Orange County Water Interruption

After Action Report

December 2017

Crisis Focus, LLC

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Handling Instructions

1. The title of this document is the Orange County Water Interruption After Action Report.
2. This document was compiled by Crisis Focus, LLC on behalf of Orange County Emergency Services, Orange Water and Sewer Authority (OWASA), Town of Chapel Hill, Town of Carrboro and the University of North Carolina at Chapel Hill.
3. The information gathered in this After Action Report (AAR) is not classified as For Official Use Only (FOUO) and can be shared readily.
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Executive Summary

In February 2017, a "Do Not Use, Do Not Drink" order was issued by the Orange County Department of Public Health in consultation with the Orange Water and Sewer Authority (OWASA) which created a community-wide emergency for drinking water and sanitation concerns. OWASA proactively communicated the situation in concert with participating agencies to warn the public, while the Orange County Emergency Management Program supported the community through water distribution points and other functions.

Immediately following the conclusion of the Water Interruption Incident on February 3, 2017, a multi-agency/jurisdictional work group formed to begin the After Action Review (AAR) process for the incident. The committee conducted an initial planning meeting and briefly discussed overarching strengths and areas for improvement. The group also studied the option of acquiring an external, third-party consultant to guide and develop the formal AAR and improvement plan for this significant event.

After reviewing proposals from several consulting firms, the committee reached a consensus to recommend the use of Crisis Focus, LLC. The firm has vast local experience with similar events, "town and gown" relationships, and the formalized AAR process.

The After Action Reporting process included document reviews, stakeholder interviews, and the deployment of three surveys of separate groups to determine the strengths and areas for improvement from the incident. More than 1,200 survey responses were analyzed and compared against national best practices and information gleaned from the document review process.

Overall, the Orange County community responded appropriately to the unprecedented event, worked within pre-established frameworks to solve issues creatively and provided services to customers under difficult circumstances. As with all major incidents, strengths and areas for improvement were identified to allow the Orange County community to continue to improve their operations and disaster-planning process for future incidents. Key strengths and areas for improvement are listed below and described in detail later in this document.

Key Strengths

1. Orange County agencies worked together (county, town, private, public and nonprofit) to support the incident.

2. An exercise the previous year on a fictitious water event allowed response agencies to practice their collaborative approach prior to the incident.

3. Agencies proactively communicated with the public and business interests in the affected area to relay the required actions.

4. Agencies set up commodity distribution networks without previous planning or practice to provide water to those in need within 24 hours of incident activation.

Key Areas for Improvement

1. The Orange County Emergency Operations Framework should be updated to include the towns of Carrboro, Chapel Hill and Hillsborough in a Comprehensive Emergency Operations Plan concept.

2. A Joint Information System/Joint Information Center plan should be developed and exercised to ensure a coordinated public information release process for future complex incidents.

3. A Commodity Distribution Plan should be created to support and ensure a coordinated and efficient delivery of commodity to community members impacted by emergencies or disasters.

4. The Orange County WebEOC system should be evaluated and updated to include all agencies and organizational structures in the Emergency Operations Framework for situational awareness, resource requests and incident documentation.

5. Additional training is needed for elected officials, agency representatives and the general public on the emergency plans, preparedness measures and expectations for disasters within Orange County.

Event Summary

Between February 3 and February 5, the Orange County Health Department and Orange Water and Sewer Authority (OWASA) issued a "Do Not Use and Do Not Drink" order for all customers as the result of a series of cascading events negatively impacting the water supply capabilities of the organization. The greater Orange County community came together to coordinate a response to the unforeseen event and to support the community by reducing the overall impact of the event.

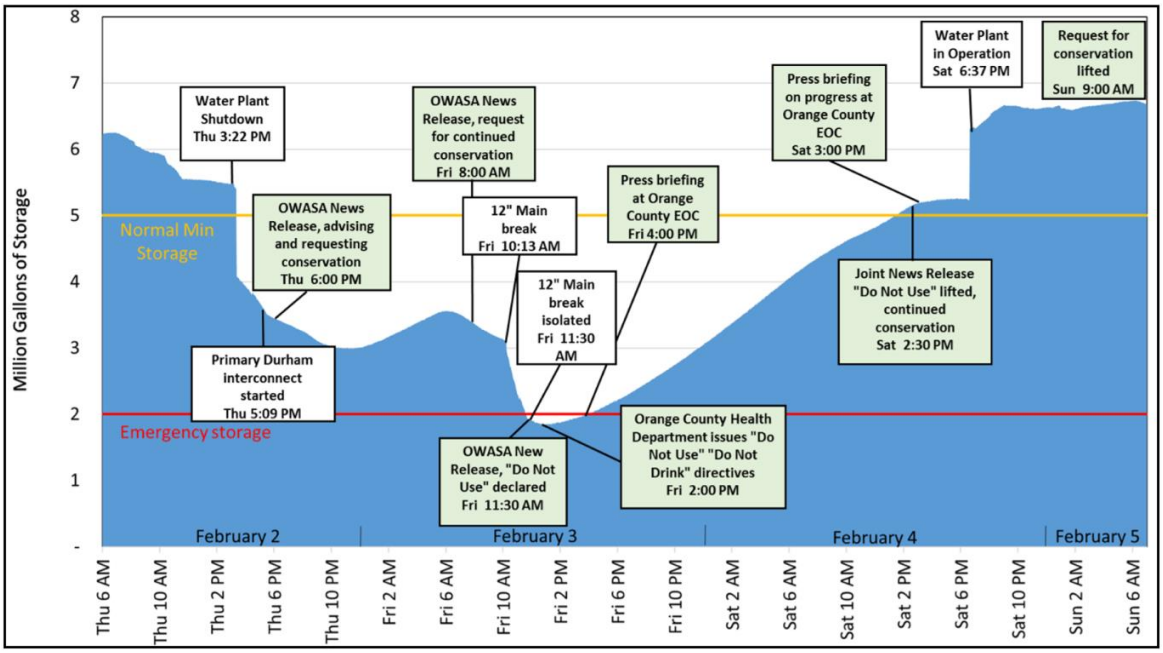
February 2, 2017: OWASA had a process failure at its water plant which created a potential health concern as the result of over-fluoridation of the drinking water for the Chapel Hill/Carrboro communities. OWASA effectively quarantined the contaminated water and activated an agreement with the City of Durham to receive drinking water through a drinking water system interconnection.

February 3, 2017: Because of a water main failure in the Foxcroft Drive area, water levels began to drop to critically low levels, threatening the infrastructure of OWASA and creating the potential for a larger public health incident. OWASA and Orange County Public Health issued a "Do Not Use/Do Not Drink" order for all OWASA customers and requested the activation of the Orange County Emergency Operations Center to support the incident.

February 4, 2017: Four locations were activated as Points of Distribution (POD) to provide free bottled water to OWASA customers. In the late afternoon, it was announced the Jones Ferry Road Water Plant was back online and the "Do Not Use" order was lifted. A boil water notice was issued for the Foxcroft Drive area, and customers were asked to continue to conserve water use.

February 5, 2017: Water levels returned to normal throughout the system, and the boil water notice was lifted for the Foxcroft Drive area. All restrictions were lifted, and the community returned to normal.

Event Timeline



Initially published in the OWASA post incident analysis.

After Action Reporting Methodology

Immediately following the event, primary incident response stakeholders completed an incident debrief to gather initial feedback from the event. During the initial data collection process, it was determined that an outside organization should complete a thorough After Action Review process on the response to the event which would include document reviews, process analysis and a series of electronic surveys.

A steering committee composed of Orange County Emergency Management, Orange Water and Sewer Authority (OWASA), The Town of Chapel Hill, The Town of Carrboro and the University of North Carolina at Chapel Hill guided the process and identified five key areas of focus for the After Action Report. The areas of focus, aligned with the Department of Homeland Security Core Capabilities, were:

1. Operational Coordination.
2. Public Information and Warning.
3. Community Planning.
4. Mass Care Services (commodity distribution).
5. Community Resilience.

In June of 2017, three separate surveys were deployed to distinct audiences to determine the strengths and areas of improvement for the resiliency of Orange County for future events. Surveys were delivered to elected and appointed officials, responding agency stakeholders and the general public, including residents and businesses within Orange County. More than 1,250 unique surveys were submitted and then scored and analyzed by Crisis Focus, LLC for areas of strength and opportunities for improvement.

In addition to the three surveys, Crisis Focus, LLC reviewed a number of documents provided by the primary incident response stakeholder agencies and identified strengths and areas for improvement based on best practice. Documents reviewed were the Orange County Emergency Operation Framework, Incident Action Plans and Situation Reports, WebEOC reports, Everbridge messages, and reports from local news agencies.

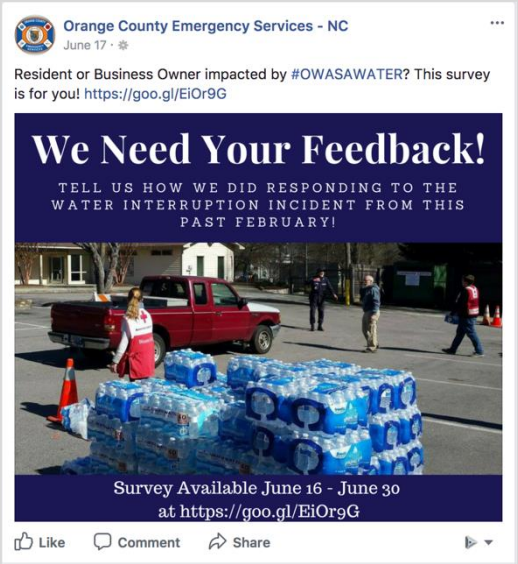
The action items aggregated from the survey responses and collated with findings from the document reviews were provided to stakeholder agencies for review and then discussed during an After Action Conference (AAC) in September 2017. During the AAC, the areas for improvement were discussed in depth to determine their factual basis, potential solutions and agency participation. The outcomes from the After Action Conference provided the basis for this document and the details provided in the Improvement Plan.

