

Regaining Trust in the Nation's Public Alert and Warning System: Engaging the Support of
Public Information and Training Officers

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ABSTRACT

Trust in the FEMA Integrated Public Alert and Warning System (IPAWS) has been eroded following wildland fires in Gatlinburg and Sonoma County, California and a ballistic missile false alert issued by the Hawaii Emergency Management Agency. IPAWS Alerting Authorities can regain trust by focusing on the composition and delivery of the public alerts. This is possible by engaging public information officers in the IPAWS process and using the alerting formula provided by FEMA researchers. (Mileti 2018, FEMA, 2018). The second step is to develop and implement an IPAWS training program for all staff, but especially for alerting operators. This program should include IPAWS internal agency exercises and monthly drills. Lastly, Alerting Authorities should promote a continuous public education campaign to prepare their communities to not only receive and respond to emergency alerts, but to understand the potential risks within their areas. IPAWS is built using technology that frequently changes. The demands on creating the correct messages and continuously training to understand the system will be high and are essential in rebuilding the trust of the public alert and warning system in the United States.

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INTRODUCTION

The Integrated Public Alert and Warning System (IPAWS) was created in 2006 to be a trusted national system providing alerts for the public related to emergencies, weather alerts and civil alerts. (FEMA, 2018) However, in 2016, 2017, and 2018 large-scale disasters highlighted flaws within the system that may have led to the loss of lives. Early notifications save lives. Public safety officials urge people to sign up for emergency alerts using this phrase, however, when the system is not used, or is used incorrectly, the results can be disastrous. According to a FEMA *Know Your Alerts and Warnings* Fact Sheet (2016) the system:

“Organized by FEMA, the Integrated Public Alert and Warning System (IPAWS) is the Nation’s alert and warning infrastructure. It provides an effective way to alert and warn the public about emergencies using the Emergency Alert System (EAS), Wireless Emergency Alerts (WEA), NOAA Weather Radio All Hazards, and other public alerting systems from a single interface. IPAWS is used to send notifications for three alert categories – Presidential, AMBER, and Imminent Threat.” (FEMA, 2016)

Alerting authorities at the state and local government levels are responsible for developing and sending public alerts through IPAWS to their communities. Multiple case studies derived from extreme wildfires and false alarms show that decreasing confidence in the system may exist. This thesis explores how the use of the system by public safety agencies between the years of 2016 through 2018 led to questions of trust and reliability.

Problem Statement

Examples of complications with the use of the system are not difficult to find. Research found concerns with Tennessee’s Gatlinburg Wildland Fire in 2017, Sonoma County, California Wildland Fires in 2017 and a ballistic missile false alert in 2018 issued by Hawaii. Crisis

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Intervention Educator Steve Crimando (2017) stated, "Under crisis conditions, people do not rise to the occasion, they fall to their training." Training impacted both the public safety professionals charged with keeping people safe as well as the general public receiving the alerts.

A second issue impacting the use of the system is the public safety Alerting Authority's understanding of how to compose emergency notification messages. The case studies will explore the psychological impacts and concerns discovered as the incident after action reviews (AAR) were completed. The review of the case studies will be used to answer the thesis research question.

This thesis proposes engaging both public information officers and training officers to support each public agency Alerting Authority. Public information officers could address the psychological impacts of writing emergency alerts. Training officers could support the creation, implementation and documentation of IPAWS training program within each agency responsible for sending public alerts to their community at the local or state level.

Research Question

This thesis reviews three case studies and determines the impacts of the findings related to the FEMA Integrated Public Alert and Warning System (IPAWS). The research question is "Is the FEMA Integrated Public Alerts and Warning System (IPAWS) a platform trusted to warn the public of all-hazard incidents?"

Literature Review

The literature review explores three areas related to the FEMA Integrated Public Alert and Warning System (IPAWS). The first area defines the IPAWS system. This section explores what the system is and who is responsible for issuing public alerts. The second area of research

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focuses on the impact of IPAWS training opportunities and programs. This section explores the use of the system by both the public safety Alerting Authorities issuing the alerts as well as the members of the public receiving the messages. The third topic area relates to the psychology of composing alerts and warning messages. This section explores best practices for composing messages and the psychological impacts such as panic or milling.

IPAWS Program Information

It is important to understand the components of the IPAWS before exploring the three case studies included in this thesis. Alerting Authorities are local, state, federal, tribal and territorial government agencies that have a Memorandum of Agreement (MOU) with the Federal Emergency Management Agency (FEMA) IPAWS program to issue emergency alerts. FEMA's (2018) website reports more than 1,000 authorities currently exist within the United States. The list of current Alerting Authorities is available on the FEMA website at <https://www.fema.gov/alerting-authorities>. (FEMA, 2018).

In addition to the MOU, Alerting Authorities must complete an application and the FEMA Independent Study-247a *Integrated Public Alert and Warning System* course. After completing these three steps the agency receives specific alerting permissions from the IPAWS program.

