wires and trees.

Implemented in 2008, Boston's 311 system was extended with the City Worker mobile app, which "...routes service requests straight to Android-based mobile devices of the nearest work crew from the responsible department...thanks to the city's end-to-end issue reporting, execution and tracking, which helped guide the city in the optimal deployment of resources"<sup>9</sup> In Sandy, the mobile app helped officials respond to more than 700 tree emergencies and 300 downed wire reports. Officials also responded to issues reported by citizens through social media channels and the Citizen's Connect mobile app.

### **211**

211 is a model for providing community resources and information through the 2-1-1 phone system. The New Jersey 2-1-1<sup>10</sup> system, launched in 2005, is operational throughout the state via landline, cell phone, and Internet. The state's two 2-1-1 call centers are united through a Virtual Private Network, using broadband connections and a statewide host server for database integration.<sup>11</sup> In New Jersey, the 2-1-1 system is managed by the NJ 2-1-1 Partnership, which is a subsidiary of the United Way of Jersey. In addition to the phone lines, the New Jersey 2-1-1 website, <http://www.nj211.org/>, provides information on:

- Recovery resources;
- FEMA assistance and the application process;
- Food assistance;

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<sup>9</sup> Industry Perspective: Dual Tasking 311 Infrastructure. David Moody; GovTech.com  
<http://www.govtech.com/public-safety/Industry-Perspective-Dual-Tasking-311-Infrastructure.html>

<sup>10</sup> New Jersey 211: <http://www.nj211.org/energy/index.cfm>

<sup>11</sup> New Jersey 211: <http://www.nj211.org/moreabout211.cfm>

- Utility payment assistance; &
- Animal information; &
- Legal assistance; and &
- Clean-up resources and local recovery efforts. &

Individuals visiting the website can search the NJ 2-1-1 database for local resources, searching by topic, agency, or program name.

### *Geeks Without Bounds*

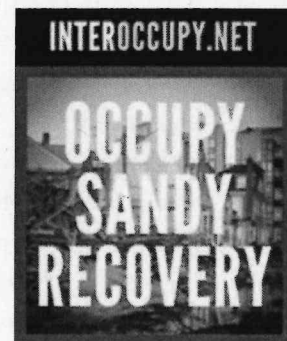
Geeks Without Bounds (GWOB) deployed with the FEMA Innovation Team for Sandy response in November of 2012, helping to bridge the formal and informal response efforts. GWOB spent equal time in the field in the Rockaways, Staten Island, and Breezy Point as it spent operating from co-working spaces and from FEMA's offices.

GWOB worked with Occupy Sandy to streamline its exchanges with FEMA and other formal organizations. For example, when Occupy Sandy went to clean out houses, GWOB notified the Rockaways and organizations doing disposal work to go to those areas to remove refuse before it became a health concern. GWOB also linked Occupy Sandy with Sahana, an open source database specific to disaster response, to help satisfy Occupy Sandy's logistics needs.

### *Occupy Sandy*<sup>12</sup>

Occupy Sandy, an ad hoc and spontaneous volunteer effort, provided support to the communities affected by Sandy through the pre-existing network, relationships, and connections created in support of Occupy Wall Street in the fall of 2011. The nonhierarchical nature in which Occupy activists were accustomed to organizing was useful for triage and immediate support immediately following the hurricane's landfall. Within the first 2 weeks, Occupy Sandy represented a significant response effort, with an estimated 5,000 to 10,000 volunteers.

Considered a provider of technology support and services to community-led relief efforts, Occupy Sandy leveraged free and open-source tools, like Sahana Eden, to develop a technical infrastructure and disaster management system for information sharing and response support. The group used the Sahana software at a dispatch hub for communications and to log requests for assistance, to print waybills with inventories and their destinations, and to track requests for disaster relief supplies like food, water, dry goods, and cleaning supplies. The software was also used to track work orders for houses needing cleaning, mold remediation, etc.<sup>13</sup> In the future, additional funds will be necessary in order to customize the system for specific needs and to ensure its immediate readiness in emergencies.



<sup>12</sup> <https://speedbird.wordpress.com/2012/11/21/preliminary-notes-to-a-diagram-of-occupy-sandy/>

<sup>13</sup> [http://sahanafoundation.org/interview-with-devin-balkind-sahana-and-occupy-sandy-relief-efforts/?utm\\_source=twitterfeed&utm\\_medium=facebook](http://sahanafoundation.org/interview-with-devin-balkind-sahana-and-occupy-sandy-relief-efforts/?utm_source=twitterfeed&utm_medium=facebook)

Occupy Sandy established social media profiles immediately following the storm, and within a day, volunteers arrived in the Rockaways. In fact, social media served as a primary source of information for Occupy volunteers for information sharing to and from the field throughout recovery efforts.

In addition to providing physical and operational support to victims of the storm, the group created a centralized website (right), Occupy Sandy Recovery, and a map using Google Fusion Tables embedded in their WordPress-powered website to provide information, connect individuals with resources, collect donations, and register and direct volunteers in five locations: New Jersey, Coney Island, Greenpoint, the Rockaways, and Staten Island. Individuals could visit the site to register community needs and request aid—information that was used to help allocate volunteer, and other resources. Volunteer information was collected in a CiviCRM<sup>14</sup> system, making it easy to segment volunteers by interest and location in order to target and send specific information.

A map developed by Hurricane Hackers NYC<sup>15</sup> offered National Oceanic and Atmospheric Administration (NOAA) aerial imagery of affected areas with an overlay of recovery locations. Hurricane Hackers also provided information in a centralized location,<sup>16</sup> connecting online resources and other organizations such as CrisisCommons, NYTechResponds, Recovers.org and others working on technology projects and resources. Additional information and resources available on the Occupy Sandy website, [www.interoccupy.net](http://www.interoccupy.net), included:

- Clean-up information;
- Disaster assistance resources;
- A Disaster Recovery Center Locator;
- Education-related information and contacts;
- FEMA resources and contacts;
- Financial assistance and funding resources;
- Housing and shelters;
- Job opportunities;
- Legal assistance;
- Medical and mental health assistance;
- Mutual aid;
- Power and electricity resources;
- Immigrant resources;
- Safety information;
- Tenant and homeowner rights; and
- Volunteer projects.

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<sup>14</sup> <http://civicrm.org/>

<sup>15</sup> Hurricane Hackers NYC was a hack-a-thon, or event in which scientists, designers, developers, and citizens gathered to develop tools and apps to assist in the recovery efforts. More information available at: <http://mapbox.com/blog/hacking-hurricanes-with-noaa/>

<sup>16</sup> <https://docs.google.com/document/pub?id=1SGcfQz13ce4FfB-QHKF3WLwxHoCRGBouuvZn-3aoX0k>

### ***National Voluntary Organizations Active in Disaster (NVOAD)***

NVOAD, a nonprofit, nonpartisan, membership-based organization, serves as the forum where organizations share knowledge and resources throughout the disaster cycle—preparation, response, and recovery—to help disaster survivors and their communities.<sup>17</sup> NVOAD membership includes 108 organizations comprising faith-based, community-based, and other nongovernmental organizations throughout the nation, representing all 50 states, 4 territories, and the District of Columbia.

Like many state VOAD organizations on the East Coast during Sandy, NVOAD was extremely busy coordinating a multistate disaster relief and recovery effort. Once the hurricane made landfall, social media profiles were updated infrequently, leaving comments and negative posts unaddressed. To help support social media profiles and increase the visibility of NVOAD's efforts, Scott Reuter, President of Oregon VOAD and an active social media volunteer, was asked by NVOAD to lead the social media effort and enhance its social media presence during Sandy.