Report Scope

The scope of analysis for this report is focused on the community response to the "Do Not Use" order. It does not include the technical and tactical response of OWASA to the water restoration process or the root cause of the water event. OWASA contracted with third-party engineering firms to complete a root cause analysis and technical evaluation of its operations. This analysis is available on the OWASA website at http://owasa.org/2017-water-emergency.

Survey Methodology and Summary

Between June 16 and June 30, 2017, three separate surveys were electronically distributed to capture community feedback on the response to the water interruption incident. Crisis Focus, LLC used a leading online survey tool to capture the data and provide initial data analysis for the three audiences of elected and appointed officials, program stakeholders, and the greater community (residents and business). The surveys were developed based on an initial review of incident-related documents provided by Orange County, direction provided by stakeholders in the project kickoff meeting, and initial findings from the incident "hot wash" held immediately following the conclusion of the incident.



Project stakeholders reviewed and edited the initial drafts of the survey to ensure that the questions aligned with the strategic objectives of the After Action Reporting project. Once the surveys were completed, Crisis Focus, LLC finalized the survey question mapping and provided links to the project stakeholders for distribution.

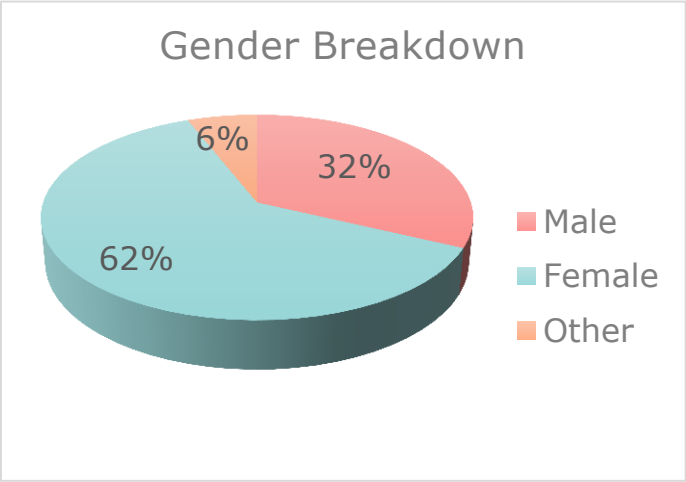
Surveys were distributed by the project stakeholders through direct email (to elected officials and agency representatives) and through email, press releases and social media for residents and businesses.

Between the three surveys, 1,203 responses were collected through the online survey tool. Each survey and corresponding demographic breakdowns are described below.

Community Survey

Between June 16 and June 30, 2017, 1,116 respondents completed the Community Survey providing feedback on the response to the water interruption incident in February 2017. A total of 1,041 respondents answered the questions from the viewpoint of a resident or visitor while 75 responses came from businesses.

Demographically, the respondent self-reported breakdown was 62% female and 32% male, with the remainder electing not to answer, preferring not to say, or identifying as non-binary, third gender. The ages of respondents were evenly distributed between 21 and 60+ with only a few responses from individuals between 18 and 20 or those choosing not to answer the question. Overwhelmingly, respondents related with the race/ethnicity of "White/Caucasian" at 78.9% with the next highest race/ethnicity selection preferring not to answer.



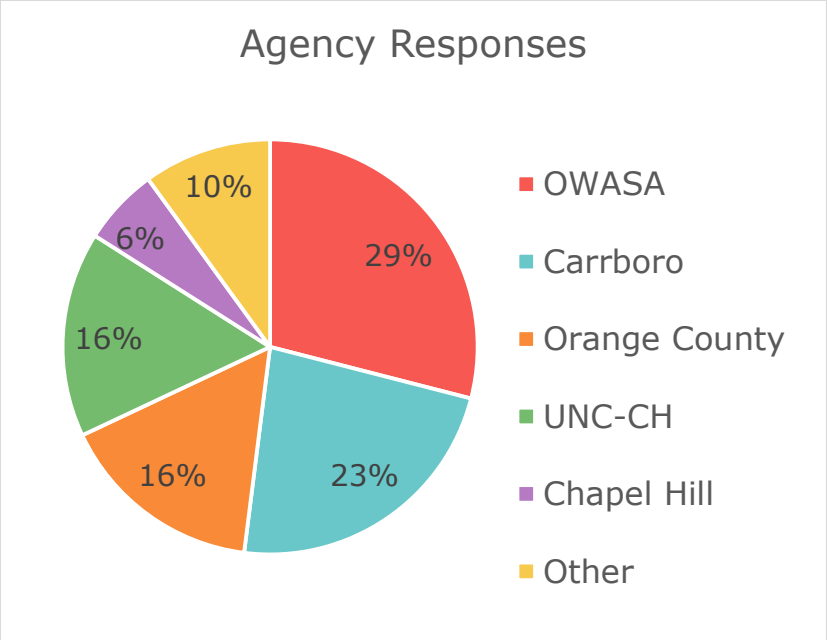
Of the total respondents (residential and business), 71.8% were direct OWASA account holders, and 20.8% received their water through OWASA but were not direct account holders. The remaining respondents were either not sure of their water source, used a private or community well, or had another source of water.

Business entities were asked to classify their organization into a business type to determine the impact the incident had on their operations. Of the respondents, 31% identified as food establishments; 26% identified as general business organizations; 21% identified as retail sales organizations; 10% identified as healthcare organizations; 8% identified as educational organizations; and 5% selected "other."

To determine the impact the event had on the overall community, the survey asked respondents to recall their specific circumstances during the February event. 80.1% of respondents stated that they had water but were asked not to use it. 12.6% stated that they had no water during the event. 3.8% of the respondents stated that they had water and used it throughout the event. However, as we will discuss later in the report, this percentage does not correlate with the usage data provided by OWASA during the incident. The percentage of people who continued to use the water and disregard the "Do Not Use" order was much greater than self-reported through this survey.

Stakeholder Survey

Agency stakeholders received a link and invitation to provide feedback for the After Action Report through a direct email from their organization. 69 respondents completed the survey with the following agency breakdown: OWASA, 29%; Town of Carrboro, 23%; Orange County, 16%; UNC-Chapel Hill, 16%; Town of Chapel Hill, 6%; and Other agencies, 10%. Of the stakeholders responding to the survey, just over half (53%) were personally impacted at home by the water interruption.



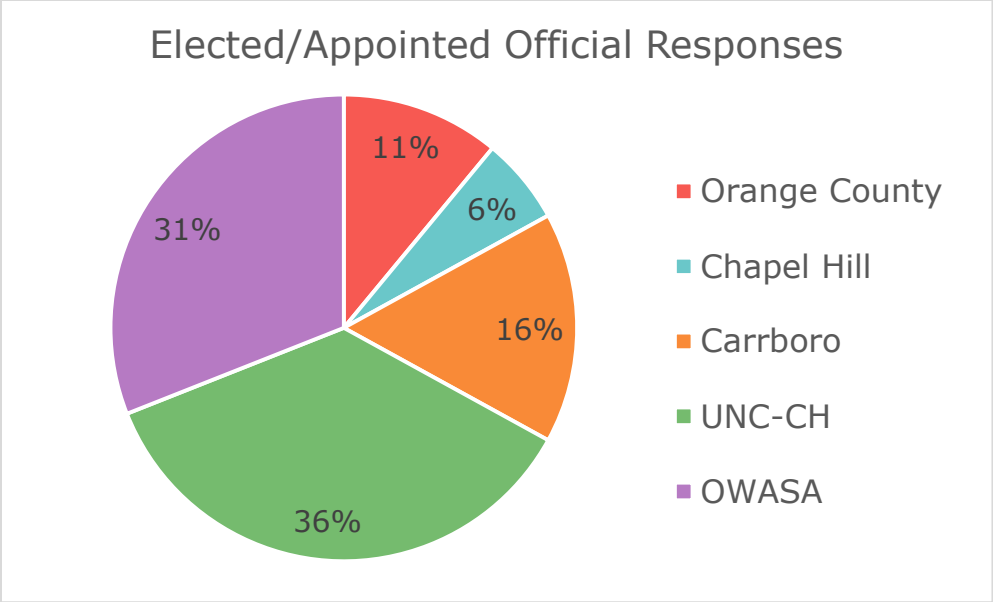
Stakeholders were asked to quantify the total amount of time they spent in each of the response areas (County EOC, Organizational EOC, Point of Distribution or Remote Operations) and, based on the data received, more than 1,065 hours were reported among the locations. A majority (87%) of the responding agency stakeholders believed the incident was either a "Major" or "Significant" incident for the community.

Elected/Appointed Officials Survey

A customized survey was created for elected or appointed officials from each participating agency to gather strategic feedback and offer an opportunity for the community leaders to provide input into the After Action Reporting process. Website links were created for each board and distributed via email through their organization with an overview of the process and the intended outcomes.

The groups engaged in the survey included The Orange County Board of Commissioners, the Town Council of Chapel Hill, the Carrboro Board of Aldermen, the OWASA Board of Directors, and the UNC-Chapel Hill Policy Group. (The Town of Hillsborough was given the opportunity to participate but declined the offer due to the limited impact the incident had on the Town). The survey received a total of 19 responses with the following breakdown: Orange County, 10.6%; Town of Chapel Hill, 5.3%; Town of Carrboro, 15.8%; UNC-Chapel Hill, 36.8%; and OWASA, 31.6%.