Alerting Authorities use several components that make up the IPAWS program to disseminate emergency alerts to the public. According to FEMA's *Know Your Alerts and Warnings* Fact Sheet (2018), the system can send messages through the following channels:

- Emergency Alert System (EAS)
- Wireless Emergency Alerts (WEA)

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- IPAWS compliant digital road signs and sirens
- NOAA Weather Radio All Hazards
- Local Opt-In Text and Email Systems
- Enhanced Telephone Notification (ETN) Systems
- Outdoor Sirens or Voice Alert Systems

These components each provide different methods to reach the public. Three of these systems will be discussed in the case studies, including: EAS, WEA and opt-in text and voice messages. The EAS sends detailed warnings to broadcast, cable, satellite, and wireline communication pathways. These alerts are the messages that we see scroll on the bottom of our televisions announcing severe weather or blare through our radios. The WEA sends free, 90-character emergency text messages to mobile devices through cell towers providing alerts to every mobile device within the cell tower's broadcast area or to people traveling into the area. Individuals do not sign up for WEA alerts. The public automatically receives alerts as long as their cellphone has the current functionality to receive the messages.

The final component most frequently used by public safety agencies is the opt-in system providing texts and voicemails. These alerts are typically sent through systems known publically as CodeRed, Nixle, Regroup, Everbridge and many others. Alerts sent through this system are typically send to an area drawn out by the Alerting Authority referred to as a polygon to individuals who have opted-in for the messages.

Documentation related to the IPAWS system is limited. Research on the system was found mainly from two sources: government and media agencies. Most of the information studied for this thesis came directly from FEMA or the Federal Communications Commission (FCC) in the form of fact sheets, publications, webinars or website content. Local and state

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government sources shared IPAWS information related to lessons learned or after action reports (AARs). Additional information was found in reviews by journalists on media sites.

Training Opportunities and Programs

"You don't get too many good warnings in local communities where untrained amateurs are in charge," Dennis Mileti, professor emeritus at the University of Colorado Boulder, stated in a Reuters interview. (Whitcomb, 2018)

FEMA provides three training courses on the IPAWS program. The courses include:

- IS-247a IPAWS Alerting Authority Online Training
- IS-248 Online Course for the American People
- IS-251 IPAWS for Alerting Authorities Best Practices (FEMA, 2018)

The only required course is the IS-247a training for Alerting Authorities during the application process. The other two courses are recommended and provided on the FEMA website. The U.S. Department of Homeland Security (2013) *Best Practices in Wireless Emergency Alerts* outlines a suggested training and drill guide for Alerting Authorities. The guide includes a WEA Go Live Checklist as seen in Appendix A and in Figure 1 below.

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Step	Action	Owner	Completion Date
1	Acquire IPAWS- compatible software ¹		
2	Establish memorandums of agreement with FEMA ¹		
3	Apply for IPAWS public alerting authority permissions ¹		
4	Complete IPAWS web-based training (IS-247) ¹		
5	Establish internal policies and standard operating procedures (SOPs) for WEA		
6	Train internal staff and other related personnel <input type="checkbox"/> Train WEA operators using IPAWS web-based training (IS-247), proprietary materials based on your WEA SOPs, and your service provider’s training materials <input type="checkbox"/> Train other staff (e.g., dispatchers, 911 operators, public relations personnel) on the purpose and usage of WEA to prepare them for the impacts of WEA		
7	Coordinate plans for WEA deployment with emergency response agencies in your jurisdiction		
8	Coordinate plans for WEA deployment with emergency response agencies in adjacent jurisdictions and the state		
9	Complete internal testing of WEA operations		
10	Educate the public about WEA using state-generated materials (if available), press releases, media interviews, social media, your agency’s website, presentations at town hall and civic group meetings, etc.		

Figure 1 WEA Go Live Checklist (U.S Department of Homeland Security, 2013)

The training aspect is an essential component impacting the use of the IPAWS. The case studies will demonstrate that lack of training impacted Alerting Authority’s decisions to use the system during emergencies or lead to false alerts being issued. Although, this thesis will include case studies from Tennessee, California, and Hawaii, the impact of improper training also impacted other agencies who issued false alerts or had problems issuing correct alerts. An example of this occurred in Colorado on June 24, 2018 when the Colorado Bureau of Investigation issued an AMBER Alert. The tweet is shared in Figure 2. (Twitter, 2018) The initial AMBER Alert failed to disseminate due to the inclusion of invalid characters. When the message was copy and pasted into the commercial alerting system, the inclusion of invalid

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characters caused the alert not to deploy to the public. This is an example of insufficient training of alerting operators. The public conversation regarding the issue, shared in Figure 2, with a member of the Denver media demonstrates the frustration and lack of trust created with the public. (Twitter, 2018)

