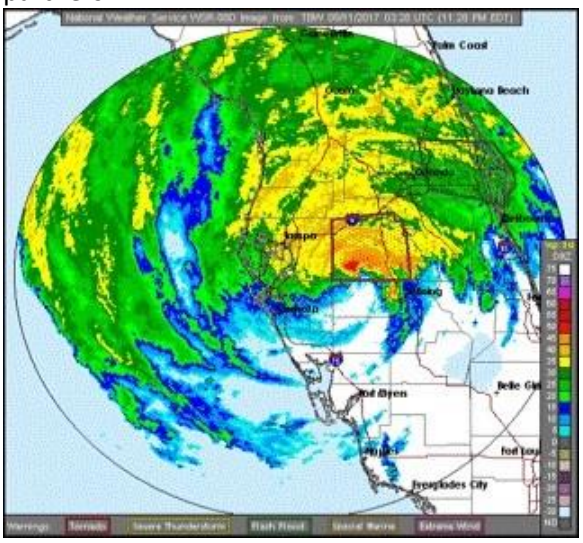
Pinellas County, Florida
Hurricane Irma After-Action Report

January 2018

Table of contents

Executive summary

The organizational structure for emergency evacuation and response within Pinellas County is a well-developed collaboration between the county, 24 cities, law enforcement, fire services, and hundreds of community partners and agencies. For large-scale events or incidents, the primary agencies and partners form a Response Operations Coordination (ROC) group to discuss scenarios and operational concerns and to plan implementation and timing of emergency actions. In response to a hurricane, the ROC group holds an initial meeting once the county enters the three-day forecast cone, the anticipated path of the storm. The group then meets—in person or virtually—every six hours as new hurricane advisories are issued. The ROC also meets in the aftermath of a storm to promote information-sharing among all area partners.



The eye of Hurricane Irma passed about 40 miles east of Pinellas County during the early morning hours of September 11. While the county prepared and evacuated for a direct hit by a Category 2 storm, it was spared the worst impacts when it received sustained tropical storm-force winds and up to Category 1 hurricane-strength gusts with negligible storm surge. Pinellas County had not experienced a hurricane since 2004, when Hurricanes Charley, Frances, and Jeanne affected the county. Since then, hundreds of county, municipal, and private-sector organizations have spent months and years planning for the next hurricane to strike the county. Personnel from these agencies worked long hours before, during, and after the storm to communicate with the public, evacuate residents and visitors (including those with special needs), open and operate hurricane shelters for people and pets, repair infrastructure damage, and remove debris.

Although Pinellas County escaped a storm surge, Hurricane Irma left behind more than $38 million in damage to businesses, residences, and infrastructure. Over 400,000 county customers lost power, with outages lasting up to a week for some customers. However, despite the disruption of infrastructure and massive movement of people—including hospital patients—no lives were lost in Pinellas County during the storm.

Approach

The purpose of this report is to highlight topics of most interest to residents and provide actionable recommendations for improving citizens' experiences during disaster response. As such, this report focuses on five key areas: warning and evacuation, healthcare facilities, sheltering, communications and critical infrastructure, and debris management. Pinellas County asked CNA, a nonprofit organization that specializes in analyzing the response to hurricanes and other emergency incidents, to facilitate the after-action process, which included the following steps:

1. Pinellas County Emergency Management (PCEM) collected written input from county

staff, municipalities, and private-sector organizations involved in preparedness, response, and recovery.
2. CNA consolidated and synthesized the input into an initial set of observations.
3. PCEM established working groups for each of the five key areas that included participation from relevant government and private-sector organizations.
4. CNA facilitated meetings with each working group to discuss and refine the initial observations, identify the root causes of issues, and identify recommendations for improvement.
5. CNA developed this after-action report summarizing the output of the working-group meetings. The county also collected testimonials from the public and from partner agencies, highlights of which are featured throughout the report.

While best practices are noted throughout, this report focuses on strategic-level areas for improvement and the corrective actions needed to address them. PCEM is also preparing a supporting after-action report that addresses operational and tactical areas.

Findings and next steps

With over 350,000 residents within the evacuation zones, the county was successful in implementing key missions, including evacuation, sheltering, and post-storm debris removal. Forty-nine healthcare facilities evacuated 3,250 patients, and the county cared for more than 23,000 people and 2,000 pets in public shelters. Pinellas County Public Works picked up more than 375,000 cubic yards of debris and kept potable water flowing throughout the storm and the days that followed.