Of the officials responding to the survey, 89% said they received direct constituent contacts during the event in February 2017. A majority of the officials (82%) viewed the incident as a "Major" or "Significant" incident for their community.



Community Perceptions

To determine an overall view of the response effectiveness of the organizations supporting the Water Interruption Incident, all three surveys (community, stakeholder, officials) asked the same question about each of the participating agencies. Respondents were asked to "grade" each of the agencies for their response efforts. The following table summarizes the overall grades for each organization by survey type.

Organization	Community Survey	Officials Survey	Stakeholder Survey
Orange County	A	A	B+
OWASA	A	B	C+
Town of Chapel Hill	A	A	B
Town of Carrboro	A	A	C+
UNC-Chapel Hill	A	A	B

Operational Coordination

Summary

This section will review the elements of the response by the communities, including incident coordination and incident command elements throughout the participating organizations. The Department of Homeland Security defines the Operational Coordination Core Capability as to "Establish and maintain a unified and coordinated operational structure and process that appropriately integrates all critical stakeholders and supports the execution of core capabilities." This capability was addressed by a number of structures set up to manage the overall incident. These structures included the Orange County Emergency Operations Center, the OWASA Emergency Operations Center, the Town of Chapel Hill Emergency Operations Center, the Town of Carrboro Emergency Operations Center and the UNC-Chapel Hill Emergency Operations Center. These organizations used phone, email and other electronic means to coordinate between the structures.

Orange County Emergency Operations Center

At the request of OWASA on Friday, February 3, the Orange County Emergency Operations Center (EOC) was activated to support the ongoing water event. The EOC was activated primarily because of the complexities created when a water main break occurred in the Foxcroft neighborhood in Chapel Hill and created an unsafe situation with water supply levels and pressures. The Emergency Operations Center remained open and active through Saturday evening as the situation stabilized and the community returned to normal operations.

Based on the AAR methodology, the key strengths and areas for improvement for the Orange County Emergency Operations Center are:

Strengths

1. Impacted and supporting agencies staffed the EOC appropriately to coordinate the overall response to the incident.
2. Agencies worked well together and remained flexible to mold existing plans and experiences from past events to respond to this event.
3. Members participating in the Emergency Operations Center remained flexible and able to adjust roles based on the changing conditions

4. The Emergency Operations Center completed three (3) operational cycles with Incident Action Plans and Situation Reports.
5. The Salamander Accountability system did a good job at tracking who was in the Emergency Operations Center at any given time.

Areas for Improvement

1. Not all agencies were adequately represented within the Emergency Operations Center.
2. The role of the EOC should be better defined to ensure it is not functioning as an Incident Command Post.
3. The physical layout and space available for operations, parking and media briefings at the Emergency Operations Center are not sufficient for an operation of this size.
4. Technology within the Emergency Operations Center was outdated and did not facilitate EOC operations efficiently.
5. Additional management for the Emergency Operations Center needs to be identified, staffed and trained for more cohesive operations.
6. Additional training and exercises on EOC Operations for affected agencies is needed for primary and secondary representatives to ensure role continuity and efficiency.
7. It was not always clear which agencies were represented in the EOC during the operational periods.

Based on stakeholder feedback, the majority of individuals who operated within the Emergency Operations Center believed the Orange County EOC was an effective way to coordinate the community-wide response to the event. The Emergency Operations Center cycled through three (3) Operational Periods, wrote three (3) Incident Action plans and completed three (3) separate Situation Reports updated with limited staffing.

At times, the staff attempting to manage the Emergency Operations Center (EOC Manager, Planning, etc.) also was attempting to coordinate the overall incident and was involved with logistical operations, press operations and other executive roles, such as State of Emergency coordination. For future events, the role of the EOC Manager should be separate from the Emergency Manager for the jurisdiction or

should be staffed with a Deputy EOC Manager for delegation of tasks and more appropriate spans of control.

Throughout the incident, the Emergency Operations Center was the focal point of the community-wide response to the water outage event. At times, the Emergency Operations Center was functioning as an Incident Command Post in a command and control setting. For future planning, exercises and incidents, better delineation between the Emergency Operations Center and the Incident Commander/Incident Command Post needs to occur to effectively use the frameworks provided in the National Incident Management System (NIMS) and the Incident Command System (ICS).

While most stakeholders stated they were well trained for their roles in the Emergency Operations Center, there were a number of individuals who stated they needed more training for their responsibilities in the Emergency Operations Center. This topic will be addressed in the Community Planning section.

Departmental Emergency Operations Center

In support of the overall operations, OWASA, UNC-Chapel Hill, Carrboro and Chapel Hill set up operational centers to manage internal assets and organization-level policies. The operations centers were called by different names (Emergency Operations Center, Command Center, Departmental Operations Center, etc.), but all served as organizational command centers within their realms of operation.

Eighty-five percent (85%) of respondents who worked within a departmental operations center agreed that it was an effective way to coordinate their organization's response to the water incident. Of those same respondents, the majority stated that they felt disconnected from the County's Emergency Operations Center, either because of the lack of a trained and effective liaison at the County EOC or the lack of an effective situational awareness tool such as WebEOC.

Based on the AAR methodology, the key strengths and areas for improvement for the Departmental Operations Center are:

Strengths

1. Departmental Operations Centers were set up to support tactical operations for many of the supporting agencies engaged in the incident.

2. The OWASA Emergency Operations Center was set up and operational prior to the water main break and was able to quickly coordinate response operations.

3. The operations centers for the towns and university were set up quickly and staffed to support the incident.

Areas for Improvement

1. Staffing for Departmental Operations Centers was not consistent across agencies, and many representatives did not believe they were the appropriate representatives for the operations center because of conflicting roles.

2. Additional planning discussions need to take place to determine if there is a need for a departmental operations center and if agencies have available staffing to set up a departmental operations center (Chapel Hill and Carrboro).

3. Communication lines and role delineation need to be better defined between Departmental Operations Centers and the County's Emergency Operations Center to better align operations.

Throughout the event, the departmental or organizational operations centers were opened at different levels to support the incident response. While representatives physically located at the County's EOC believed there was a clear decision-making process and clear lines of communication, individuals at the departmental operations center reported they felt disconnected and that the overall response was not well coordinated.

Additional planning should be done to align activation levels, roles and responsibilities between organizational emergency operations centers and the County's Emergency Operations Center. These plans should be aligned and coordinated into a single Comprehensive Emergency Operations Plan for Orange County to ensure horizontal and vertical organizational alignment during disasters.

Information Sharing and Common Operating Picture

The Department of Homeland Security defines the core capability of information sharing as the ability to "Provide all decision makers with decision-relevant information regarding the nature and extent of the hazard, any cascading effects, and the status of the response." During the water incident, this was primarily done through the Orange County Emergency Operations Center briefings, departmental operations center briefings, situation reports, incident action planning and WebEOC.

Based on the surveys taken by primary incident response stakeholders, representatives who were physically present at the Orange County Emergency Operations Center believed they were well informed and had the information needed to make good management decisions throughout the incident. Individuals who were not physically present at the Emergency Operations Center did not feel as well informed and reported a lack of clear understanding of the ongoing incident.

In reviewing the ways in which stakeholders and elected/appointed officials received information about the incident, it was determined the majority of respondents received official updates via email from their organization or the Orange County Emergency Operations Center. It was not clear based on information acquired through the survey if the official situation reports from the Orange County Emergency Operations Center were consistently distributed outside of WebEOC to other stakeholders or elected/appointed officials.

Based on the AAR methodology, the key strengths and areas for improvement for inter-agency information sharing are:

Strengths

1. Elected and appointed officials believed they were well informed throughout the ongoing situation.
2. For the agencies using WebEOC, the system provided good situational awareness and a process for documentation.
3. There was good use of social media monitoring to drive coordinated decision making within the Orange County Emergency Operations Center.
4. EOC Briefings were held to provide situational awareness updates at regular intervals during the incident.

Areas for Improvement

1. Most agencies were not using WebEOC for information sharing, situational awareness or incident documentation.
2. WebEOC was not configured for communications coordination between department operations centers and the Emergency Operations Center.
3. WebEOC was not configured to support all agencies operating within the Emergency Operations Center or for coordinating public information processes.
4. Business entities were not well represented at the Emergency Operations Center and did not receive situational awareness information to support their decision-making processes.
5. EOC situational awareness briefings were not effective and did not include all outside command and coordination centers.
6. Information shared via email was not always available to the right people at the right time because of shift work and emails going from person to person instead of being targeted to those who needed to be kept informed.
7. Decision-making processes and outcomes were not well documented throughout the event for both information sharing purposes and post incident analysis review.
8. Situation Reports were published within the Emergency Operations Center but did not receive a wider audience to ensure a clear understanding of the ongoing situation.

Once the Orange County Emergency Operations Center was activated on Friday, information sharing improved between agencies and those agencies physically present at the EOC. The use of briefings at the EOC facilitated some information sharing; however, additional methods of extending the briefings through teleconference or webinar should be considered to connect the departmental operations centers throughout the county.

Additionally, Orange County used WebEOC to track disaster information and information sharing within the Emergency Operations Center. WebEOC is highly customizable and can be extended to incorporate information sharing and request tracking to operations centers outside of the County's Emergency Operations Center. It is recommended that Orange County conduct a process review of the current

WebEOC configuration and extend the functionality to the key partners within the community who need to communicate during a disaster.