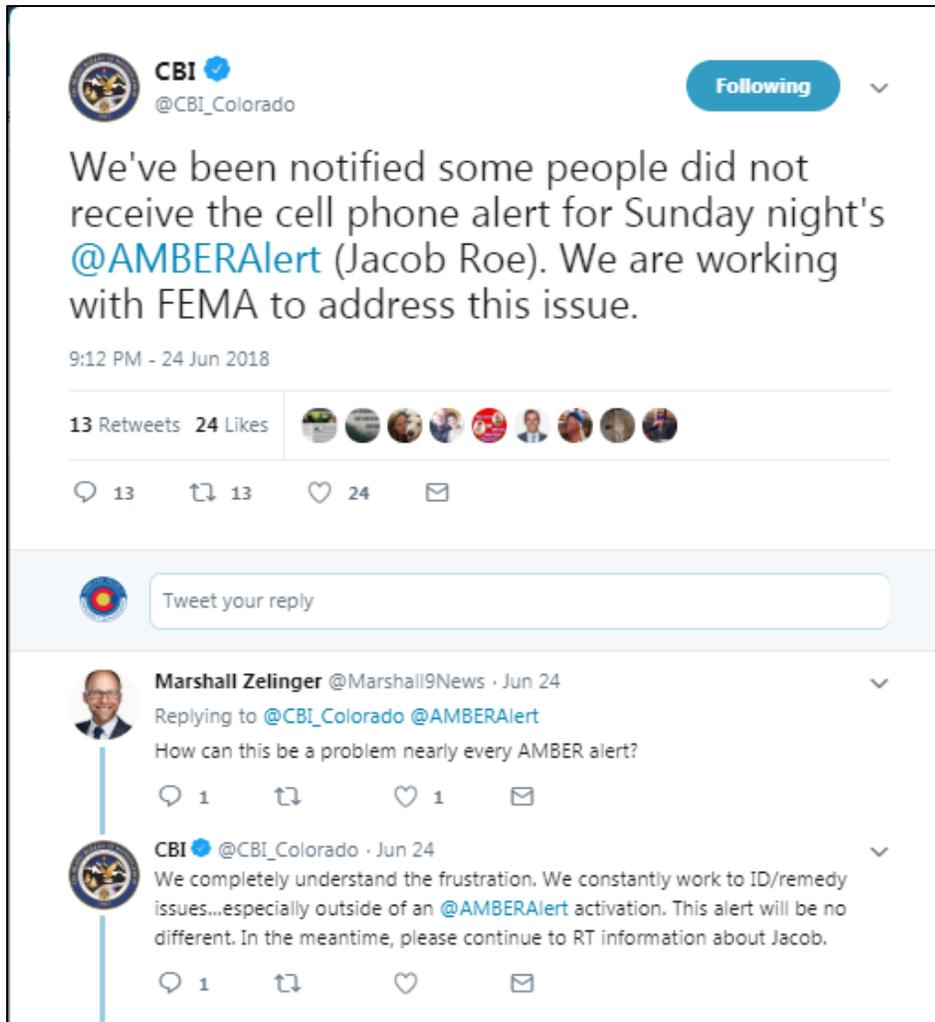


Figure 2 Tweet from Colorado Bureau of Investigation (Twitter, 2018)

Each Alerting Authority is responsible for developing their own training and exercise programs for IPAWS. The IPAWS Program Management Office (PMO) also provides an *IPAWS Toolkit for Alerting Authorities* (FEMA, 2012) that outlines both training opportunities

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and the need to exercise or practice the issuing of alerts. The guidance suggests working with the IPAWS PMO to conduct live testing of the system in order to learn how to issue alerts. This also helps to learn more about the system purchased by the Alerting Authority to issue public alerts. Training improvements should be considered moving forward for all Alerting Authorities. The sources of information related to IPAWS training were limited and found mainly from government agencies, including FEMA and the FCC, or commercial vendors that are IPAWS compatible, such as CodeRed, Everbridge, and Nixle among others.

Psychology of Composing Alert and Warning Messages

Research on the IPAWS system provided several sources that discuss the composition of the public alert messages. The sources were from government agencies such as FEMA, as well as other researchers employed by FEMA, to increase the effectiveness of the public alerts. Two advocates of the psychology behind public alerts stood out.

The first is disaster reporter and writer Amanda Ripley. In a January 2018 FEMA PrepTalk video she states there is “an incredible power of just a little information.” (Ripley, 2018) Ripley shares in her book *Unthinkable: Who Survives When Disaster Strikes – and Why* that there are three phases of response to an emergency or disaster that include: denial, deliberation, and decisive movement. (Ripley, 2008)

This final phase, decisive movement, is the point when two important events can occur. This is the point that a well composed public alert can direct action. It is also the point that some Alerting Authorities stated, in after action reviews or media interviews, that panic occurs. However, Ripley's research and additional case studies show that it is more likely we will see no action than cases of panic. The definition of panic is the “sudden uncontrollable fear or anxiety,

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often causing wildly unthinking behavior.” (dictionary.com, 2018) Panic is important to understand as it is used by Alerting Authorities and public safety leaders as a reason for failing to use the IPAWS system during emergencies. Ripley dedicates an entire section to panic within her book. (Ripley, 2008). This may demonstrate the need for public safety leaders to better understand how individual's response to public alerts. Under the incident command system, the public information officer is charged with providing guidance to leadership on these types of topics so that the right information, gets to the right people, at the right time.

The second advocate of composing public alert messages for actionable response by the public is Professor Dennis Mileti from the University of Colorado Boulder. In his FEMA 2018 PrepTalks he shares the best practices for composing public alerts. The template suggested when creating public alerts should have the following components in this order and is found in Figure 3:

- Source
- Threat
- Location
- Guidance
- Expiration Time (Mileti, 2018)

The importance of this template, according to Mileti, is that public alerts using this formula will reduce the time individuals take to act upon the alert. This is referred to as “milling”. (Mileti, 2018)

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Figure 3 Modernizing Public Warning Messaging (Mileti, 2018)

This guidance is not new. It can be found in the FEMA IPAWS *Toolkit for Alerting Authorities* (FEMA, 2012) The same formula has also been shared by the University of Colorado Denver Associate Professor Hamilton Bean in a presentation of his research titled *Comprehensive Testing of Imminent Threat: Public Messaging for Mobile Devices*. (Bean, 2016)

Why are so many IPAWS public alerts written in haste and with little information when research for this thesis provided multiple sources include templates and guidance on the most effective way to compose a public alert using the IPAWS platform? The information was

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presented in several formats, including webinars, written publications, conference presentations and government websites.