Mr. Reuter and a digital volunteer colleague, Marlita Reddy-Hjelmfelt, also established a Virtual Operations Support Team (VOST)<sup>18</sup>-style collaborative workbook in which to search for, identify, list, and track as many active VOAD-related social media accounts and websites as they could find. This workbook focused on organizations that were helping in Sandy recovery efforts, especially those who were VOAD member organizations posting updates on their Sandy relief activities. The goal was to demonstrate that VOAD member organizations and state VOADs were highly active in recovery efforts. Mr. Reuter and Ms. Reddy-Hjelmfelt responded to all comments and questions posted to the Facebook and Twitter accounts and began to regularly post updates they received from NVOAD or as they found them on social media. They also tracked their progress and coordinated their efforts through the workbook, monitoring, documenting, and reporting on the activities of VOAD member organizations throughout the recovery. Within a couple of days of supporting NVOAD's social media efforts, the negative posts stopped; NVOAD's Facebook and Twitter accounts began to gain friends, followers, and positive posts.

### ***Titus and NJVOAD***

Aaron Titus from Mormon Helping Hands, a member of New Jersey VOAD, developed a private tasking system and map that was made available to organizations with ground teams responding to assess and resolve issues. The system provides organizations a method of coordination without command and control over



a broad geographic footprint. Throughout recovery, more than 90 organizations surveying damage and identifying resource needs were able to resolve thousands of incidents by using this system to capture

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<sup>17</sup> National Voluntary Organizations Active in Disaster: <http://www.nvoad.org/about>

<sup>18</sup> Virtual Operations Support Groups: <http://vosg.us/>

assessments and track issues through to resolution. Georgia and Mississippi VOADs have used the system since the tornadoes in February 2013.<sup>19</sup>

***Information Technology Disaster Resource Center (ITDRC)<sup>20</sup>***

The ITDRC is a nonprofit organization whose mission is to assist communities with technology continuity and recovery during times of disaster. Through partnerships with government and nongovernmental entities, as well as through service request forms published to the ITDRC website, the ITDRC engaged various members of the New York Tech community to supplement local volunteer resources. A total of 26 ITDRC technology volunteers, augmented by strategic partners and nearly 1,000 local tech volunteers, mobilized to provide temporary communications, resources, and technology assistance to communities, nongovernmental organizations (NGOs), and small businesses. The ITDRC technology teams installed computers, networks, Wi-Fi infrastructure, and internet-based telephone in fire stations along the Rockaway Peninsula and in Disaster Resource Centers (DRCs) throughout the region.

Working in collaboration with the FEMA Innovation Team, the ITDRC helped to satisfy needs that were identified in daily meetings and conference calls. For example, the ITDRC obtained a list of private and public DRC locations within a 25-mile radius that were candidates for Internet connectivity and public Wi-Fi. Stakeholders were then provided with access to site information through an online collaboration document, where they could monitor installation status and add additional sites as they were identified.

The ITDRC also worked with a number of NGOs and community organizations such as the NY Tech Meetup, NYC Economic Development Corporation, Geeks Without Bounds, Humanity Road, City-Wide Disaster Services, Global Disaster Immediate Response Team (D.I.R.T.)<sup>21</sup>, Team Rubicon<sup>22</sup>, Disaster Tech Labs, and the Red Hook Initiative.<sup>23</sup>

***Cisco Tactical Operations***

Cisco Tactical Operations ([www.cisco.com/go/tacops](http://www.cisco.com/go/tacops)) is an emergency technology team created by Cisco Systems to assist public safety, critical infrastructure, and continuity of government operations during disasters and other crisis situations. The team's emergency response operations are funded through Cisco's Corporate Social Responsibility (CSR) program. The team is equipped with specialized vehicles and kits and is trained to operate in austere disaster environments within the United States and around the world during the acute phase of an emergency.

During Sandy, the Cisco Tactical Team, along with other organizations on the ground including DRCs, the FEMA Innovation Team, and various NGOs, responded from North Carolina and California to provide emergency communications support and restoration. This support included donation and loaning of Internet data, voice, video, and collaboration tools to public safety (police, fire, emergency management) organizations in New York and New Jersey.

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<sup>19</sup> <http://www.aarontitus.net/blog/2012/12/20/disaster-recovery-collaborative-work-order-system/>

<sup>20</sup> <http://www.itdrc.org/index.html>

<sup>21</sup> <http://globaldirt.org>

<sup>22</sup> <http://teamrubiconusa.org>

<sup>23</sup> [http://itdrc.org/pubs/whitepapers/Hurricane\\_Sandy-ITDRC\\_AAR-Jan2013.pdf](http://itdrc.org/pubs/whitepapers/Hurricane_Sandy-ITDRC_AAR-Jan2013.pdf)



## Multi-Way Information Sharing

In Sandy, social media enabled multi-way information sharing and partnerships, highlighting the usefulness of collaboration across sectors, groups, organizations, and jurisdictions. Social media was used for more than just a reporting mechanism allowing one-way conversations from the government to the public. The following section highlights how social media facilitated multi-way information sharing across the community.

### Government to Public

Even before Sandy made landfall, government agencies, response partners, and utility companies used Twitter, Facebook, and other websites extensively to relay information, evacuation orders, and updates. After the storm, people used Twitter to report issues, danger, and power outages, and many regarded it as a lifeline. Additionally, political leaders and response professionals used Twitter to confirm information provided by the public and to engage directly with the public. Examples of such influential users of Twitter included:

- [Massachusetts Emergency Management Agency](#); (@MassEMA)
- Newark, New Jersey Mayor, Cory Booker (@corybooker);
- New York State Governor, Andrew Cuomo (@NYGovCuomo);
- New Jersey Governor, Chris Christie (@govchristie);
- Craig Fugate (FEMA) (@craigatfema);
- Delaware Government, Jack Markell (@GovernorMarkell);
- New York City Fire Department (@fdny);
- Port Authority of New York and New Jersey (@PANYNJ);
- City of New York Mayor's Office (@nycmayoroffice, @nycgov);
- New York City Office of Emergency Management (@NotifyNYC, @nycoem);
- Virginia Department of Emergency Management (@vdem);
- Fairfax County, Virginia (@fairfaxcounty);
- New Jersey Central Power and Light (@jcp\_);
- Public Service Electric and Gas Company (@pse&gdelivers);
- Dominion, Virginia Power (@domVApower);
- New York City Fire (@FDNY);
- New York City 311 (@311NYC) (call, click, or text)<sup>24</sup>;
- State of New Jersey Beach Quality Monitoring Program (@njbeachreport)
- [U.S. Small Business Association](#) (@sbagov); and
- [U.S. Department of Housing and Urban Development](#) (@hudnews).

Additionally, Fairfax County, Virginia used its [blog](#) to share information with the public during and after the storm.<sup>25</sup> Posts included information on flooding, road closures, power outages, downed trees, and how to stay informed through its [Community Emergency Alert Network text/email](#).

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<sup>24</sup> <http://www.nyc.gov/apps/311/about.htm>

### **Private Sector to Public**

Private sector stakeholders provided additional assistance in support of the government response. For example, Twitter published a #Sandy web page that provided information on several resources, including important Tweets and a list of Twitter profiles to follow in each affected state as well as Federal agencies. Twitter also offered “promoted” crisis tweets to the American Red Cross, FEMA, New York City Mayor’s Office, and the Maryland Emergency Management Agency. Finally, Twitter’s government account (@gov) compiled a list of widely suggested emergency and local accounts to follow.