Public Information and Warning

Summary

The Department of Homeland Security defines the core capability of Public Information and Warning as the ability to "Deliver coordinated, prompt, reliable, and actionable information to the whole community through the use of clear, consistent, accessible, and culturally and linguistically appropriate methods to effectively relay information regarding any threat or hazard, as well as the actions being taken and the assistance being made available, as appropriate." Orange County and partner agencies distributed a significant amount of information throughout the event to support the function of public information and information sharing.

Based on the After Action Reporting methodology, the analysis has been broken down into the following areas: Message Effectiveness, Coordination of Public Information Releases, Delivery Method Analysis and Mass Notification/Everbridge use.

Message Effectiveness

From the beginning of the incident until the "Do Not Use" directive was issued, OWASA managed the initial messaging. Once the "Do Not Use" directive was issued until it was rescinded on February 4, the message was managed quasi-jointly. After the "Do Not Use" directive was rescinded, OWASA resumed responsibility for incident messaging. When the community was surveyed about timeliness, clarity and effectiveness of messages, the responses were positive overall and indicated the messaging seemed to meet the needs of the community. (Q8 Community).

Message effectiveness also can be measured by the actions taken by the public during the event. 75% of survey respondents stated that they stopped all water usage during the incident but, based on OWASA post incident analysis, there was only a 37% drop in system demand on the water distribution system. This small decrease in system utilization may be the result of an unclear message to the population, a disregard of the message by the population, or a combination of the two. Regardless of any unintended survey bias, the feedback received through the initial survey, analysis of comments in social media postings, discussions with stakeholders and document reviews, the following strengths and areas for improvement were identified:

Strengths

1. Numerous press releases and social media messages with detailed information regarding the situation went out at the inception of the incident.

2. Notifications to the public regarding the "Do Not Use" order were issued in a timely manner and through numerous methods.

Areas for Improvement

1. For individuals who received the initial message about the fluoridation issue and who then received the "Do Not Use" order, there was confusion about any linkage between the two incidents. This undermined future releases and information being sent out by OWASA by injecting confusion and questioning the reliability of information being released.
2. After the initial "Do Not Use" order, limited updates were sent out, creating rumors and uneasiness among the public.
3. The basis for the "Do Not Use" order was not clear and caused concerns within the community as to the cause of the order (contaminated water or lack of water).
4. Monitoring of the media and social media was not effectively used to ensure that effective messages were being distributed by the media.
5. Social media messages from all supporting agencies were not aligned and therefore undermined the basis for all messages.
6. Messages from the Health Department regarding business and food establishment operations were not clear.
7. Clarity and transparency were not evident regarding the risks posed from the fluoride event prior to the water main break. This undermined the credibility of future messages.
8. It was not clear which areas were impacted by the water interruption because many people are not familiar with the area or their water source.
9. Messaging at the end of the event was not clear as far as any additional protective actions, water restrictions, etc.
10. Residents and businesses did not have information regarding when the situation would be resolved or when "the next update" would be released. This made planning difficult.
11. Businesses reported receiving mixed messages regarding remuneration for incurred losses.

The analysis completed by Crisis Focus, LLC of the press releases and messages distributed throughout the event identified a lack of clear message effectiveness and clarity. While complexity of the incident made communicating the changing situation challenging, the messages distributed by OWASA and the Health Department did not meet the definition of "reliable and actionable" information delivered in a "clear" methodology to "effectively relay information regarding the threat."

Based on this analysis, it is recommended that individuals crafting emergency messages for stakeholder agencies should receive additional training in crisis communication messaging and message delivery methods.

Coordination of Public Information Releases

At the beginning of the over-fluoridation incident, OWASA managed all public notifications and messaging for that phase of the incident. Initial communications were not considered "emergent" and therefore public relations staff used traditional methods for information sharing and customer service.

On Friday when the incident expanded to the "Do Not Use" order, OWASA immediately engaged Orange County Emergency Management, Orange County Public Health and other stakeholders to coordinate messaging and response operations.

Agencies sent public information staff to the Orange County Emergency Operations Center to initiate an impromptu Joint Information Center (JIC) in support of the incident. While there were initial concerns about the ability to coordinate public information messages, only 17% of survey respondents believed the messages were uncoordinated.

Based on the AAR methodology, the key strengths and areas for improvement in the coordination of messages between departments are:

Strengths

1. Agencies identified the need for coordinated messages early in the event and started coordinating the process on Friday.
2. An impromptu "Joint Information Center" was created at the Orange County Emergency Operations Center to facilitate message coordination and dissemination.

3. Once agencies came together to coordinate messages, the process and clarity of the messages improved.

Areas for Improvement

1. A formal Joint Information Center or Joint Information System plan did not exist prior to the incident.
2. Messages sent by different agencies at times seemed to contradict one another (OWASA and Public Health) and created a lack of confidence in the responding agencies.
3. Different and conflicting messages were provided to separate segments of the community, creating confusion and lack of confidence in the responding agencies.
4. Regardless of the "Do Not Use" order, only a 37% drop in water usage was reflected on the system.
5. Businesses believed they did not receive sufficient and timely information on the potential impacts of the event to make business operation decisions.
6. Agencies operating call centers or individuals answering phone "hotlines" were not given succinct talking points or provided a way to send feedback to the Emergency Operations Center or Joint Information Center for ongoing improvement.
7. The location chosen for the impromptu Joint Information Center did not have enough room and was not set up for operations, press briefings and parking.
8. When separate messages were created for different segments of the population, it was not communicated or documented to all responding agencies and partners. This gave the impression messages were not being coordinated.
9. Individuals on the UNC-Chapel Hill campus and UNC Medical Center received conflicting information throughout the event regarding their ability to use water.
10. Phone "hotlines" did not provide consistent information and operators did not have a method to communicate concerns and issues back to the Emergency Operations Center.
11. The public information role did not have enough staff members to effectively manage the incident.

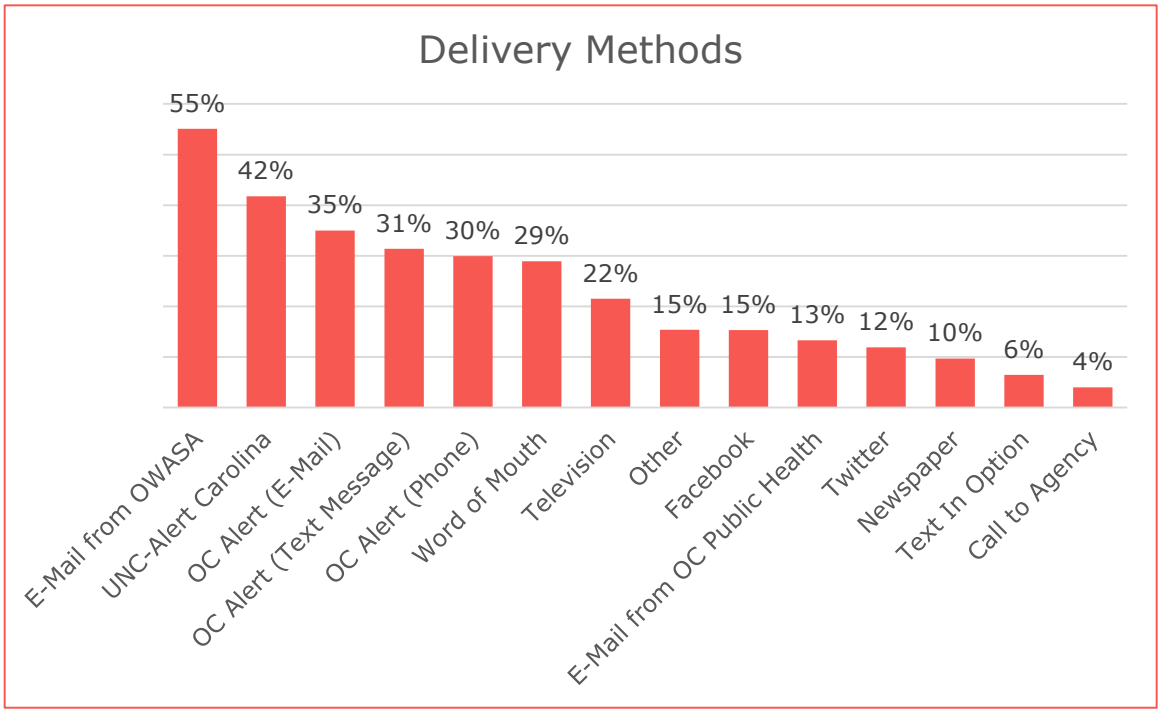
Based on survey results, provided documentation and discussions with stakeholders who were involved in the public information process, the community stakeholders overall did an excellent job of coordinating the emergency messaging without a defined process or plan for message coordination. The creation of an impromptu Joint Information Center facilitated information sharing and helped to coordinate a standardized message when possible.

While the stakeholders put together an organization on the fly, additional coordination was needed to ensure the correct message was being delivered to the intended audiences. With that in mind, Crisis Focus, LLC recommends that the Orange County Emergency Management Program work through a comprehensive planning process to develop a Joint Information System Plan which may include a Joint Information Center or other structures to coordinate joint message delivery and dissemination.

This process should include basic training for all agencies in Public Information in an Emergency (FEMA Basic PIO Course and FEMA Independent Study Courses in Joint Information Systems) and hosting the Joint Information System/Joint Information Center FEMA course in Orange County. These courses should provide the educational foundation to write, train, exercise and implement a comprehensive Joint Information System within Orange County.