Literature Review Conclusion

The current sources of information related to IPAWS continue to grow as the system is used, or purposely not employed, more frequently and due to more extreme emergency situations. The FEMA Integrated Public Alert and Warning System allows Alerting Authorities from local, state, federal, tribal and territories to issue public alerts to their communities. The public alerts are issued across multiple platforms with the three main channels being the Emergency Alert System (EAS), Wireless Emergency Alerts (WEA) and Opt-In texts or emails. Training and exercise programs are provided at different levels across the country depending on the Alerting Authorities agency. There are a limited number of training courses provided by the IPAWS Program Management Office, although support is available for live testing of the system. Training officers can assist in developing formal IPAWS training programs within each Alerting Authority agency. Understanding how to compose the public alerts can greatly impact the responsiveness of the individuals receiving the message. Message composition can be supported by public information officers within each agency. Delays in acting, called milling, can be reduced if a best practice public alert formula is used universally by Alerting Authorities.

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METHOD: CASE STUDY

This thesis explores the FEMA Integrated Public Alert and Warning System (IPAWS) using three case studies. The thesis breaks down the case studies into three incidents: the 2016: Gatlinburg Wildland Fire Case Study, the 2017: Sonoma County California Wildland Case Study, and the 2018: Hawaii False Alert Ballistic Missile Launch Case Study. The research method includes a review of after action review (AAR) reports by government agencies, review of media coverage and the combined findings from each of the sources. The review determines whether the IPAWS is a trusted source for public alerts related to all-hazard incidents. The final recommendations will focus on maintaining and creating trust in the platform.

Case Study: 2016 Gatlinburg Wildland Fire

The Gatlinburg Wildland Fire was reported on November 23, 2016 in the Great Smokey Mountains National Park near Gatlinburg, Tennessee. The wildland fire ultimately killed 14 people, injured 130 people, destroyed or damaged approximately 2,500 homes and forced 14,000 people to evacuate. (ABS Group, 2017) The Gatlinburg Wildland Fire burned nearly 17,000 acres. The ABS Group completed a written after action review (AAR) of the fire in December 2017 at the request of Sevier County Emergency Management, Tennessee Emergency Management Agency (TEMA) and the Great Smokey Mountains National Park. This scope of this thesis is limited to a review of the IPAWS system during this incident and will not cover other findings or conclusions. The Gatlinburg Wildland Fire timeline shows that the first evacuations were conducted at 12 p.m. on November 28, 2016 by first responders. Voluntary evacuations were announced later that day at a 4 p.m. news conference by public information officers, however, this would be just the beginning of the night's evacuations. Mandatory

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evacuations began at 6:27 p.m. (ABS Group, 2017) and continued through 8 p.m. on November 28, 2016. The AAR (ABS, 2017, p.24) notes that at 8:40 p.m. the “Tennessee Emergency Management Agency (TEMA) was asked to issue an IPAWS notification to both mobile devices and through the Emergency Alert System (EAS) to announce the evacuation of the entire City of Gatlinburg.” The request was made by the Gatlinburg Fire Chief to the Sevier County Emergency Management Director (SCEMD). The SCEMD spoke to the TEMA public information officer to confirm the wording of the emergency alert message. However, the “TEMA personnel unsuccessfully tried to contact the SCEMD again to verify the message content as required by TEMA policy due to widespread power outages.” (ABS Group, 2017, p. 25) TEMA policy required message approval before dissemination.

The AAR states (ABS Group, 2017, p. 25) that at 9 p.m. the NWS sent an EAS message. The NWS could not send a Wireless Emergency Alert (WEA) because this was not a weather emergency. TEMA staff did not issue the requested IPAWS message after seeing the NWS EAS message. The AAR (ABS Group, 2017, p.25) does document that the, “SCEMD was unaware for several days that the message initially requested for broadcast by TEMA did not go out. Even if the message had gone out, the communication system outages at that time would have prevented or limited the intended message from reaching the audience.”

Questions regarding this initial IPAWS message plagued TEMA and Gatlinburg's first responders for nearly a year. The IPAWS system was brought into question by multiple media sources, but especially by the Knoxville News-Sentinel through series of stories that ran for a year. An August 10, 2017 Knoxville News-Sentinel article focused on the communication issues of the fire, including the failed IPAWS alert. (Jacobs, 2017). When asked in the newspaper

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story about the failed alert, the TEMA PIO is quoted as saying, “At this point, I have an unverified message.... We didn't have the information to send (an alert) that was accurate, so we didn't.” (Jacobs, 2017).

Research findings related to the Gatlinburg Wildland Fire focused on ensuring the dissemination of emergency alerts using the IPAWS. This is suggested through changes to current policies and an emphasis on training and exercise of the system between local, state and federal partners.

The ABS Group's AAR recommends five goals for change. Goal four applies to the use of the IPAWS. It states, “Help ensure that residents and visitors in all relevant areas are informed of the need for an evacuation from a wildland fire in a timely manner.” (ABS Group, 2017, p. 136).