Infrastructure providers such as water, power, and transportation organizations shared information on the status and availability of their resources through various social media channels as well. Some examples included:

- Amtrak (@Amtrak);
- Pepco (@PepcoConnect);
- Multiple Florida Power Companies’ Twitter accounts;
- Progress Energy (@ProgEnergyFL);
- First Energy Outage Map;
- Con Edison (@ConEdison);
- New York ConEd Power Outage Map; and
- New York Long Island LIPA Power Outage Map.

### **Public to Government (ACTIVE)**

The public used social media to report problems and needs, call for help, and look for and provide information and support throughout the course of the storm. The information shared by the public both informed and engaged government agencies, providing enhanced situational awareness for response officials. This information was actively requested and/or shared via social media channels, or passively collected by government officials scanning the networks for applicable information.

As an example of active information sharing, the Maryland Emergency Management Agency launched a crowdmap to assess impacts being discussed in social media, activated Humanity Road, and asked for the public to provide input. This initiative involved the use of trained volunteers to perform monitoring and active listening in social media networks to collect damage reports shared by the public and input this information to the crowdmap for specific geographies in Western Maryland and along the Eastern coast of Maryland.

### **Public to Government (PASSIVE)**

Information gleaned through social media was received not only directly, but also through government agencies monitoring social media in order to catch important messages and emerging threats and identify resource needs.

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<sup>25</sup> <http://www.fairfaxcounty.gov/emergency/metrics/>

For example, throughout Sandy, the New York Fire Department (FDNY) provided information through the official department Twitter feed.<sup>26</sup> Early on, FDNY's social media manager, Emily Rahimi, posted directions not to tweet emergency calls. However, as the storm progressed, individuals tweeted calls for help, reporting flooding, individuals trapped in buildings, and more. FDNY responded to these calls, asking for more information, contacting dispatch and relaying information regarding the individuals' posts, and assisted when individuals were not able to get through to 911.<sup>27</sup>

#### **Public to Public**

The public also used social media to initiate and maintain contact with loved ones and friends, show and provide support to the community, solicit donations, and more. In this capacity, nonprofit information aid/bridging organizations helped to direct information to the right resources and make key connections.

Although much of the information shared by the public could not be used by government agencies without being verified, information gleaned from public sources was helpful in illustrating trends, and was used by many in search of resources such as gas, food, and shelter. Groups such as Humanity Road, a member of Virginia VOAD, helped to connect information points within communities by aggregating contact information and key messages and publishing them in centralized locations.

Local community members in the Rockaway region of New York created the Rockaway Help<sup>28</sup> Facebook page to communicate with Rockaway residents and those who could provide them with aid. Created on October 31, 2012, the daily list of high-priority donation requests<sup>29</sup> was published and used to guide public behavior for providing preferred donated items. As of March 12, 2013, this Facebook page was still being used to share information and had over 10,000 "likes".

The deployment of resources and technology in Rockaway to provide the public, Rockaway residents, and public charities with the ability to communicate presents an example of collaborative efforts. Alison Thompson, a resident of New York, activated Humanity Road in Rockaway to provide communications support to the public. Once Humanity Road was onsite, a lack of a reliable network led the volunteers to request ITDRC and Disaster Tech Lab to provide a public Wi-Fi network for the local community command center at St. Francis De Sales Church and School. Standard car batteries powered the launched network; connectivity to the Internet via satellite was facilitated by ITDRC. Goal Zero ([www.goalzero.com](http://www.goalzero.com)) arrived and delivered solar battery packs to power laptops, printers, lighting, and recharging stations. This community center served 48,000 people, and the communications and office equipment enabled them to organize and communicate with their local community.

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<sup>26</sup> <https://twitter.com/FDNY>

<sup>27</sup> FDNY Twitter support during Sandy: <http://news.yahoo.com/blogs/ticket/meet-fdny-one-woman-twitter-response-team-guiding-141143449.html>

<sup>28</sup> Rockaway Help Facebook Page: <https://www.facebook.com/pages/Rockaway-Emergency-Plan/463945416990840?ref=ts&fref=ts>

<sup>29</sup> Example of donation request post: <https://www.facebook.com/pages/Rockaway-Emergency-Plan/463945416990840?ref=ts&fref=ts>

Additional examples of public-to-public use of social media included:

- [Breezy Point Cooperative Hurricane Sandy Information \(Official\) Facebook page;](#)
- [Hurricane Sandy News Facebook page;](#)
- [Oceanside, NY Hurricane Sandy Updates Facebook page;](#)
- [Hurricane Sandy Info – Relief & Recovery Facebook Page;](#) and
- [Hurricane Sandy Relief Volunteer Group Facebook Page.](#)

#### **The American Red Cross**

The American Red Cross' three-person national social engagement team, assisted by digital volunteers, local chapters, local volunteers, and other partners, used social media tools to carry out the organization's mission online. This mission included helping the Red Cross community become more informed and prepared, providing the public with a seat at the operational table, and using information gleaned from the public to help in decision-making during a disaster.

Between October 22 and November 30, the Red Cross tracked more than 2 million posts for review, choosing specific keyword searches relevant to Red Cross services, such as shelter and emotional support. In that time frame, the team tagged 10,447 posts for further consideration, using the information gleaned from the posts to populate the team's social media updates and to guide social media content and engagement. Types of posts tagged for further review included:

- Direct inquiry to a Red Cross social media account;
- Positive or negative experience with the Red Cross;
- Question about a Red Cross service/how to get Red Cross services (e.g. Emergency communication for military families, sign up to give blood, etc.);
- Comment that has (positive or negative) bearing on Red Cross reputation;
- Mention of a Red Cross campaign (e.g. Holiday Catalog, National Preparedness Month);
- Mention of a service that is provided by Red Cross (e.g. CPR courses, etc.);
- Misinformation about Red Cross;
- Any post from a person in a disaster area who is talking about the experience;
- Any post from an organization the Red Cross closely partners with (e.g. FEMA); and
- Any post from a Red Cross organization or local chapter.

The social engagement team conducted three official digital volunteer trainings and certified 19 individuals to use its Radian6 software for situational awareness. The team also leveraged spontaneous volunteers who helped to respond to hundreds of posts on the Red Cross Facebook page.

Following the hurricane's landfall, 31 digital volunteers responded to 2,386 of the reviewed posts. In comparison, only 500 posts were reviewed after Hurricane Isaac. From the reviewed posts, some 229 posts were sent to Mass Care team at National Headquarters; 88 resulted in a change in action on ground operations. The American Red Cross also offered a [Hurricane App](#) for both iPhone and Android

device users to assist in individual recovery.<sup>30</sup> The social engagement team at the American Red Cross created 19 digiDOC (a situation report) briefs, including highlights from online conversations, topic trends, issues and concerns, and proactive social posts, which were distributed daily to a group of disaster services workers and partners.<sup>31</sup>

### **The Role of the Media, Ad Hoc Groups, and Ad Hoc Volunteers**

The media, ad hoc groups, and spontaneous volunteers all helped to provide and relay information to and from the public during Sandy. Media outlets such as the Huffington Post provided resources like Stormwatch<sup>32</sup>, a map that obtained data from official government websites.

Several websites, blogs, and spontaneous volunteers published, addressed, and corrected rumors. For example, Snopes.com, a website already dedicated to correcting “urban legends, folklore, myths, rumors, and misinformation,” published information on various photos<sup>33</sup> and rumors, as well as response and recovery information. Some additional examples of media, ad hoc groups and/or volunteer efforts include:

- WNYC.org;
- Hope For New York (www.hfnyc.org/hurricane);
- DNAinfo.com;
- My New York Legal Help;<sup>34</sup> and
- It Is In All of Us<sup>35</sup>

Although ad hoc and volunteer groups played a significant role in response and recovery efforts and were empowered by social media to organize, collect, and share information and resources, they also experienced frustration and difficulties interacting with traditional response stakeholders.