Delivery Method Analysis

Throughout the event, multiple delivery methods were used to communicate with the general public, businesses, elected officials and employees. Based on the community survey, more than half of the respondents (55%) stated they were contacted directly by OWASA through email, and 41% of respondents also received notification through the UNC-Alert Carolina notification system. A complete breakdown of delivery methods is shown in the following chart:



When survey respondents were asked how they preferred to receive information on future incidents, the overwhelming response was by text message from OWASA.

Based on the AAR methodology, the key strengths and areas for improvement for public information delivery methods are:

Strengths

1. Multiple delivery methods were used to reach the widest possible audience.
2. Local media covered the event and provided a medium for updates to be delivered to the community on an ongoing basis.
3. A number of agencies sent officers and employees door to door to disseminate information on the "Do Not Use" order. This effort was very effective for the individuals contacted through this method.
4. The press conferences helped to convey a single message by all agencies involved and showed a unified effort.
5. Email systems used by agencies to notify customers, residents and constituents were helpful and well received by the community.

6. Creating the opt-in text message system on the fly for non-OWASA direct customers was a good way to engage that portion of the community.

7. Multiple agencies staffed impromptu "hotlines" to provide information to customers.

Areas for Improvement

1. The location used for the press conference was not conducive for information sharing because of limited set-up options and parking.

2. While some messages were coordinated, message paths and dissemination channels were not always coordinated. On a number of occasions, press releases went out and were posted on news sites before text messages were sent or social media updates were posted.

3. Message delivery methods were not provided for individuals who are deaf or hearing impaired.

4. Message delivery methods did not include options for multi-lingual requirements in the community.

5. A central location for information on the incident was not clearly identified for everyone, such as a disaster information website or a single social media channel.

6. Residents and businesses reported a lack of empathy from telephone operators when they called with questions about the incident.

Based on the feedback received from stakeholders and the community, it is recognized that the Orange County community has a solid foundation of delivery methods for emergency communications and was successful in delivering the message to a significant portion of the impacted population.

Additional focus should be placed on message delivery to ensure the community is able to deliver "culturally and linguistically appropriate" messages to the diverse populations within Orange County.

Mass Notifications and Everbridge Use

Orange County and community stakeholders use the Everbridge Mass Notification system to provide notifications to residents, customers and stakeholders during disasters. During this event, multiple Everbridge messages were sent out to separate and distinct constituent groups using multiple delivery methods. While less than 35% of survey respondents stated that they received a message from Orange County Alerts (OC Alerts), this may have more to do with a lack of understanding that messages from OWASA and Orange County Emergency Services were coming through the OC Alerts system.

Based on Everbridge reporting, 17 messages were delivered to approximately 120,000 contacts throughout the incident period. Message confirmation was not activated on all outgoing messages so it was not possible to determine the number of messages actually received by individuals from the system. A listing of messages sent through the Everbridge system is located at the end of this document.

Strengths

1. The Everbridge platform provided a solid message delivery system to quickly notify customers and contacts in the system.
2. The Community Engagement functionality of Everbridge allowed for a quick opt-in process to be created for text updates for the Water Incident.
3. Agencies were already using Everbridge as a message delivery system and able to adapt their operation to the incident.

Areas for Improvement

1. Customers received duplicate calls and messages from Everbridge because of less-than-optimal notification settings selected by OWASA operators.
2. Customer databases did not have updated contact numbers in the system for everyone on the OWASA water system.
3. Text messages sent to the OC Alerts Community Engagement opt-in system were not coordinated by the impromptu Joint Information System and therefore did not get updated as often as other delivery methods.

4. Message and Notification templates were not pre-built for a "Do Not Use" order, and operators were not familiar with the correct message and notification settings to create a notification from scratch.

5. Multiple "Everbridge Organizations" were used during the incident which had the effect of duplicating messages to some recipients.

6. The school system used its mass notification system to announce the availability of a Harris Teeter water distribution location without coordinating through the Emergency Operations Center.

Based on the analysis of Everbridge messages and system use, minimal changes to policies and procedures are needed to ensure an effective delivery of messages for future events. It is recommended that the stakeholders within the Orange County Everbridge system develop standard policies and procedures for message crafting, settings, delivery and coordination for future large events. Notification Templates should be created for all future scenarios and then used to ensure the appropriate settings are chosen for large-scale events.

Contact information within the software system will be a constant challenge to maintain; however, agencies should work to create policies and procedures for contact method updates and validation. This may include semi-regular testing of the system, printing of contact information on file in utility bills, or other methods for contact maintenance.

Community Planning

Summary

The Department of Homeland Security defines the core capability of Community Planning as the ability to "Conduct a systematic process engaging the whole community as appropriate in the development of executable strategic, operational, and/or tactical-level approaches to meet defined objectives." Orange County Emergency Management maintains an Emergency Operations Framework (EOF) (2013) as required by NCGS 166a to coordinate the overarching emergency management program in Orange County. The plan is reviewed annually with North Carolina Emergency Management and reviewed after major disasters.

Other stakeholders involved with this incident also maintain emergency plans for their organization or jurisdiction that are intended to supplement the county's Emergency Operations Plan and ensure their respective organizations can respond to emergencies and disasters. The water outage incident provided a good opportunity to activate portions of the plans that are not routinely exercised or activated and helped to identify a number of areas of improvement for future planning initiatives.

Emergency Plans and Coordination Framework

The Emergency Operations Framework for Orange County provided the basis for agency organization and agency responsibilities for the water interruption incident within Orange County.

At different times throughout the incident, the county Emergency Operations Center was coordinating with individual agencies or Departmental Operations Centers. The Orange County Emergency Operations Framework does not specifically outline the relationships between the Emergency Operations Center, City/Town Emergency Operations Center, an Incident Command Post or other Departmental Operations Centers.

Based on the AAR methodology, the key strengths and areas for improvement for the emergency plan and coordination framework are:

Strengths

1. The Emergency Operations Framework for Orange County included some details on a Central Receiving and Distribution Point (CRDP) to guide the commodity distribution process.

2. The Emergency Operations Framework for Orange County included information on volunteer management which supported the use of volunteers at the Points of Distribution (POD).

Areas for Improvement

1. A Joint Information System or Joint Information System plan does not exist that includes all of the agencies participating in this event.

2. A comprehensive Commodity Distribution process is not included in the Emergency Operations Framework with details on POD operations or county-wide responsibilities.

3. A utility interruption annex does not exist or provide guidance on how the community should coordinate a major utility interruption.

4. A plan does not exist for a UNC-Chapel Hill campus closure with little notice to engage supporting agencies to facilitate the logistical requirements needed to support a campus evacuation.

5. Current community plans do not clarify the communications paths with business and industry stakeholders during large emergencies.

6. The Emergency Operations Framework does not sufficiently clarify the roles and responsibilities of the EOC, town EOCs, the university EOC and departmental operations centers.

7. Town Emergency Operations Plans do not sufficiently detail communications paths and reporting relationships with the county's Emergency Operations Center.

Overall, the community is well prepared for the risks faced from a planning standpoint and, as past incidents have shown, the framework exists for interagency coordination. However, based on the lessons learned from this complex incident, it is recommended that the county revise the Emergency Operations Framework to include the plans of the towns (Carrboro, Chapel Hill and Hillsborough) in a "Comprehensive Emergency Management Plan" to align operations and responsibilities. The revision should outline coordination paths with UNC-Chapel Hill and other major organizations that choose to operate a departmental operations center.

Training and Exercise Program

The training and exercise program in Orange County is guided by a three-year Training and Exercise plan maintained and organized by Orange County Emergency Management. Agencies participate in this plan along with holding their own training and exercises at times based on external requirements or organizational direction.

Stakeholders were asked about training and exercises through the participant survey. Responses indicated that the participants had diverse experiences in both training and exercises in their emergency roles. Most notably there was a self-reported lack of recent Incident Command System (ICS) training. While many of the participants in the event had participated in ICS training in the past, the majority of individuals had not participated in any ICS training (basic or refresher) within the last two years and did not have formal training for their roles in the Emergency Operations Center.

Many of the participants had participated in a water contamination exercise within the past 12 months, which was referenced numerous times throughout the survey as a significant benefit to the community and a process that helped them manage the water interruption incident in February 2017.

Based on the AAR methodology, the key strengths and areas for improvement for the training and exercise program are:

Strengths

1. Agencies participated in an exercise a few months prior to the event with a similar scenario allowing them to practice the response and learn from that exercise.

2. Many agency representatives at the Emergency Operations Center reported they were comfortable with their roles and responsibilities at the EOC.

3. Orange County maintains a three-year training and exercise plan which guides leaders on strategic enhancements of the emergency operations framework.

Areas for Improvement

1. Elected officials were not well informed regarding their roles during emergencies or plans for disaster coordination within the communities affected.

2. Agency representatives at the Orange County Emergency Operations Center were not well trained on their roles, responsibilities and processes at the EOC.

3. Additional training on Incident Command System (ICS) principles is needed for all agency representatives and staff members engaged in emergency operations.

The community, using a three-year training and exercise program, has significantly supported the preparedness levels of the stakeholder agencies and employees. In discussing training needs and exercise needs with participants, it was discovered that many of the stakeholder agencies in the Emergency Management Program were not aware of the three-year training and exercise program. Additional participation in the adoption of the training program is needed to ensure a successful implementation.