The hurricane provided an opportunity to test plans, identify refinements to those plans, and prepare for future hurricanes that could be much more devastating than Hurricane Irma. Challenges included communications and technology outages, sheltering individuals with special needs, monitoring the status of healthcare facilities, and illegal dumping.

This report recommends areas in which further planning, training, exercising, and purchasing of equipment may be needed. The working groups established to develop this after-action report, made up of cities, county departments, and community partners, will continue to refine and implement the recommendations contained in this report.

Event overview

Governor Rick Scott issued Executive Order 17-235 on September 4, 2017, declaring a State of Emergency for all counties in Florida. Pinellas County's Emergency Operations Center (EOC) activated to Level 3 (monitoring) at 7:30 a.m. the next day. The Citizen Information Center opened at 11:00 a.m. to answer hurricane-related calls from the public, and the Public Information Officer team in the EOC issued the first warning on social media. Municipal and special fire districts began calling special-needs registrants to verify requests for transportation assistance, and the EOC held the first of many Response Operations Coordination (ROC) group conference calls to coordinate and share information among county and municipal agencies and with private-sector partners. By 11:00 p.m. on September 5, Pinellas County entered the National Hurricane Center's five-day cone—the probable track of the center of the hurricane over the next five days.

By the numbers

- 250 county employees activated at the EOC
- More than 200 local, state, and federal partners coordinated response efforts
- Hundreds of field crews coordinated for field preparations ahead of the storm

On September 6, the Pinellas County School Board announced the decision to close all schools beginning September 7. On September 7 at 11:45 a.m., the County Board of Commissioners declared a Local State of Emergency and ordered a Mandatory Level A Evacuation for the county, which includes mobile homes, to begin at 6:00 a.m. on September 8 and end at 8:00 a.m. on September 10. The county activated seven hurricane shelters in public schools to receive evacuees, including the general population, citizens with special needs, and pets.

At 5:30 a.m. on September 8, the EOC activated to Level 1 (full activation) to coordinate evacuation and sheltering operations, including the evacuation of healthcare facilities in the evacuation zone. By 10:00 a.m. the same day, the Pinellas County Sheriff's Office and municipal police departments began restricting access to county barrier islands.

On September 9, just after midnight, the National Weather Service issued a Flash Flood Watch for Pinellas County, and the county began locking down drawbridges in coordination with the Florida Department of Transportation and the United States Coast Guard. With the arrival of additional forecast information, the county revised the evacuation order to a Level B Mandatory Evacuation Order, effective at 9:00 a.m. on September 9, and activated an additional 10 hurricane shelters.

At 6:00 a.m. on September 10, the county shut down access to the barrier islands and later restricted access to the entire county. By the evening, fire, police, and rescue services altered emergency services due to high winds. At 9:30 p.m., Duke Energy reported more than 100,000 county customers without power.