Newly formed volunteer and ad hoc groups were sometimes unfamiliar with the logistics of delivering resources and long-term recovery efforts and may not have known the roles and responsibilities of local and federal governments, emergency management regulatory agencies, and utilities like FEMA, the American Red Cross, VOAD, and others.

Consequently, ad hoc groups found it difficult to organize and engage with response organizations on the ground and virtually.<sup>36</sup> In the future, relationships and trust built prior to the onset of a disaster will help to better utilize volunteer and ad hoc resources.

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<sup>30</sup> <http://www.emergencymgmt.com/disaster/Sandy-Social-Media-Use-in-Disasters.html?page=2&>

<sup>31</sup> American Red Cross Hurricane Sandy Social Engagement Report, December 18, 2012

<sup>32</sup> Huffington Post: StormWatch: <https://hpsandy.crowdmap.com/>

<sup>33</sup> Snopes.com Photos: <http://www.snopes.com/photos/natural/sandy.asp>

<sup>34</sup> [www.mynewyorklegalhelp.com/hurricanesandynyassistance](http://www.mynewyorklegalhelp.com/hurricanesandynyassistance)

<sup>35</sup> <http://itisinallofus.blogspot.com/2012/11/updated-111212-815am-list-of-fb-pages.html?spref=fb>

<sup>36</sup> Old and New Disaster Workers Learning to Work Together; Scott Reuter: FirstResponder.gov - <http://www.firstresponder.gov/FRBlog/Post.aspx?ID=135>

### Rumor Control and Misinformation

Throughout the course of the storm, misinformation and doctored photographs circulated on the Internet, made it difficult to find and verify accurate information.<sup>37</sup> For example, several photos of what were supposedly storm clouds over New York City made it very difficult to identify other photos that were, in fact, accurate and depicting what was happening on the ground. Individuals from across the globe began trying to verify photos through various techniques, sharing their findings on blogs like [www.istwitterwrong.tumblr.com](http://www.istwitterwrong.tumblr.com) and re-tweeting the original photos or the point of origin of the real photo.



Unfortunately, due to the viral nature of social media and the sensationalism that often accompanies a disaster, it became difficult to sift through various photos, verify those that were accurate, and push correct information back out to the Internet.



Rumors were also prevalent across various social media platforms. In many instances, these rumors were dispelled by various entities actively searching for rumors regarding their respective organizations. See **FEMA's Hurricane Sandy Rumor Control Website, below**. Rumor examples included that the New York Stock Exchange was beneath three feet of water and that Ocean City, Maryland, had burned down. Other Twitter users, various websites such as BuzzFeed.com and Snopes.com, as well as many government agencies helped to call out such rumors as incorrect.



**FEMA's Hurricane Sandy Rumor Control Website:** In an effort to consolidate and correct the circulating rumors regarding its Sandy response efforts, FEMA added a page to its website, [FEMA.gov](http://FEMA.gov). FEMA posted popular rumors alongside accurate information on [www.FEMA.gov/hurricane-sandy-rumor-control](http://www.FEMA.gov/hurricane-sandy-rumor-control) in an attempt to dispel inaccuracies and encourage reposting of accurate content. A green check

<sup>37</sup> Additional information and examples of photos and efforts to correct: <http://istwitterwrong.tumblr.com/post/34563249044/is-that-really-a-picture-of-hurricane-sandy-descending>

mark, placed next to a post, indicated that the information was correct, whereas a red “x” indicated that the information was incorrect. Accurate information often included links to external sources for additional information. Some of the rumors that were dispelled (or verified) on the site concerned:

- Bridge failures;
- Lack of critical resources, such as water;
- Location of shelters and other support;
- How to volunteer for recovery efforts;
- Payment for recovery efforts and hiring opportunities; and
- Status of recovery efforts.

Government agencies sometimes have to manage a high volume of misinformation and rumors throughout the course of emergency events, which can be difficult given limited resources. In Sandy, the public, the media, and digital volunteers—both ad hoc and official—enhanced these efforts organically by seeking out inaccurate photos and rumors and locating, sharing, and disseminating accurate information.

### **Alternative Utilization of Private Resources and Partnerships**

Following Sandy, the demand for rental and temporary housing increased dramatically; however, the means to easily connect those in need with those hoping to provide housing resources did not yet exist. The U.S. Housing and Urban Development Agency (HUD), in conjunction with the White House Office of Science and Technology Policy, worked with various tech companies—detailed below—to develop innovative solutions.<sup>38</sup>

#### **Angie’s List ([www.angieslist.com](http://www.angieslist.com))**

Angie’s List is a website where individuals can search for information on local businesses and post ratings, reviews, and deals to be seen by others. Following Sandy, Angie’s List provided free one-year memberships to 1,000 homeowners within the Tri-State area. The site also launched a Sandy recovery page providing safety tips, notes on possible scams, important contact information, information on available resources and homeowners’ insurance, and more.<sup>39</sup>

#### **Airbnb.com**

Airbnb is an online marketplace connecting those with accommodations with those who are looking for a place to stay.<sup>40</sup> After Sandy, the White House reached out to Airbnb for assistance. The website first waived registration fees for anyone in the affected region and then created a free Sandy website to help connect those needing housing with available accommodations.

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<sup>38</sup> <http://blog.hud.gov/index.php/2012/11/30/hud-partners-pitch-families-find-housing-hurricane-sandy/>

<sup>39</sup> <http://www.angieslist.com/weather-protection/storm-recovery.htm>

<sup>40</sup> <https://www.airbnb.com/help/question/hosting/1>

As of November 30, 2012, more than 1,350 people used Airbnb to offer free living space to those displaced by Sandy. Although this effort was successful, future events may require additional steps in order to achieve similar success; these steps include:

- Establishing a relationship with online providers and local community partners beforehand, as well as conducting outreach to local communities to ensure familiarity with the resource;
- Involving state and local response agencies to help address local regulations that do not allow for occupants to rent out their bedrooms using the Airbnb.com platform; and
- Providing access to resource and housing websites like these and others at DRCs to promote the awareness and use of alternative platforms and housing.

#### **SeeClickFix.com**

SeeClickFix partnered with various media entities, such as Boston.com and the Huffington Post,<sup>41</sup> to enable individuals to report issues after Sandy. Individuals reported issues such as power outages, downed trees, flooding, lost pets, need for emergency supplies, and more. SeeClickFix published these reports visually on a map and provided them to the local authorities. More than 800 reports of downed trees, flooded roads, and other storm-related concerns were logged across Boston, Philadelphia, New Haven, Washington, D.C., and other municipalities across the region between Monday afternoon, October 29, and midday Tuesday, October 30.<sup>42</sup>

#### **WalkScore.com**

Walk Score, a website where people can search for housing based on commute time for various modes of transit, launched a website to support those in search of temporary housing after Sandy. Individuals could enter the preferred mode of transit as well as the address to which they commuted, and received results of apartments available for rent within the chosen time period and/or transit preference.