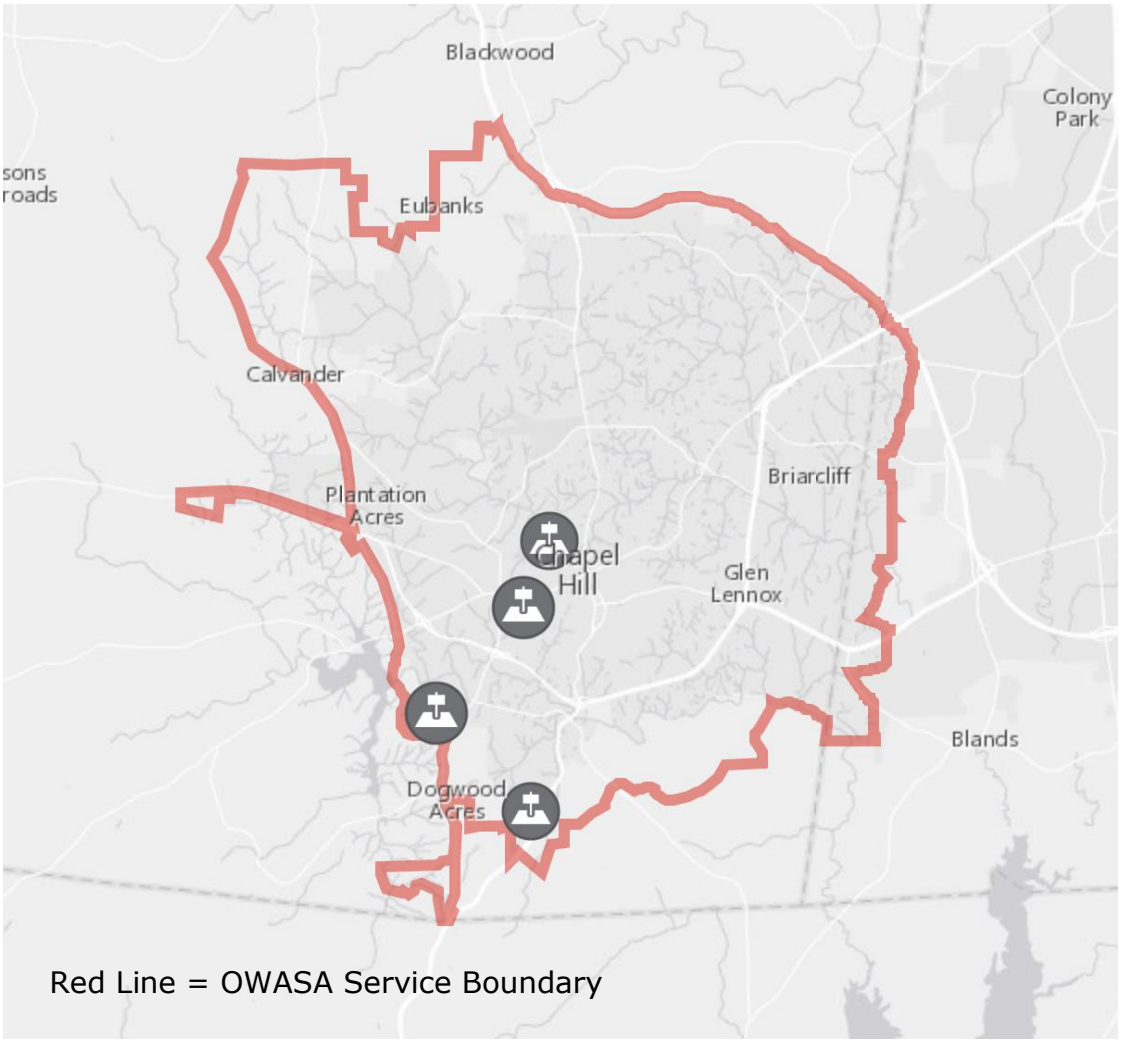
To ensure agency representatives are able to function at the Orange County Emergency Operations Center, a training course should be offered and required for all participating agencies on their roles, responsibilities and expectations of operating at the Emergency Operations Center.

Additionally, refresher Incident Command System training should be a focus for all participating agencies as many of the key ICS tools used during this incident are advanced concepts that participants do not have a regular need to practice. Through refresher training and exercises, these advanced concepts, ICS/EOC interactions and Joint Information System functions should be practiced.

Mass Care Services – Commodity Distribution

Summary

The Department of Homeland Security defines the Mass Care Services core capability as to "Provide life-sustaining and human services to the affected population, to include hydration, feeding, sheltering, temporary housing, evacuee support, reunification, and distribution of emergency supplies." For this incident, this was accomplished by distributing bottles of water to the community through four points of distribution or PODs. The Points of Distribution were located at Hargraves Community Center, Southern Community Park, McDougal Middle School and Carrboro High School



Approximately 12,250 gallons of water (98,000 bottles) were distributed directly from the PODs. Water also was distributed directly to organizations such as UNC-Chapel Hill, Orange County EMS and the American Red Cross.

In addition to the four PODs set up by the response stakeholders, Harris Teeter also established a free water distribution location in Chapel Hill, which was not coordinated through the Orange County Emergency Operations Center or publicized by Orange County stakeholders.

Points of Distribution Operations

Overall, the Points of Distribution received positive remarks through the community survey. 80% of respondents categorized the POD operations as either "Outstanding" or "Good," and a high percentage believed the PODs were appropriately located and provided an appropriate amount of water.

Based on the AAR methodology, the key strengths and areas for improvement for points of distribution operations are:

Strengths

1. Participating agencies were flexible and overcame significant challenges to open four Points of Distribution within 24 hours of the incident initiation.
2. The Civil Air Patrol and the Orange County Community Emergency Response Team (CERT) provided staffing at Points of Distribution.
3. The Town of Carrboro took the lead and completely supported the POD opened within the town limits of Carrboro.
4. There were sufficient amounts of water available at all PODs based on the amount of water distributed during the POD operations.

Areas for Improvement

1. A comprehensive commodity distribution plan did not exist prior to the incident, which created issues with agency roles, assumptions and operations.
2. Each Point of Distribution needs to have a lead individual who is responsible for site management, communications to the EOC, etc.
3. Security and traffic control coordination needs to be provided at each POD.
4. Additional logistical staff and equipment were needed at the Central Receiving and Distribution Point (CRDP).
5. American Red Cross self-deployed to PODs, creating confusing roles and inefficiencies within the distribution system.
6. POD locations were not accessible through public transportation routes.
7. POD locations did not have enough staff or the right equipment to be as effective as needed.

Other Supporting Commodity Distribution Elements

Agency representatives were asked about POD operations in the Stakeholder survey and provided excellent feedback on how operations could be improved for future commodity distribution processes. 81% of stakeholder respondents believed the POD process was an effective way to distribute water to the community, and 65% of respondents stated the POD operations were either "Outstanding" or "Good" from their perspectives. Some additional strengths and areas for improvement as identified by stakeholders are listed below.

Based on the AAR methodology, the key strengths and areas for improvement for other commodity distribution functions are:

Strengths

1. A Central Receiving and Distribution Point (CRDP) was staffed and set up on the fly and successfully supported POD operations.
2. Equipment was procured to operate the CRDP with little lead time and pre-event planning.

Areas for Improvement

1. Individuals believed the notifications about the POD locations, opening times and availability were not timely or clear.
2. Community PODs were opened by Harris Teeter without coordination from Orange County and were not included in the messaging process from the Orange County Emergency Operations Center.
3. Residents expected water distribution sites to be announced using the Everbridge opt-in system as well as customer databases within Everbridge.
4. Water was distributed at the UNC-Chapel Hill campus, but the location of the POD was not communicated to the campus Emergency Operations Center for coordination and awareness.

5. Additional PODs should have been set up to provide for a more geographically dispersed distribution network.

Overall, the community successfully provided water to areas in need during an unanticipated event. The stakeholders devised a commodity distribution process without any supporting plans or pre-existing agreements between agencies or vendors. This ability to pull together a working coalition of agencies willing to support a commodity distribution process shows the strong interagency cooperation that exists between stakeholder agencies and the ability to adapt to changing conditions during a disaster.

Based on this event and the potential for other threats requiring commodity distribution, it is recommended that Orange County and all stakeholder agencies create a comprehensive commodity distribution plan for future events. Planning should include the identification of POD locations, staffing, leadership and required logistics to support multiple PODs.

Community Resilience

Summary

The Department of Homeland Security defines the Community Resilience core capability as the ability to "Enable the recognition, understanding, communication of, and planning for risk and empower individuals and communities to make informed risk management decisions necessary to adapt to, withstand, and quickly recover from future incidents." Orange County's ability to quickly respond and recover from this incident was based on the stakeholders' pre-existing relationships, planning initiatives and flexibility to adapt previous plans to an ever-changing incident.

Community resilience elements were analyzed through the community surveys and interviews with key stakeholders. Through this process, the elements of Disaster Response Capabilities, Community Support and Engagement, and Preparedness Education and Outreach were collected and discussed as components of community resiliency below.