During this fire the public information officer was involved in the message composition, however, policies dictated that without approval from Sevier County it could not be disseminated. Policies, along with increased training between partners, should be explored to ensure that the public receives life-saving emergency notifications.

The failure to deploy the Gatlinburg Wildland Fire IPAWS evacuation information became national news bringing the reliability and trust of the system into question well beyond the borders of Sevier County and the State of Tennessee.

A secondary issue raised during research is how to reach tourists in a wildland fire area. This demonstrates a need for public education campaigns focused on signing up for emergency alerts as people travel away from their homes. The AAR indicates that authorities initiated work

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on correcting issues with the use of the IPAWS as seen in Figure 4. References made to enhancing the emergency notifications to visitors or tourists is capture in items 3-4 and 3-5.

(ABS Group, 2017, p. 143) The Gatlinburg Wildland Fire demonstrates an incident that caused the American people to question the reliability of the IPAWS.

Table C-3 Actions Already Taken or Underway	
3-1	Develop an enhanced Emergency Notification System with the capability to provide advanced notifications and warnings to the public.
3-2	Procure technology to enable recording of all radio channels and phone lines with an uninterrupted power source to avoid manual logging of calls during high volume situations.
3-3	Request a change to TEMA guidelines that would allow them to send an IPAWS notification even if communications are lost with the EOC.
3-4	Enhance the county’s CodeRed subscription and IPAWS alert capabilities, as well as advertise and arrange mass enrollment opportunities as needed.
3-5	Create a redundant and robust citizen/visitor notification and warning system.
3-6	Maintain awareness (e.g., ESF11 – food emergency service function and others) of the potential need to use multiple avenues of food providers to feed first responders over numerous days to provide continuity in the food services.
3-7	Establish a protocol for providing regular communication to the public and all residents and visitors in Sevier County, using multiple communication methods (e.g., TV, social media, radio) addressing non-emergency public safety information.
3-8	Provide signage to all roads and intersections in mountainous portions of Sevier County to aid in the navigation of the terrain, and conduct a study to determine if alternative routing technologies could be applied to the roadways in the City of Gatlinburg and surrounding communities.
3-9	Obtain a cache of satellite phones for Sevier County and associated municipalities to be deployed during an emergency when other forms of communication are fractured, and request that the GSMNP also have accessibility.
3-10	Design, develop, and implement a Firewise public education system, and include materials to be provided to all residents and visitors.
3-11	Begin self-evaluation, conduct workshops, and initiate steps to become a Firewise-recognized community.
3-12	Establish a backup communications center in Sevier County that is available for use by the City of Gatlinburg and other Sevier County agencies.
3-13	Establish redundancy in phone system for the City of Gatlinburg.
3-14	Install a warning system and an AM radio frequency system. Sevier County and the City of Gatlinburg have as of this date upgraded the CodeRed system as well as other notification systems.
3-15	Apply to FEMA to allow Sevier County to utilize IPAWS.
3-16	For emergency situations, use the same notification methods for non-emergency as for door-to-door notification, IPAWS, emergency notification (CodeRed), siren systems, and AM radio frequency.
3-17	Acquire a sufficient number of chain saws for use by law enforcement during an emergency.

Figure 4 3 Actions Already Taken or Underway (ABS Group, 2017, p.143)

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Case Study: 2017: Sonoma County California Wildland Fire

On October 8, 2017 the FEMA Integrated Public Alert and Warning System (IPAWS) was once again in the spotlight. The cause of the attention was created by the intentional decision not to use the emergency notification system available to Sonoma County California as multiple wildfires erupted in the area. The wildland fires led to the evacuation of more than 100,000 people, the destruction of 5,000 homes and 25 fatalities making it “the most destructive wildfire in California history” according the Cal OES *Public Alert and Warning Program Assessment for Sonoma County*. (Cal OES, 2018, p. 2) Sonoma County has four systems available to disseminate emergency notifications. (Cal OES, 2018, p.5-6) The first system is an opt-in system called SoCoAlert that allows the county to send emails and text messages. The second system, another opt-in notification system, is called Nixle.

Nixle is a commercial platform that works with IPAWS to issue emergency alerts. The third system is the IPAWS Emergency Alert System (EAS) that allows the county to push emergency notifications through broadcasters and cable television. The last system is the IPAWS Wireless Emergency Alerts (WEA) that sends text emergency notifications through cell towers to a specified area. This system reaches anyone in the cell tower area simultaneously or as they enter the area for a time specified by the Alert Authority.

According to the Cal OES report (2018) “they [county alerting authority decision makers] never seriously considered the EAS during the fires.” The report asserts the decision was not, “based on fear of panic, but rather a judgement of road capacity” (Cal OES, 2018, p.11) that led to the final decision to not use the EAS or the WEA. However, a LA Times story states, “County emergency manager Chris Helgren said he was worried the notoriously imprecise

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system would trigger countywide panic.” (St. John, 2017) As with the Gatlinburg Wildland Fire, national media attention focused on the county's use of the IPAWS Wireless Emergency Alerts. The EAS would have enabled public safety officials to send a message to everyone in the area as the fast moving fires raced through the county leaving behind death and destruction. This is a second example of the system's reliability and trust being questioned by individuals relying on the emergency notifications. This time the cause highlights human decision making factors involved in the understanding the IPAWS technology and the perceived panic that might ensue.