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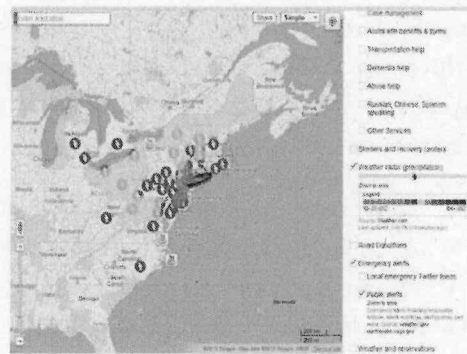
<sup>41</sup> [http://www.huffingtonpost.com/2012/10/29/report-hurricane-sandy-issues\\_n\\_2038138.html](http://www.huffingtonpost.com/2012/10/29/report-hurricane-sandy-issues_n_2038138.html)

<sup>42</sup> <http://seeclickfix.blogspot.com/2012/10/bloombergbusinessweek-talks-seeclickfix.html>



### Maps and Crowd-Sourced Information

Displaying data on maps can be an enormous help to emergency response professionals, providing situational awareness with regard to weather, key resources and personnel, their location, and more. Social media provide a relatively new source of data that—when displayed geographically—can help to enhance real-time situational awareness.



In the fall of 2011, Hurricane Irene made landfall on the Northeast coast. A few agencies, already using live data within a mapping environment, began including tweets from response agencies within the impact zone as an additional data layer.<sup>43</sup> The information collected from social media (or crowd-sourced data), however, imposed a specific concern; the information was not vetted or verified and therefore was not used for more than informational purposes.

In Sandy, however, the degree to which the public turned to social media for communication—whether to plead for information, help, or offer it—was so great that the benefit of using this resource became too great to ignore. Several volunteer groups helped to develop and provide data for maps from social media channels. This information helped provide situational awareness both to the public and to response officials. The [Google Crisis Map](#) (above) is one such map, but there were many other mapping initiatives involving multiple partners, nonprofit organizations, and volunteers, visualizing a variety of data, including the information immediately below (these layers were included specifically in the Google Crisis Map):

- Damage Assessments;
- Traffic Conditions;
- Local Emergency Twitter feeds;
- FEMA Disaster Declared Areas;
- Crowd Assessments;
- Power Outage Information, Location, and Availability of Gas;
- Sandy-related YouTube Videos;
- Senior Services;
- Volunteers Needed;
- Donations Needed;
- Caregiver Support;
- Shelters and Recovery Centers;
- Weather Radar; and
- Road Conditions and Emergency Alerts.

<sup>43</sup> <http://www.thehomelandsecurityblog.com/2011/09/23/engaging-citizens-the-right-way-government-uses-twitter-during-hurricane-irene/>

### Crisis Commons

On November 2, 2012, CrisisCommons received a call from the White House asking for assistance. The request and effort focused on collecting and gathering information on various gas maps, but more specifically to:

- Identify information for displaying on maps;
- Look for open standards to connect and share information on maps;
- Create maps and collaborate with other groups;
- Create a complete gas map story;
- Report and validate map information from the public; and
- Determine how the virtual community could contribute to these initiatives.

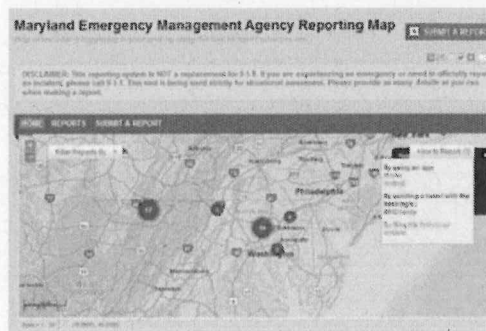
CrisisCommons and others used Hackpad.com to collaborate, build requirements, and discuss operations.<sup>44</sup> It also worked with ESRI and others to create a map of gas station locations and availability of gas.<sup>45</sup> Andrew Turner of ESRI helped to gain access to infrastructure groups who could provide lists of gas stations over a large region. Additional information, gathered through crowdsourcing efforts, was also included. Citizens without data access were able to report gas station status on Twitter by texting US short code: 40404 with the address of the gas station, including #findgas, #nycgas, or #nogas. Crisis Commons coordinated with other mapping efforts, including the IMSOCIO<sup>46</sup> gas station map, Gasbuddy, and <http://mappler.net/gasstation>.

### Maryland Emergency Management Agency Reporting Map and Humanity Road

The Maryland Emergency Management Agency (MEMA) launched a crowdmap on October 31, 2012, in order to collect situational awareness from the public on the impacts of the storm; it also requested help from Humanity Road to support the effort.

Goals were clearly identified and assigned; Humanity Road was tasked to:

- Identify vulnerable areas in the state not receiving help;
- Monitor unsafe conditions, such as flooded roads, infrastructure damage, fallen trees, etc.; and
- Identify if the resource (the map) would be valuable in the future.



<sup>44</sup> <https://hackpad.com/ATx1TCEAHpS#hurricanesandy-gasmap-projects> &

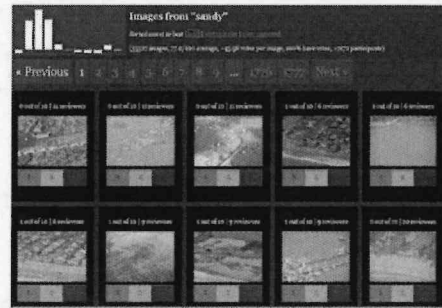
<sup>45</sup> <http://ajturner.github.com/gasmap/> &

<sup>46</sup> Scholars Organizing Culturally Innovative Opportunities (IMSOCIO) <http://www.imsocio.org/> &

Within 48 hours of launching the crowdmap, Humanity Road produced the results and MEMA disengaged the map. The pre-existing relationship between the state agency and the nonprofit group enabled effective coordination to occur quickly and efficiently.<sup>47</sup>

#### Civil Air Patrol Damage Assessments<sup>48</sup>

FEMA, in partnership with the Civil Air Patrol (CAP), and the Readiness, Response, Recovery (R3) team from the National Geospatial Intelligence Agency (NGA), enlisted online volunteers, including the Crisis Mappers and OpenStreetMaps teams, to conduct aerial damage assessments. Volunteers were asked to visually review aerial images collected by CAP and to assign damage assessment ratings. By November 4, 2012, more than 4,000 online volunteers were actively assisting in this effort.



Aerial Imagery collected by CAP and evaluated by volunteers after Hurricane Sandy

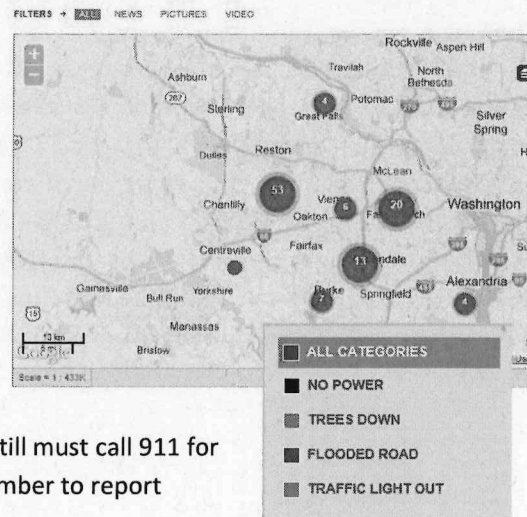
Damage scale:

- Green: Light or No Damage: shingles or doors missing.
- Yellow: Moderate Damage: moderate to heavy damage to one or more structures, roads, and infrastructure. Some structures may be only lightly damaged.
- Red: Severe Damage: heavy damage to multiple structures, or if the area is still flooded.