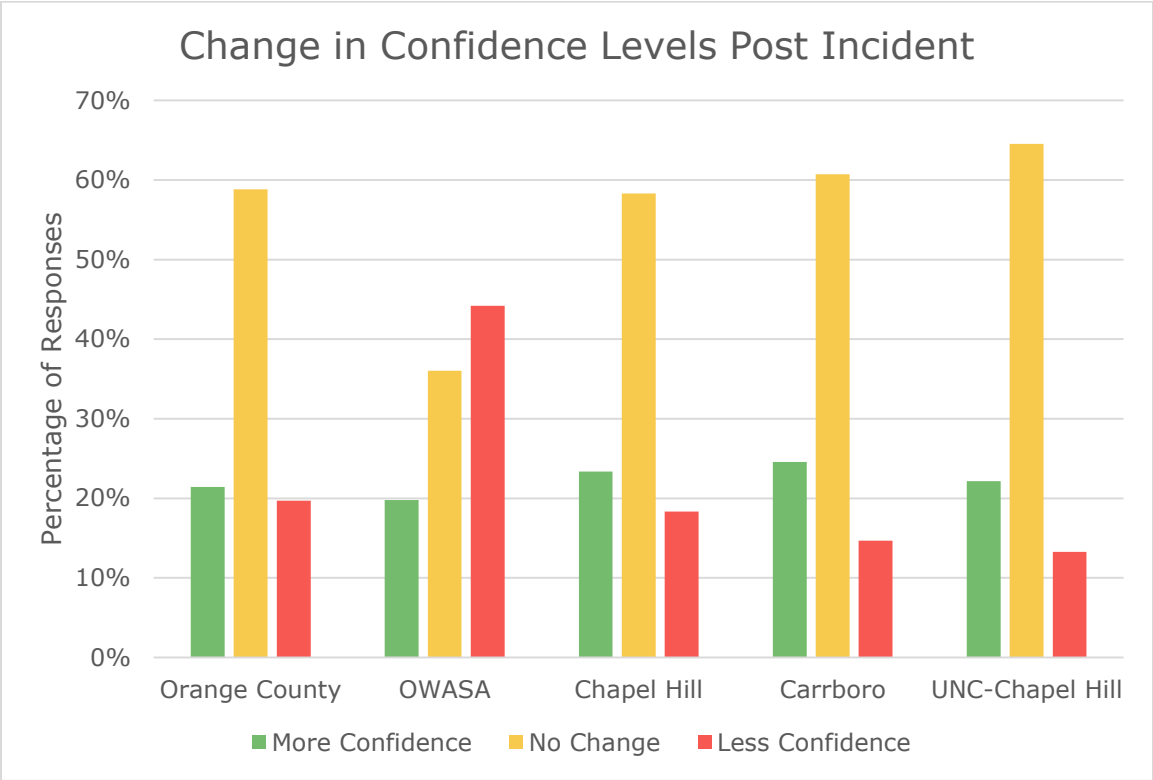
Disaster Response Capabilities

Disaster response capabilities can be defined as the agency assets available for a disaster response, or the agency stakeholder's capacity to overcome adversity and create a flexible response to a changing situation. Throughout the water interruption event, issues not directly defined in the Emergency Operations Framework were presented to stakeholder agencies that immediately created processes on the fly to solve the issues in a positive manner.

Ongoing support by the community is a key element of a resilient organization, and the community needs to have confidence that their governmental agencies can respond to and recover from major incidents and emergencies. The community stakeholder survey specifically asked participants about their level of confidence in the community's ability to respond to and recover from future incidents. Overwhelmingly, 62% of respondents stated they believed the community would respond and recover appropriately in a future event. 20% were undecided with the remaining 18% disagreeing that the community would be able to respond or recover from a future event.

The survey then asked members of the community if their level of confidence has changed in each agency's ability to "provide the basic services you expect." The chart below shows the breakdown of responses from the community survey

representing the percentage of "more confidence," "no change in confidence," or a "less confident" responses for each agency.



In general, there was either no change or an increase in the level of confidence in each agency's ability to provide the services the community expected during an emergency of this sort. The notable exception was OWASA, where a majority of respondents stated after the incident that they had less confidence in the organization's ability to provide the basic services they expected.

Based on the AAR methodology, the key strengths and areas for improvement for disaster response capabilities are:

Strengths

1. The majority of elected officials, residents and businesses have confidence in the community's ability to respond to and recover from a disaster of this magnitude in the future.
2. Agencies were flexible and took on roles not previously identified through formal planning processes to meet the needs of the community.

Areas for Improvement

1. Elected officials requested additional training and exercise opportunities to become more familiar with the plans and elements in place to respond to and recover from disasters in the area.

2. A formal resiliency planning process should include the county, towns, nonprofits and other partners to increase long-term resiliency in the community.

3. In certain areas of the community, there is a lack of confidence in OWASA's ability to provide clean, safe and reliable drinking water.

Overall, the community has confidence in the organizations and trust that they will respond and recover appropriately from future disasters. OWASA has been open and transparent about the water interruption incident and mitigated some of their detractors from this incident through their technical After Action Report and post incident communications. Unfortunately, a subsequent algae issue in OWASA's reservoirs in the spring of 2017 which caused taste and odor concerns for some OWASA customers may have undermined any confidence regained and continued to degrade the confidence in OWASA's abilities to meet customer service expectations.

While many communities in North Carolina were required to complete a community resiliency plan post Hurricane Matthew, Orange County was not included in that state project because it did not receive a disaster declaration during Hurricane Matthew in 2016. It is recommended that the Emergency Management Program engage the whole community in a formal resiliency planning project after the Emergency Operations Framework is updated, based on the recommendations of this report.

Preparedness Education and Community Involvement

Orange County Emergency Management, Orange County Health Department and other agencies have been providing preparedness information to the general public for many years prior to the incident. The community survey included questions to determine the preparedness levels of individuals, families and businesses before and after the incident.

Based on the survey responses, 31% of respondents had an emergency plan prior to the incident, and 43% of respondents stated they had an emergency plan after the incident. This represents a 12% increase in family disaster planning based on the experiences from the water interruption incident.

The survey showed that only 33% of respondents had a disaster supply kit that included water prior to the incident. This number increased to 56% of respondents after the incident, showing a 23% increase in the number of families reporting they have a disaster supply kit that includes water.

When respondents were asked what actions they have taken after the conclusion of the incident, more than 70% of survey respondents stated they now keep water on hand for future incidents, and 20% stated they have planned for alternate sources of water in the event of a future interruption in service.

While there were many positive steps toward additional preparedness and resiliency in family units, there were a number of respondents who continue to believe (through comments) that the process of preparing for a disaster is the role of OWASA and government agencies and that they should not have to plan for future emergencies.

The survey also asked businesses to share information about their levels of preparedness for future disasters. 43% of businesses participating in the survey stated they did not have a disaster plan prior to the incident for their business. After the incident, an additional 2% of businesses stated that they have planned for future disasters after what they learned from the water interruption incident.

Strengths

1. Orange County and partners have been providing public education materials for self-sufficiency and disaster preparedness.
2. Community members came together to support multilingual message delivery on the fly.

3. Individuals volunteered to work at Points of Distribution to distribute water as needed.

Areas for Improvement

1. Information on preparing for water interruptions in the home, healthcare settings and restaurants should be developed and made available for agencies to distribute.
2. Preparedness materials and programs need to be offered in multiple languages and through multiple methodologies to ensure the messages are communicated with the whole community.
3. A coordinated method for community alert and warnings should be created and then included as part of the preparedness training provided by stakeholder agencies.
4. A number of survey respondents clearly believe that disaster planning is not their responsibility but the responsibility of government and the utilities.

Ongoing preparedness efforts in the personal and family focus areas have provided a basis for capitalizing on increasing preparedness plans and kits after disasters. Agencies still have work to do to engage businesses in the process of planning for disaster, but headway has been made as a result of the water interruption incident.

Other Areas of Analysis

Throughout the survey, a number of additional themes were identified that did not fall into previously categorized areas as strengths or areas for improvement. The survey identified the following areas for improvement:

Areas for Improvement

1. Businesses did not feel informed or engaged in the response or recovery from this event and had a difficult time making decisions on their operations because of a lack of actionable information.
2. The Health Department had a difficult time contacting medical facilities (long-term care, dialysis, etc.) to notify them regarding the water interruption and health implications.
3. The Health Department had a difficult time communicating effectively with restaurants to notify them of the required closures because of the "Do Not Use" order.

4. OWASA needs to work with "Master Meter" customers to ensure they have a way to communicate with their tenants or allow tenants to join a notification system for communication purposes.

Orange County Incident Action Plan (IAP) Excerpts

The Orange County Emergency Operations Center, coordinated by Orange County Emergency Management, became the focal point for community coordination and incident management. The Orange County EOC coordinated Incident Planning using the Incident Command System "Incident Action Plan" process. The following operational periods, event summaries and incident objectives were determined by the Emergency Operations Center during the incident. The Operational Period information listed on the following pages has been taken verbatim for historical purposes to provide context for individuals reviewing this report who were not a part of the original response.

Operational Period 1: February 3 at 1300 until February 3 at 2000

Event Summary:

On 2/2, there was an overabundance of fluoride in OWASA's water supply. This water never made it to the public, and the supply was suspended. Because of this, a line from Durham was opened to provide water to OWASA's service area.

In the morning hours of 2/3, this water main burst, causing issues with supply. The public was asked to avoid using water as the supply was critically low. Also, due to the break, it is unclear whether the water is safe at this time.

Additional sources of water through interconnects from Hillsborough and Chatham County are being tested before supplying water to the affected area. These tests could take up to 20 hours. In the meantime, requests are being made to the state for water to supply to the affected public.

Incident Objectives:

1. Establish Joint Information System/JIC by 1400.
2. Analyze impacted area and determine population, critical infrastructure, and anticipated impacts by 1500.
3. Process and place logistical support requests by 1700.
4. Establish long-range Public Affairs strategy by 1800 to include community public information line.
5. Evaluate and establish donations management.

Operational Period 2: February 3, 2017 – 0800 until 2000

Event Summary:

Water is unavailable to approximately 60,000 residents. Several businesses and residences have been impacted in Chapel Hill and Carrboro. Critical facilities such as hospitals and care facilities are without water and depending on bottled water. The water shortage is expected to last at least 24 hours and could be as long as 48 hours.

Points of Distribution are opening at five locations throughout the area to provide water to residents.