The findings from the Sonoma County wildland fires again focuses on training and the composition of messages to include their psychological impacts of messages. More than 950 records are included in a Google search of Sonoma County wildland fires and the IPAWS. The Cal OES report (2018) provides 11 recommendations for Sonoma County officials related to the IPAWS. Six of the recommendations focus on procedure and policy changes that fall outside of the of this thesis scope. Of the remaining recommendations three are dedicated to message composition and the remaining two recommend training improvements. Recommendations for message composition include developing templates that are pre-scripted for all-hazards events that could strike the county at any time. The templates allow public information officers to provide detailed messages following the formula recommended previously by Professor Mileti (Mileti, 2018). The findings also push for dispatch and emergency operations centers to learn how to compose effective messaging in addition to publicly disseminating them. In addition to composing effective messages, training improvements are included in the Cal OES report. A call to “establish a documented program of refresher training and practice sessions for alert authorizers and alert operators” is included the report. (Cal OES, 2018, p.11) Training instructions from Cal OES specifically request a “focus on the science of effective warning ...

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with regard to evacuation orders.” (Cal OES, 2018, p. 11) The Sonoma County wildland fires public attitude can be summarized in a Press Democrat headline stating “‘You failed us:’ Records show how Sonoma County reacted to warning shortfall in October fires.” (Morris, 2018)

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Case Study: 2018 Hawaii False Alert Ballistic Missile Launch

The final case study involves the use of IPAWS during a false emergency alert issued by the State of Hawaii. On January 13, 2018 the Hawaii Emergency Management Agency's Warning Point issued a false ballistic missile alert through the IPAWS. The alert stated, "BALLISTIC MISSILE THREAT INBOUND TO HAWAII. SEEK IMMEDIATE SHELTER. THIS IS NOT A DRILL." (FCC, 2018, p.3) Although a social media post was issued 13 minutes after the false alert, it took 38 minutes to correct the false alert through both the IPAWS Emergency Alert System (EAS) and Wireless Emergency Alerts (WEA) platforms that were used for the initial alert. (FCC, 2018, p.3) Reports from both the FCC (2018) and the State of Hawaii (2018) share the cause of the false alert as human error. This case study demonstrates a third use of the IPAWS to result in a loss of trust and reliability in the emergency notifications system. According to a memo from the International Association of Emergency Managers (IAEM), "This error led many residents to report that they were frightened and confused. People nationwide have echoed those feelings." (IAEM, 2018)

The research findings for this case study are primarily from the FCC and State of Hawaii after action reports (AARs) indicating human error as the cause of the false alert. The State of Hawaii focuses on training and public information issues. (Hara, 2018, p.3) The FCC report finds training and technology safeguards as the primary issues. (FCC, 2018, p.24) The technology safeguards are outside of the scope of this thesis, however, the training and public information issues can be addressed. The State's report identifies four recommendations. Two of the items are related to technology and policies. The State of Hawaii report states that the State Watch Point Ballistic Missile Alert Checklist did not include the emergency management public

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information officer (PIO) on the notification list. “The missing key step to notify the PIO contributed to the delay in rapidly notifying the media and public.” (Hara, 2018, p.2) The last State recommendation is to “develop and deliver training and education programs for the public, government leaders, and EM employees.” (Hara, 2018, p.3) Although the Hawaii Emergency Management Agency had conducted a yearlong public education outreach program for ballistic missile preparedness, the State of Hawaii report found the campaign “limited in its success.” and included a charge to take another look at the campaign. (Hara, 2018, p.11) The FCC report finds the Hawaii Emergency Management Agency “alert proficiency training...to have been deficient” in addition to several statements related to technology and policies. Related to emergency alert messaging, the FCC report calls for a “refrain from using phrases such as “This is Not a Drill” or “Real World” in test messages.” (FCC, 2018, p.24) These recommendations are issued in an effort to regain the trust of the community members receiving emergency notifications from government agencies in the United States.

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RESULTS

How can public information officers impact the trust and reliability of the Integrated Public Alert and Warning System (IPAWS)? There are many findings which include:

- Public information officers should be involved in alert messaging for emergencies, disasters, and exercises.
- Deployed messaging does not create panic. Informed communities make educated decisions and follow direction.
- Lack of deployment may result in fatalities as found in the Gatlinburg Wildland Fire and California Wildland Fire case studies.
- Public information officers should understand the system to provide their leadership advice and guidance on messaging through IPAWS.
- Public information officers should understand the system to provide accurate media interviews and lead effective public education campaigns.

How can training officers impact the trust and reliability of the IPAWS? There are many findings which include:

- Alerting Authorities should understand the IPAWS system.
- Lack of training results in false alerts as seen in Hawaii, Colorado Bureau of Investigation, and multiple other states during this three-year period.
- The need for formal training and exercise programs is demonstrated in each of the case studies.

RECOMMENDATIONS AND CONCLUSION

Journalist Amanda Ripley states during her January 2018 FEMA Prep Talk, “Our best chance is to trust them [people] with more information sooner. More transparency than we’re comfortable with. Then we know we are doing it right.” (Ripley, 2018). During blue skies and normal operations many government agencies communicate transparency as a priority until emergencies and community disasters strike. At this point public safety agencies have demonstrated a hesitation to use the FEMA Integrated Public Alert and Warning System (IPAWS) to issue timely and effective emergency notifications to the members of their community. Two of the main reasons for the hesitation seems to be caused by the message composition process and a need for increased training and exercise programs.