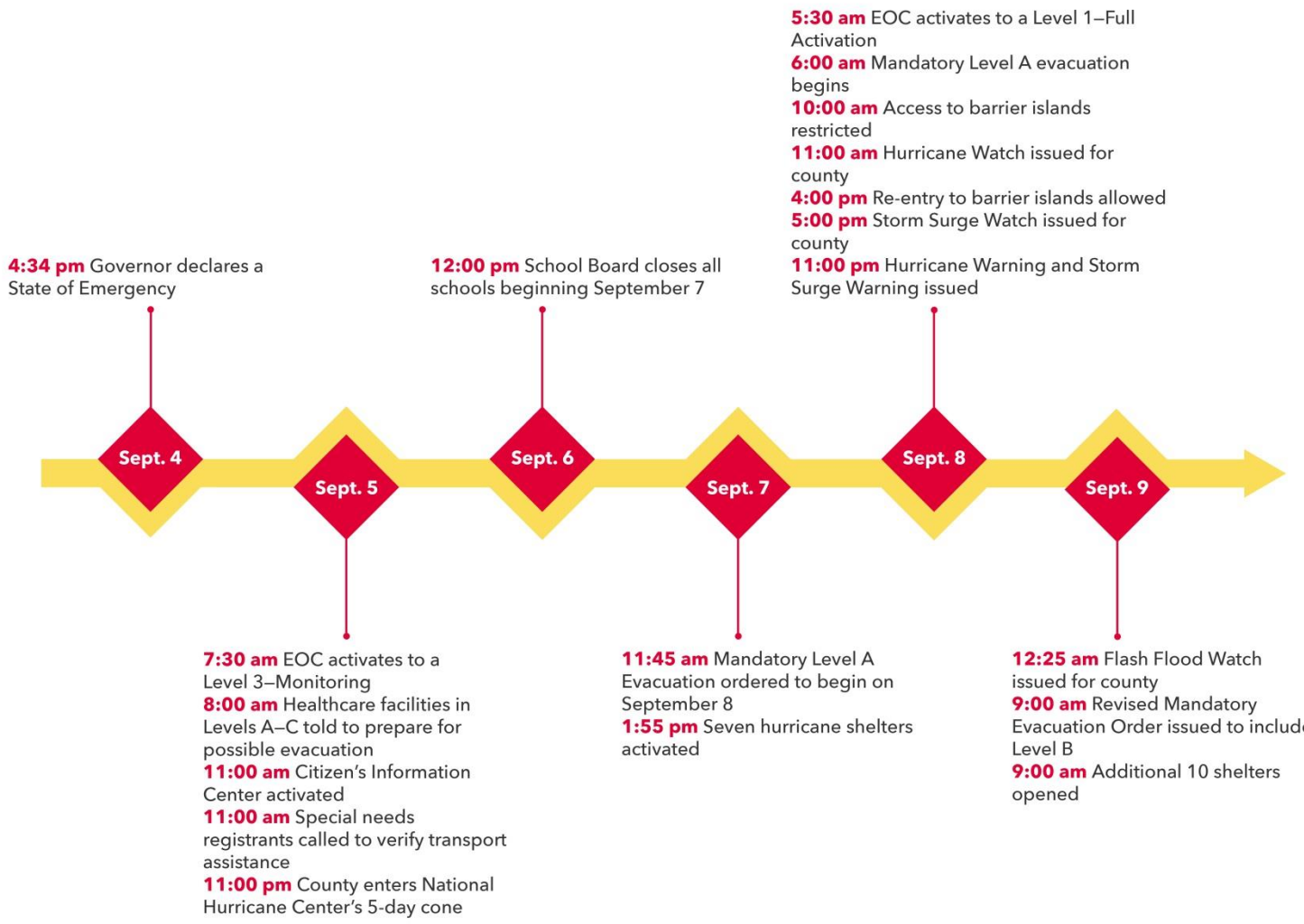
The eye of the storm passed about 40 miles east of Pinellas County during the early morning hours of September 11, and the National Hurricane Center downgraded the Hurricane Warning to a Tropical Storm Warning at 5:00 a.m. At 9:30 a.m., citizens were allowed to re-enter the county. At 11:00 a.m., the National Hurricane Center discontinued the Tropical Storm Warning, and at 4:00 p.m., the county

allowed citizens to begin re-entering the barrier islands. At 5:00 p.m., Duke Energy reported a peak of 433,267 county customers without power. Also on September 11, shelter demobilization began and special-needs shelters were consolidated.