Incident Objectives:

1. Continue monitoring water conditions through OWASA.
2. Establish and deliver drinking water to POD Sites by 1000 hours.
3. Establish LEO security support at POD sites.
4. Establish traffic control pattern around main break.
5. Maintain CRDP through operational period.

Operational Period 3: February 4 at 2000 until February 5 at 0800

Event Summary:

Health and Safety Hazards and develop necessary measures (remove hazard, provide personal protective equipment, warn people of the hazard) to protect responders from those hazards.

As of 1300, the testing at the OWASA plant yielded favorable results. No time was set for the water treatment plant becoming operational, but they will work to bring it back on line throughout the night.

The “Do Not Use” advisory is being lifted in favor of a "Use but Conserve" notice, with the exception of the Foxcroft community in Chapel Hill and two nursing homes that will be under a "Boil Water" advisory.

As of 0200 the clear well at the OWASA plant should be drained and cleaned for refill. Further testing will continue to see if water treatment plant can become operational. (possible that the “Do Not Use” could become a "Boil Water" notice) Durham water pumps are maintaining at normal operations.

Water main repair continues, contractors ran into some issues with fittings based on how old the system is.

Incident Objectives:

1. Continue monitoring water conditions through OWASA.
2. Assess economic impact of water outage on local business community.
3. Continue to provide appropriate public messaging (water conservation system-wide & boil water advisory for limited area).
4. Maintain readiness to respond quickly if required.

Participating Organizations

The following agencies participated in the Incident Response to the Orange County Water Interruption in February 2017. Specific roles for each agency are defined in the Incident Action Plans for each Operational Period.

Orange Water and Sewer Authority (OWASA)

Orange County

- Asset Management Systems
- Emergency Management
- Health Department
- Information Technology
- Public Affairs
- Sheriff's Office
- Social Services

American Red Cross

Town of Chapel Hill

Town of Carrboro

Civil Air Patrol

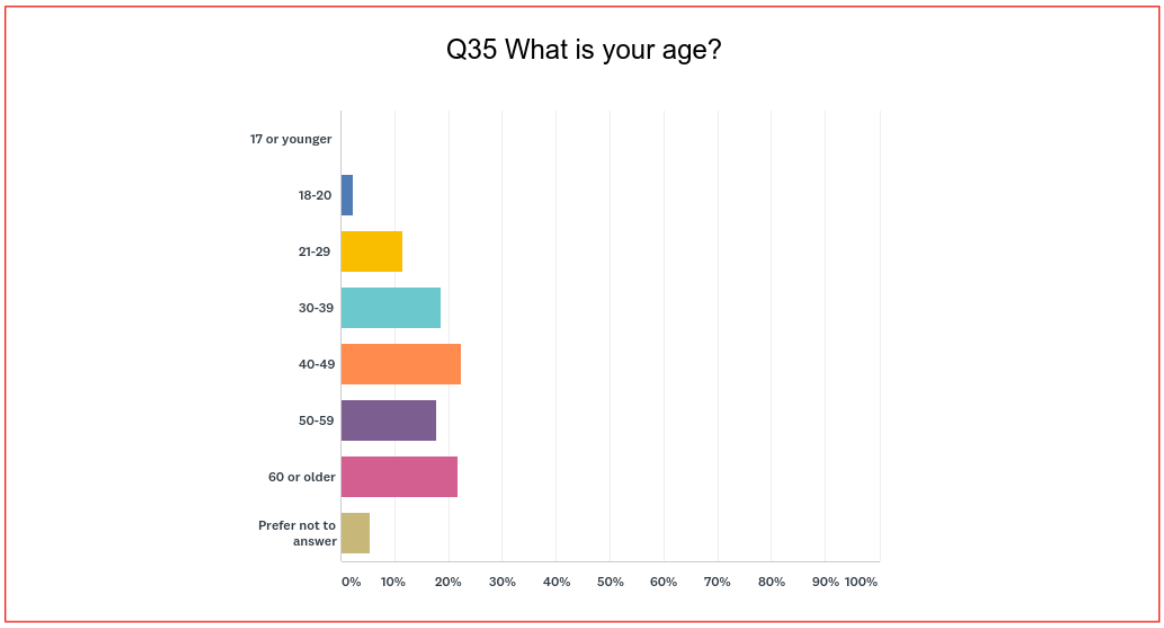
Orange County C.E.R.T.

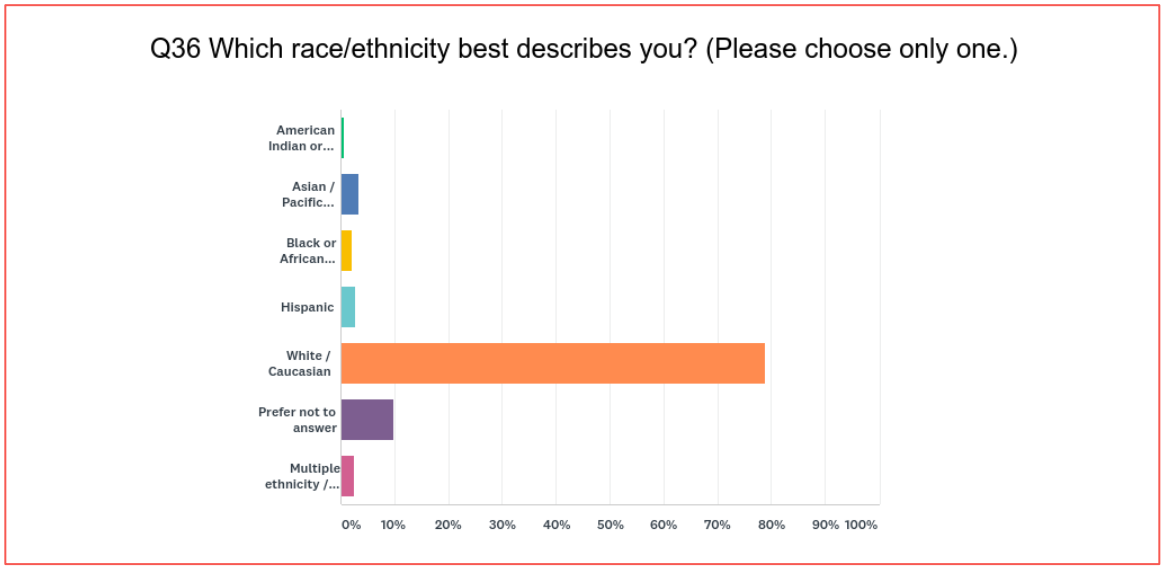
University of North Carolina at Chapel Hill

UNC Healthcare System

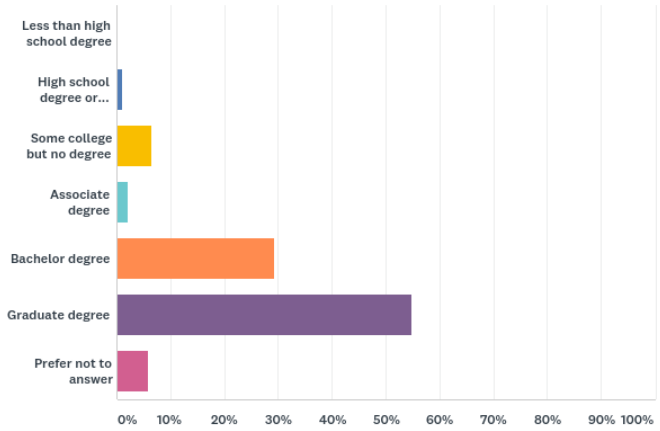
Community Survey Demographic Data

To provide additional information and background on the community survey, the following data has been included from the survey for context.

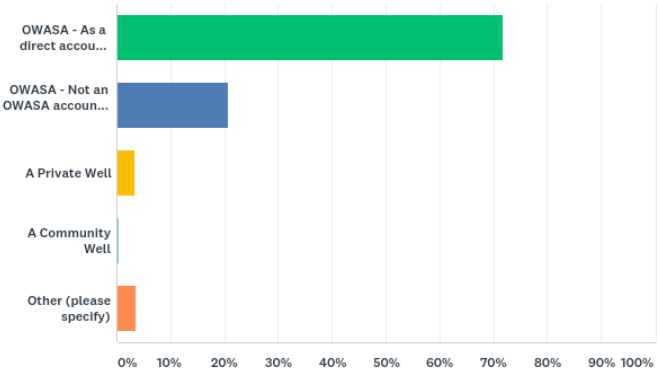




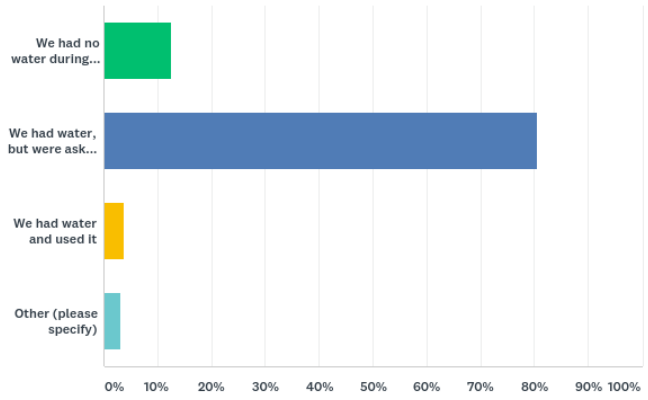
Q37 What is the highest level of school you have completed or the highest degree you have received?



Q2 How do you receive your water at home or at your business?



Q3 What was your water situation during the event?



Q4 Based on the instructions you received during the incident, what actions did you take? (Select all that apply)