This thesis shares three case studies demonstrating an impact on the trust and reliability of the IPAWS between 2016 and 2018. Although several other examples existed during this three-year period, the case studies are included due to the nationwide public conversation resulting around the Alerting Authority use of the system. The case studies included: 2016 Gatlinburg Wildland Fire, 2017 Sonoma County, California Wildland Fires, and the 2018 Hawaii Ballistic Missile False Alert. The findings of these case studies show a need for a focus on message composition and the psychological impacts of emergency notifications. The findings also show a need for Alerting Authorities to create formal IPAWS training and exercise programs.

The answer to the thesis question – Is the FEMA Integrated Public Alerts and Warning System (IPAWS) a platform trusted to warn the public of all-hazard incidents? – is that the integrity of the system is questioned by both public safety officials and the public. The findings

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of this thesis focused on the need to understand how emergency alert messages are composed. More emphasis needs to be placed on what is being said by employing research studies on the best practices of composing messages. This should be done by including public information officers in the creation of messages and the creation of templates available to Alerting Authorities. Findings also show training deficiencies impact public safety personnel and the general public. Training programs should be created for public safety officials entrusted with deciding when and how to issue emergency alerts through IPAWS. Additional public education campaigns should be created and supported for individuals receiving emergency alerts to increase compliance with the emergency alerts. Therefore, the recommendations below focus on practices that can be instituted within a short time frame.

Recommendations

Recommendation 1: Engage agency Public Information Officers for IPAWS messaging.

Public information officers should be engaged to provide direct support to Alerting Authorities and provide guidance to leadership. Specifically, messages should be composed using the formula shared by Professor Mileti by writing alerts in the sequence of:

- Source: Who is the message from?
- Threat: Describe the all-hazard event and its impacts.
- Location: Share the impact area boundaries in plain language.
- Guidance/ Time: Tell people what protective actions to take and the time frame to complete the actions and how the actions will reduce the threat.
- Expiration Time: Tell people when the alert expires. (Mileti, 2018)

Public information officers should also create pre-scripted templated messages for every hazard. The templates can be used by the alerting operators 24/7 if leadership or public information officers are not reachable. A key component of emergency alerts is for Alerting Authorities to

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understand that issuing emergency alerts does not create panic. Rather, sharing information builds trust and “trust is the basic building block of any effective warning system,” according to Disaster Reporter Amada Riply. (2008)

Recommendation 2: Engage agency training officers to support IPAWS Alerting Authorities.

A formal training program should be implemented by every Alerting Authority. A key finding from the Cal OES assessment team is that the “emergency manager’s decision was also influenced by a limited awareness and understanding of the WEA system and outdated information regarding WEA’s technical capabilities.” (Cal OES, 2018) Training cannot be limited to the initial FEMA IS-247a IPAWS course. Training should be continuous and then tested in ongoing exercises and alerting drills. Training officers can develop and implement ongoing training programs to provide opportunities for alerting operations to refresh their knowledge on IPAWS. Training officers can find support from the IPAWS Program Management Office (PMO) to schedule and conduct live tests and conduct refresher courses on the alerting system.

Recommendation 3: Create and disseminate public education campaigns focused on IPAWS.

Public education campaigns are necessary to train the public to receive and act upon the emergency alerts pushed out through the IPAWS. This should be done at the local, state, and federal levels. Although this already occurs during September’s National Preparedness Month it should become a year-round push that is coordinated by all levels of government.

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Suggestions for Future Studies

Future studies could focus on the technological and software capabilities of the FEMA Integrated and Public Alert Warning System (IPAWS). A second area of future studies will be continued research on the psychological impacts of alert messaging and the needs of the community during the disaster notification process.

Thesis Conclusion

Trust in the FEMA Integrated Public Alert and Warning System (IPAWS) has been eroded following wildland fires in Gatlinburg and Sonoma County, California and a ballistic missile false alert issued by the Hawaii Emergency Management Agency. IPAWS Alerting Authorities can regain that trust by focusing on the composition and delivery of the public alerts. This is possible by engaging public information officers in the IPAWS process and using the alerting formula provided by FEMA researchers. (Mileti 2018, FEMA, 2018). The second step is to develop and implement an IPAWS training program for all staff, but specifically for alerting operators.

This program should include IPAWS in agency exercises and monthly drills. Lastly, Alerting Authorities should promote continuous public education campaign to prepare their communities to not only receive and respond to emergency alerts, but to understand the potential risks within their areas. IPAWS is built using technology that frequently changes. The demands on creating the correct messages and continuously training to understand the system will be essential in rebuilding the trust of the public alert and warning system in the United States.