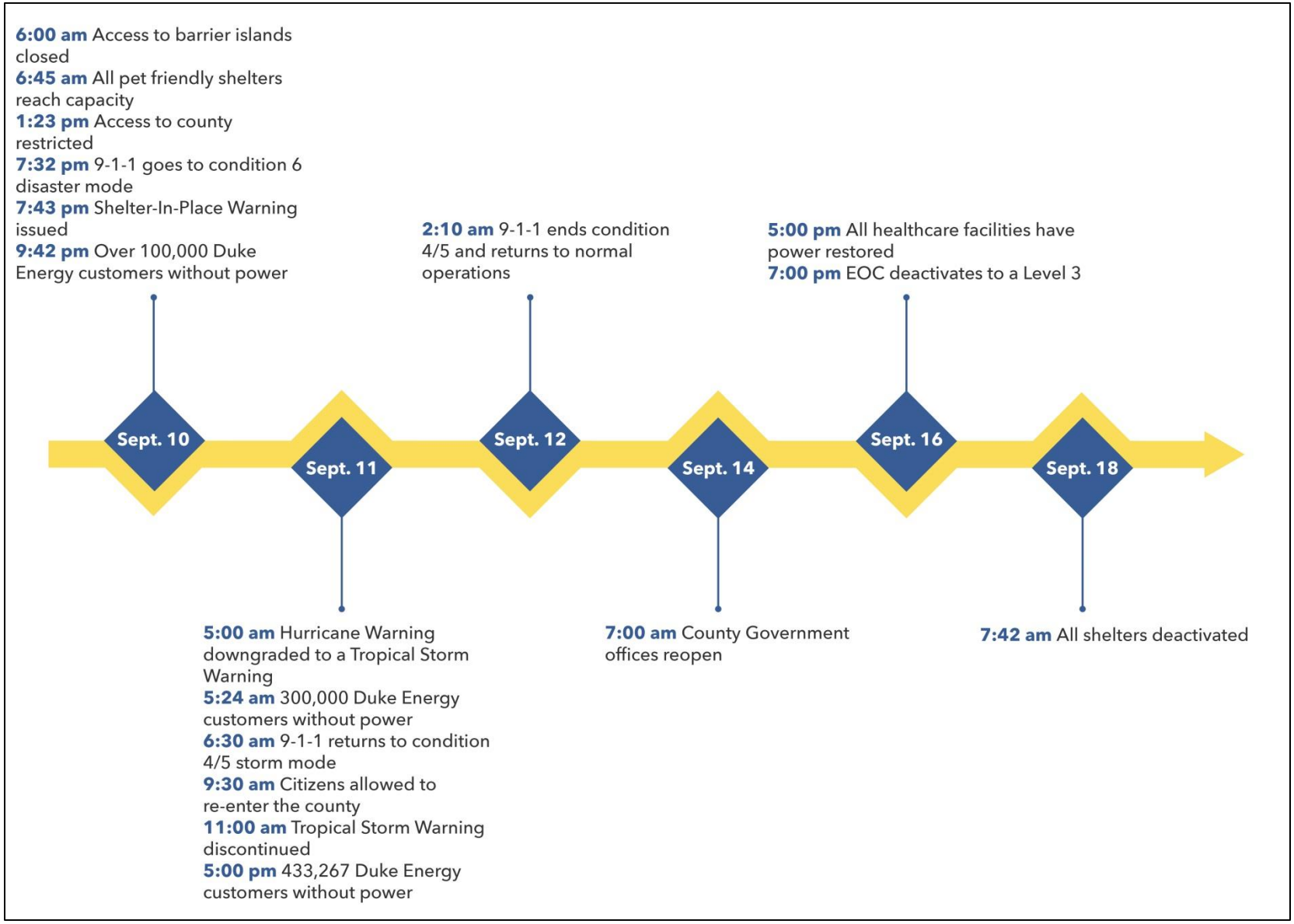
At 11:00 a.m. on September 12, the county lifted the evacuation orders for Hurricane Irma and announced that schools would reopen on September 18. By this time, Duke Energy and Pinellas County Public Works crews were restoring power lines and clearing storm debris from roads. On September 13, Pinellas County issued guidance to residents in unincorporated areas on how to collect and place their storm debris for pickup.

Government offices reopened at 7:00 a.m. on September 14. By the end of the day on September 16, all healthcare facilities reported power restored and the EOC reduced operations to Level 3 (monitoring). The county deactivated special-needs shelters by the end of the day on September 17, and Duke Energy reported that 99 percent of outages were restored. The next day, Pinellas County Public Works began debris pickup. Debris pickup continued during a first and second pass in October and November, and then by request through January 2018.

Hurricane Irma timeline



Hurricane Irma timeline (continued)



Warning and evacuation

As Hurricane Irma approached Florida, county officials closely tracked weather forecasts and made preparations for a variety of contingencies. The county evacuated two of its five evacuation zones, preparing for a potential storm surge of up to 15 feet. Luckily, the county was spared a storm surge. Nevertheless, this hurricane tested evacuation and public messaging plans. The county learned lessons that will allow it to better plan for evacuation and reentry and to improve its communications with the public during future emergencies.

Alert and warning

In preparation for Hurricane Irma, Pinellas County used a variety of mechanisms to communicate hurricane-related information to the public, including the county website, call centers, and social media. Once the EOC activated, the Public Information Officer team worked in the EOC to manage public communications.

By the numbers

- Over 354,000 residents affected by evacuation orders
- Over 28,000 Alert Pinellas signups (Sept. 3–16)
- 64,490 Citizen Information Center calls received (Sept. 3–22)
  - 34,761 answered
  - 29,693 hang-ups
- 2,426 social media posts (Facebook, Twitter, Flickr, Instagram) reached a quarter of all county residents
- Over 400 news updates and tips shared
- 5 press conferences held
- Over 50 news releases sent
- 5 multilingual videos created

To promote hurricane preparedness, the county website contains permanent hurricane material, such as information on evacuation zones, shelter locations, pet preparedness, and other topics. For example, the website identifies different ways for the public to learn which evacuation zone they are in, including maps, the Know Your Zone and Ready Pinellas applications, and telephone numbers. Other methods for communicating with the public include Alert Pinellas, Wireless Emergency Alerts (WEA), press releases, Facebook, Twitter, Instagram, and the Citizen Information Center (CIC), a hotline used during emergencies. The county activated the CIC on September 5, six days before the storm skirted the county.