#### Fairfax County, Virginia<sup>49</sup>

For years, Fairfax County has asked the public to report what is happening through social media and traditional tools. As the potential large impacts of Sandy approached, however, Fairfax County decided to consolidate all social public reports into one system, which led to Fairfax County's use of a crowdmap. The crowdmap consolidated all of the requested information from the public, which the county would publish on social platforms in one place for a common operating picture that—although not comprehensive—presented selected valuable information. The crowdmap was intended to:

- Consolidate “Tell Us What You See” reports; &
- Serve as a pilot to collect a sample of data from a real incident; &
- Deploy as a “base” map, meaning many & features a crowd map offers were turned off; & and &
- Not serve as a way to report life-threatening & needs; disclaimers were published that people still must call 911 for emergencies or the county's non-emergency number to report public safety issues. &



<sup>47</sup> Social Media & Crisis Information Management for the Emergency Management Professional – Crowdmaps & Crowdsourced Info; Humanity Road. &

<sup>48</sup> More information available at FEMA Lessons Learned Information Sharing, LLIS.gov &

<sup>49</sup> <http://fairfaxcountyemergency.wordpress.com/category/hurricanes/hurricane-sandy/> &

Though the storm did not affect Fairfax County as badly as some had anticipated, the public did submit 111 reports across four categories: no power, trees down, flooded road, and traffic light out. Crowdmap.com has a number of useful features, such as letting users approve reports for publication. The county published all but a handful of reports (because they belonged to other neighboring jurisdictions). The county did not verify reports, though, which is another feature of the tool. This pilot experience of a crowdmap was helpful for Fairfax County to test this new tool, learn about its strengths and shortcomings, and build on it for future selective deployments.

#### **Additional Mapping Efforts<sup>50</sup>**

Government agencies, nonprofit organizations, and volunteers constructed several additional crowdsourced maps, including:

- Gas Stations: <http://mappler.net/gasstation/>
- NYC-specific Google map: <http://google.org/crisismap/2012-sandy-nyc>
- Vermont Response Crowdmap: <https://vtresponse.crowdmap.com/>
- DC Crisis Camp Map: <https://sandydc.crowdmap.com/>
- #NYResponds<sup>51</sup> [Co-Working Map](#)
- Staten Island Hurricane Sandy Recovery Map
- Hurricane Sandy Communications Map
- [WYNC Hurricane Zone Map](#)
- [WYNC Transit Lines Map](#)

#### **Challenges to Crowdsourcing**

Throughout the course of the response and into recovery, several challenges regarding crowdsourcing efforts required further consideration. For example, several entities—including government, nonprofits, ad hoc and volunteer groups, and individuals—developed crowdmaps. While many of these crowdmaps provided additional situational awareness of available resources, situational assessments, etc., duplication of effort resulted because groups did not collaborate or coordinate their efforts. Future crowdmapping efforts need to consider engaging volunteers to help search and discover existing efforts as well as build relationships and plan for future events. Prepositioning technologies and/or volunteer groups and providing a means for collaboration will help increase coordination and reduce duplication of effort.

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<sup>50</sup> Additional list of Hurricane Sandy Maps:

<https://docs.google.com/spreadsheet/ccc?key=0Ap2xXP997iqZdFR1WVQwYjVmdThnM043MEd1emU4U2c#gid=0>

<sup>51</sup> <http://nytechresponds.wordpress.com/about/>

## TECHNOLOGY, PROCESS, AND POLICY GAPS REQUIRING FURTHER DISCUSSION

Sandy represents a significant advancement in the use of social media for public safety. However, several challenges, questions, and unmet or untested needs remain. Further research, technology development and assessment, discussion, partnerships, and additional funding and clarification of policy and process are needed before many of these unmet or untested needs can be addressed.

Through identification and analysis of how social media were used in Sandy, various gaps in technology, process, and/or policy have been identified. These gaps, ranging in scope, ownership, and depth have been categorized below, according to common themes.

Major Themes	Technology, Process, and/or Policy Gaps
<b>Big Data</b>	<ul style="list-style-type: none"> <li>• Discoverability of information, resources, and efforts</li> <li>• Standardization of nomenclature for data sharing</li> <li>• Cross-walking for data sharing</li> <li>• Identification of cross-utilization opportunities (e.g., same data source for multiple deployment efforts)</li> <li>• Discoverability and integration of public works and private sector data (standard and live)</li> <li>• Management of information, including validation and vetting</li> </ul>
<b>Compliance and Requirements</b>	<ul style="list-style-type: none"> <li>• Compliance of existing and new solutions with applicable laws, regulations, and other requirements</li> <li>• Development of new compliance and/or requirements</li> </ul>
<b>Funding</b>	<ul style="list-style-type: none"> <li>• Funding for staffing, surge support, technology solutions, training, exercises, program development, etc.</li> </ul>
<b>Standards, Training, and Guidance</b>	<ul style="list-style-type: none"> <li>• Development of standards for:                             <ul style="list-style-type: none"> <li>○ Level of service (provided by response organization)</li> <li>○ Level of service (provided by technology solution)</li> <li>○ Method of coordination (response organizations and partners)</li> <li>○ Training materials</li> <li>○ Standards of use</li> <li>○ Continuity of operations</li> </ul> </li> <li>• Integration of social media within incident command structure and emergency operations center protocol</li> <li>• Development of guidance on best practices and standards</li> <li>• Training on guidance, best practices, and standards</li> </ul>
<b>Policy and Process</b>	<ul style="list-style-type: none"> <li>• Process for enabling collaboration between ad hoc or nonstandard technology partners and government entities</li> <li>• Process for using nonstandard resources and/or solutions</li> <li>• Process and ability for prepositioning and/or pre-deploying technology solutions in preparation for slow-onset event</li> </ul>

	<ul style="list-style-type: none"> <li>• Ability to empower and/or activate nontraditional partner groups to support response efforts</li> <li>• Provision of information and guidance to nongovernmental, nonprofit, and nontraditional support on government requirements, policies, procedures, and available resources</li> <li>• Inclusion of social media in existing communications and technology policies and mandates</li> <li>• Development of funding and/or support to open source development</li> </ul>
<p><b>Partnerships</b></p>	<ul style="list-style-type: none"> <li>• Identification of roles, responsibilities, and protocol for collaboration between government and nontraditional partners</li> <li>• Development of credentialing for nontraditional partners and ad hoc volunteers</li> <li>• Provision of means to enhance awareness of nongovernmental, nonprofit, and nontraditional support response efforts and resources (to reduce duplication of service and effort)</li> <li>• Development of partnerships among technology providers and practitioners to identify technology requirements or necessary updates to existing technology solutions</li> </ul>
<p><b>Technology, Tools and Features</b></p>	<ul style="list-style-type: none"> <li>• Facebook activity feed algorithm and visibility of posts</li> <li>• Twitter bandwidth and update limits</li> <li>• Hardware (battery power/electricity for mobile, etc.)</li> <li>• Ability to target specific demographics and/or geographic points</li> <li>• Integration of social media within 911, 311, and 211</li> <li>• Ability to publish messaging across multiple platforms simultaneously</li> <li>• Ability to maintain flexibility with technology advances</li> <li>• Resource and aid matching</li> </ul>

**CONCLUSION**

Sandy marks a shift in how social media is now used for preparedness, response, and recovery to disasters; the public, government agencies, and response organizations now turn to social media more than ever. With this shift, however, come new technologies, new behaviors, and new challenges. This document identified various gaps in technology, process, and policy; these gaps will require further discussion in order to enhance future response and collaboration efforts.

### CASE STUDY: NEW YORK CITY

New York City serves as an excellent case study in how social media can benefit government, response partners, and the public before, during, and after an emergency. Since Hurricane Irene in the fall of 2011, New York City has leveraged social media for a variety of purposes, enabling the city's services, offices, and departments to engage and inform the public through digital means (e.g., Facebook, Twitter, YouTube). In fact, since Irene, most of the city's services, offices, and departments have gone digital in some form.