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Appendix A: WEA “Go Live” Checklist (U.S. Department of Homeland Security, 2013)

Step	Action	Owner	Completion Date
1	Acquire IPAWS- compatible software ¹		
2	Establish memorandums of agreement with FEMA ¹		
3	Apply for IPAWS public alerting authority permissions ¹		
4	Complete IPAWS web-based training (IS-247) ¹		
5	Establish internal policies and standard operating procedures (SOPs) for WEA		
6	Train internal staff and other related personnel <ul style="list-style-type: none"> <li data-bbox="305 909 1078 1010">□ Train WEA operators using IPAWS web-based training (IS-247), proprietary materials based on your WEA SOPs, and your service provider’s training materials <li data-bbox="305 1020 1078 1121">□ Train other staff (e.g., dispatchers, 911 operators, public relations personnel) on the purpose and usage of WEA to prepare them for the impacts of WEA 		
7	Coordinate plans for WEA deployment with emergency response agencies in your jurisdiction		
8	Coordinate plans for WEA deployment with emergency response agencies in adjacent jurisdictions and the state		
9	Complete internal testing of WEA operations		
10	Educate the public about WEA using state-generated materials (if available), press releases, media interviews, social media, your agency’s website, presentations at town hall and civic group meetings, etc.		

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Appendix B: Colorado Bureau of Investigation Tweet (2018)

 **CBI** 
@CBI_Colorado Following 

We've been notified some people did not receive the cell phone alert for Sunday night's [@AMBERAlert](#) (Jacob Roe). We are working with FEMA to address this issue.

9:12 PM - 24 Jun 2018

13 Retweets 24 Likes 

 13  13  24 

 Tweet your reply

 **Marshall Zelinger** @Marshall9News · Jun 24 
Replying to [@CBI_Colorado](#) [@AMBERAlert](#)
How can this be a problem nearly every AMBER alert?

 1   1 

 **CBI** 
@CBI_Colorado · Jun 24 
We completely understand the frustration. We constantly work to ID/remedy issues...especially outside of an [@AMBERAlert](#) activation. This alert will be no different. In the meantime, please continue to RT information about Jacob.

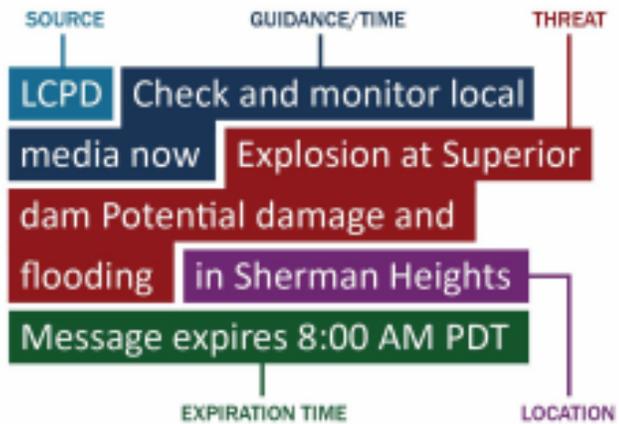
 1   

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Appendix C: Modernizing Public Alert Messaging (Mileti, 2018)



EXAMPLE



TEMPLATE

[Insert title and organization of a local, familiar, *SOURCE* authoritative message source] **Check and monitor** *GUIDANCE/TIME* **local media now** [insert description of event, dam *THREAT* name, and threat here] **in** [insert location of threat *LOCATION* here] **Message expires** [insert time here] *EXPIRATION TIME*

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Appendix D: Gatlinburg Wildland Fire Actions Already Taken or Underway (ABS Group, 2017, p. 143)

Table C-3 Actions Already Taken or Underway	
3-1	Develop an enhanced Emergency Notification System with the capability to provide advanced notifications and warnings to the public.
3-2	Procure technology to enable recording of all radio channels and phone lines with an uninterrupted power source to avoid manual logging of calls during high volume situations.
3-3	Request a change to TEMA guidelines that would allow them to send an IPAWS notification even if communications are lost with the EOC.
3-4	Enhance the county’s CodeRed subscription and IPAWS alert capabilities, as well as advertise and arrange mass enrollment opportunities as needed.
3-5	Create a redundant and robust citizen/visitor notification and warning system.
3-6	Maintain awareness (e.g., ESF11 – food emergency service function and others) of the potential need to use multiple avenues of food providers to feed first responders over numerous days to provide continuity in the food services.
3-7	Establish a protocol for providing regular communication to the public and all residents and visitors in Sevier County, using multiple communication methods (e.g., TV, social media, radio) addressing non-emergency public safety information.
3-8	Provide signage to all roads and intersections in mountainous portions of Sevier County to aid in the navigation of the terrain, and conduct a study to determine if alternative routing technologies could be applied to the roadways in the City of Gatlinburg and surrounding communities.
3-9	Obtain a cache of satellite phones for Sevier County and associated municipalities to be deployed during an emergency when other forms of communication are fractured, and request that the GSMNP also have accessibility.
3-10	Design, develop, and implement a Firewise public education system, and include materials to be provided to all residents and visitors.
3-11	Begin self-evaluation, conduct workshops, and initiate steps to become a Firewise-recognized community.
3-12	Establish a backup communications center in Sevier County that is available for use by the City of Gatlinburg and other Sevier County agencies.
3-13	Establish redundancy in phone system for the City of Gatlinburg.
3-14	Install a warning system and an AM radio frequency system. Sevier County and the City of Gatlinburg have as of this date upgraded the CodeRed system as well as other notification systems.
3-15	Apply to FEMA to allow Sevier County to utilize IPAWS.
3-16	For emergency situations, use the same notification methods for non-emergency as for door-to-door notification, IPAWS, emergency notification (CodeRed), siren systems, and AM radio frequency.
3-17	Acquire a sufficient number of chain saws for use by law enforcement during an emergency.