Early on, leadership support played a critical part in driving acceptance of this growing digital culture. Mayor Bloomberg promoted the New York City's social media profiles, mentioning them at press conferences and across other channels. Between Hurricanes Irene and Sandy, the City's social media presence grew, attracting nearly 5 million followers across all of New York City's accounts. As of January 2013, New York City maintains more than 300 social media channels.

In addition to managing NYC.gov, the City maintains numerous channels, including, Facebook pages, Flickr, Google+, Tumblr, Twitter (in both English and Spanish), and YouTube. These channels are each owned and operated by various city agencies and departments and maintained independently by nearly 200 social media managers, with support from the Mayor's office, from which guidance and best practices are provided to encourage continued use.



Throughout response and recovery to Sandy, these social media channels provided the City with the means to share information in various formats, enabling the public to find and consume information as preferred.



Throughout the storm, NYC Digital, a part of the Mayor's Office of Media and Entertainment, monitored social media for public reactions to the storm, sending daily reports to City Hall. Questions asked on Twitter were responded to directly, and the City's Tumblr account and Facebook page published information from each press conference. The public could sign up to receive text alerts from the Mayor's Office Twitter account, @NYCMayorsOffice, which served as an alternative digital resource to the City's website, once people lost power and Internet access.

### Social Media Emergency Protocol

In 2011, after Irene, the City established a Social Media Emergency Protocol. This document is assessed periodically and updated as necessary, reviewed by City Hall and the City communications teams, and sent to all social media managers to ensure their familiarity with the process. The Social Media Emergency Protocol is a clear and concise document, requiring that all messages sent out during a disaster be approved by City Hall. The document provides a list of six or seven approvers (for continuity purposes) and reminds the social media managers that any message sent from the main City account (@NYCgov on Twitter) can be retweeted or shared without approval. The document also offers direction on the tone of voice required of all messages (authoritative but calm), and grammatical considerations (e.g., no capital letters for emphasis and no exclamation points). The document reminds all social media managers to remove any scheduled tweets, to ensure that all messages provided during an emergency are standardized, appropriate, and applicable to the event at hand.

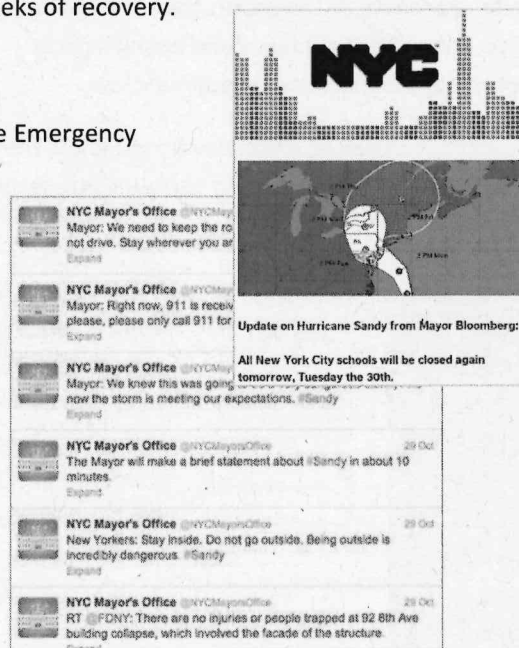
### SMART (Social Media Advisory Research Taskforce)

Following Irene, the City developed SMART, the Social Media Advisory and Research Taskforce, a group of 15 people from various agencies across New York City who are considered to be “social media rock stars.” Since Irene, this group has met once a month to review best practices and guidance documents like the Emergency Protocol. Once a document is reviewed, it is placed on the City Intranet so that it is accessible to all City employees.

In Sandy, social media and digital resources were critical to the City’s ability to manage its public communications efforts during the storm and in the weeks of recovery.

### Before the Storm

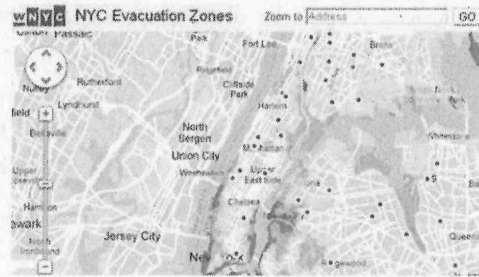
The Friday before Sandy made landfall, the City sent the Emergency Protocol out to all social media managers and reminded everyone to maintain a singular voice, originating from the Mayor’s office, across all City agencies and departments. The City had numerous communication channels including NYC.gov, 80 different Facebook pages, Flickr, Google, HootSuite, Tumblr, Twitter (in both English and Spanish), and YouTube.



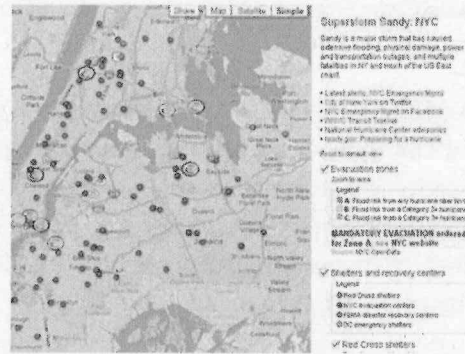


### Open Data: Applications in Response

Throughout the storm, NYC Digital, a subsidiary of the Mayor's Office, monitored social media for public reactions to the storm, sending daily reports to City Hall, which functioned as the hub for all City departments and agencies, filtering information back and forth across the City. The City also used Facebook to post summaries and critical points from each press conference. Each press conference was live-tweeted, and a summary blog with a relevant photo was posted to Tumblr as well.



In response to long wait times on the City's information line (311), many individuals tweeted the City instead. Many of their questions were answered directly on Twitter; any information not already included on City profiles was summarized and published on the City's Tumblr account so that others could access the information. The Tumblr account also included summarized accounts of every press conference; this information was also published to the Facebook pages.



When a member of the public shared information regarding resources or help needed, that information was pushed directly to City Hall, where the information was then vetted and sent to the appropriate authority. Additionally, all City agencies were asked to provide hourly updates via a central e-mail account. These updates also were sent to City Hall.

### Public/Private Partnerships

The City of New York has developed and maintained relationships with several companies and was able to leverage these relationships in support of response efforts.

**Google:** Google integrated NYC open data made available through application program interfaces (APIs) with the crisis map developed by the Google Crisis Team. This map included information on evacuation zones, shelters, food distribution centers, warming centers, recovery shelters, gas stations, and recovery assistance centers.

**Twitter:** Twitter donated promoted tweets for @NYCMayorsOffice, enabling selected tweets to appear at the top of search results and timelines.

**HootSuite:** HootSuite is the platform used across all NYC departments and agencies to post and monitor information across multiple social media profiles and accounts. HootSuite helped ensure everyone was trained to use its platform appropriately and assisted in reporting metrics.

**Volunteer/Independent:** Independent technology and media organizations such as [www.WNYC.org](http://www.WNYC.org) and the New York Times developed additional interactive maps using the City's data to target or accommodate specific needs. These maps were essential in the response; their existence extended access to the City's data and helped to alleviate some of the burden from the City's websites when online traffic surged. The City was able to direct the public to multiple sites featuring the same information, knowing the data were up-to-date and accurate because they were coming from the City's APIs.

### Applications in Recovery

To highlight recovery efforts across the City, the Press Office and NYC Service worked with NYC Digital to create a citywide Flickr album to host photos relating to Sandy relief work.

City employees in the field could email photos directly from a smartphone to a single email account that would automatically upload the photo to the Flickr album. More than 500 photos were uploaded in one week. The City directed the media to the album for information and photographs from the ground.

The City's Facebook page included photos of NYC Service volunteers and included the NYC Service website within the Facebook page through an iFrame. The Facebook page also summarized critical points from each of the mayor's press conferences.

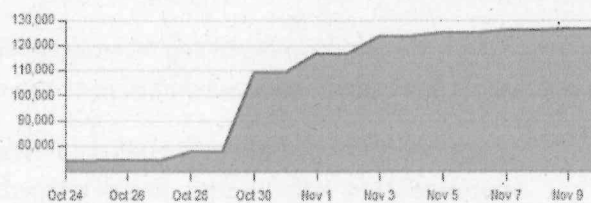


### Digital Reach and Metrics

The City's total digital reach (reach across all digital channels) as of November 9 was 2,785,806 people. Additionally, the City reported the following:

- NYC.gov had 4 million unique visitors and 16 million page views;
- The City sent over 2,000 tweets;
- At its peak, the Facebook page reach was 322,338 people;
- The City gained 176,010 new followers across all social media profiles;
- All press conferences were broadcast live and available on YouTube; mayoral press conference videos had nearly 1 million hits;
- The City aggregated more than 500 photos on Flickr; and

@nycmayorsoffice Growth



Lessons Learned - Social Media and Hurricane Sandy: Virtual Social Media Working Group

- @NYCgov, the City's Twitter profile used for direct engagement with the public, responded to more than 275 questions, including 311 requests, volunteer and donation opportunities, and more.

Mayor Bloomberg has encouraged promoting few points of contact, thereby, simplifying the task of finding critical information. These contact points include 311, one City contact number, and one website ([www.NYC.gov](http://www.NYC.gov)). On the City's website, the homepage is updated to reflect information mentioned during press conferences, as identical messages are published across social media channels. Incidentally, the City's website experienced a significantly high bounce rate during Sandy, meaning that site visitors arrived on the site's homepage and left the site shortly thereafter. Typically, a high bounce rate indicates that a website's homepage is not what was expected by a site visitor, resulting in site traffic arriving on the homepage and immediately leaving due to lack of content, interest, or other. In an emergency, however, a high bounce rate may be a good thing, indicating that the information sought by site visitors was quickly ascertained. This possibility is supported by the average time spent on the site: individuals visiting NYC.gov spent on average only 2.5 minutes viewing site content, suggesting that sought content was easily and quickly found.

## **APPENDIX A: FAIRFAX COUNTY [VA] GUIDANCE TO GOVERNMENT PARTNERS**

**Email sent from Director of Communications/Joint Information Center Coordinator, Fairfax County Government, as guidance to county department and agency social media publishers.**

*County social media publishers,*

*The Office of Public Affairs will be staffing the Emergency Operations Center's Joint Information Center later this weekend and we're keeping an eye on social media right now.*

*Under the county's Emergency Operations Plan, OPA coordinates all emergency communications, including social media. Based on input and past experiences, I've created some more specific guidelines that I hope you will find helpful rather than a more generic message in prior activations.*

*Here's what we need you to do regarding social media and #smem when the JIC is activated:*

- 1. Let us know if you will have staff available to publish to Facebook and/or Twitter so we know whether your accounts will be active or not. Please give us a general timeframe that you'll be staffing and how we can contact staff, too. Contact us by email listed below.*
- 2. If you have information that's clearly in your lane and you are confident it's accurate and won't conflict with information we have in the EOC, then go ahead and publish to social media and other platforms. If there is any doubt, then you must check in with JIC staff to get info verified. If it's extremely critical information, please also contact us directly to let us know in case we miss your posts/tweets. Contact us by email listed below.*
- 3. If someone provides you with any life safety information, reach out to us ASAP so we can share that info with the EOC. Contact us by email listed below.*
- 4. If you receive questions beyond your specific lane, you must check in with JIC staff for a coordinated answer. Contact us by email listed below.*
- 5. Please Facebook Share or Retweet our information to your fans/followers as needed.*
- 6. If you use Facebook, then post a message to your fans to follow Fairfax County Government – please use Facebook tags to reference the main county account.*
- 7. On Facebook, try to upload photos as much as possible to increase engagement with your posts.*
- 8. If you use Twitter, please occasionally reference @fairfaxcounty to your followers for complete info.*

Lessons Learned - Social Media and Hurricane Sandy: Virtual Social Media Working Group

9. *We are trying to use a county-specific hashtag on Twitter -- #ffxstorm -- please include it in your tweets if space permits.*
10. *You must provide usable content to your social media fans: for examples, links to webpages, not PDFs unless absolutely necessary.*
11. *If you are announcing building closures, don't forget your agency must notify OEM, too.*
12. *We need you to be flexible. All incidents evolve over time and we may need to change how we're using social media from strategic and tactical positions.*
13. *We reserve the right to post messages on your pages as your account as the incident progresses.*
14. *To contact us about anything regarding social media (whether listed above or not), please send an email to our emergency inbox (not to me personally as shifts will change).*

## APPENDIX B: FEMA GUIDANCE TO FEDERAL AGENCIES REGARDING SANDY WEBSITE STANDARDIZATION

**From:** Harmon, Matthew  
**Sent:** Wednesday, October 31, 2012 3:22 PM  
**Subject:** Hurricane Sandy - Web Response  
**Importance:** High

Per **Emergency Support Function 15 (ESF-15)** of the National Response Framework, the **Federal Emergency Management Agency (FEMA)** is issuing the following guidance for **all U.S. government agency websites**. Authorizing official: Jessica Smith, Director of External Affairs, Federal Emergency Management Agency

At this point in time, Matt Harmon, FEMA Web Manager is the point of contact for web coordination/questions.

### ASK #1:

At this point, all responding agencies are encouraged to create [www.\[agency\].gov/sandy](http://www.[agency].gov/sandy) landing page on their respective sites.

- On this page, please place information FROM YOUR AGENCY (stay in your lane).
- Please do not cross post information from other agencies.
- If you have information that would be of use on another agency's website, please contact the POC for that website and coordinate with them directly (if you have any difficulty identifying a POC, please contact Joanne McGovern - USA.gov web manager).
- Please create a URL for both English and Spanish language content if available.

### ASK #2:

Once your [www.\[agency\].gov/sandy](http://www.[agency].gov/sandy) page has been created, please email the exact URL of your page to Joanne McGovern (USA.gov web manager) so USA.gov can include your page on the main USA.gov/sandy page. Please also provide which general "lane" of information your content would possibly fall under:

- Health and Safety
- How to Get Help
- Find Friends and Family
- Donate / Volunteer
- What the Government is Doing
- Please include your Spanish language URL as well.

**ASK #3:**

Once the USA.gov/sandy page is created, all agencies are encouraged to cross-link from their agency home page and [www.\[agency\].gov/sandy](http://www.[agency].gov/sandy) page back to the USA.gov/sandy page, and/or embed the USA.gov widget on agency websites. The goal is to drive visitors looking for Hurricane Sandy information back to the authoritative source for information (USA.gov/sandy).

**ASK #4:**

Please also email the exact URL of your [www.\[agency\].gov/sandy](http://www.[agency].gov/sandy) page to Matt Harmon (FEMA web manager) and include the following additional information:

- Content being posted (just place YES or NO next to the item) &
  - Stats: YES or NO &
  - Situation reports: YES or NO &
  - Blog posts: YES or NO &
  - Press Releases: YES or NO &
  - Safety/recovery tips: YES or NO &
  - Other: Please provide details &