The availability and use of multiple public information methods helped the county reach a broad audience. In fact, this was the first time the county had used WEA. In addition, Facebook, Twitter, and Instagram were important mechanisms for answering questions posted by residents.

> "The Pinellas County Emergency Management Twitter feed was my lifeline for all storm prep and updates."
>
> -County resident

For press conferences, the county used a single county spokesperson—the County Administrator—to ensure consistent messaging to the public throughout the response and recovery.

Technology issues delayed the flow of information at times. For example, the Know Your Zone application crashed under high volume and had to be rebuilt overnight. In addition, some citizens reported difficulty finding hurricane information on the website, because it was not all in a single location.

The CIC experienced significant issues keeping up with call volume. The failure of the Know

Your Zone application and the county website's inability to handle the traffic contributed to longer-than-expected wait times, which apparently caused callers to hang up. In addition to adding staff, CIC management adapted to the wait time problem by replacing hold music with answers to frequently asked questions (FAQs), to help address citizens' needs before they reached a live operator.

> "I would like to see additional social media usage and less time waiting calling the [Citizen Information Center]."
>
> -County resident

The 9-1-1 center also received many calls from citizens looking for hurricane information. Staff at the 9-1-1 center did not have readily available talking points and had to compile an FAQ document in real time.

In general, there was limited capacity county-wide to translate and disseminate information in languages other than English. Additionally, Pinellas County was especially concerned that low-income communities were not receiving information, as they have more limited access to communications mechanisms.

Another major pre-storm operation was sandbag distribution. Pinellas County initially established distribution sites at three county parks, distributing well over 445,000 sandbags before the storm winds hit. Due to high public demand—there were long lines at these sites—the county established additional sites and continued to replenish supplies. This operation consumed a considerable amount of staff and residents' time. In retrospect, county officials noted that since the primary threat was storm surge, rather than flooding, sandbags were not the most effective preventive measure, and county resources might have been put to better use elsewhere.

Evacuation

On September 5, the county began holding regular ROC calls to share information among county and municipal partners and community agencies. These calls were essential to coordinating evacuation recommendations and maintaining situational awareness with all county stakeholders. Although agencies lost preparation time when a last-minute change moved up the opening time for shelters, most felt the ROC calls were an essential tool for coordination and information sharing.

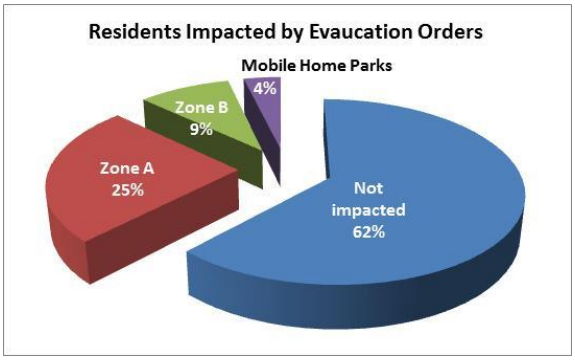
On September 7, the Pinellas County Board of County Commissioners declared a Local State of Emergency and ordered a Mandatory Level A Evacuation beginning at 6:00 a.m. the next day. Two days later, on September 9, with additional forecast information, the county revised the Mandatory Evacuation to Level B.

> "My mother was in an evacuation zone and I felt like we had plenty of advance notice to get her relocated to my house."
>
> -County resident

The evacuation was a multiagency and multijurisdictional effort involving county and municipal police, fire, and emergency management agencies. The Pinellas County Intelligent Transportation System, which includes signal timing coordination, traffic monitoring devices, and dynamic message signs, helped the county route traffic and communicate with motorists.

> "I felt the county was as prepared as possible for a completely unpredict-able event. No one could tell how severely Irma would hit our area."
>
> -County resident

There were some misunderstandings by businesses and local officials about the timing of business closures in relation to the evacuation-order window. While critical businesses such as gas stations and grocery stores should stay open as long as possible within the window, there were reports that some businesses did not understand that they could remain open during the evacuation window, and still others were asked to shut down immediately.



Some residents in evacuation zones refused to evacuate, in part because of uncertainty about gas availability and traffic. In addition, some incorporated jurisdictions said their residents were unsure whether the evacuation order applied to them, since it was issued by the county. At least one incorporated jurisdiction issued its own local state of emergency to clarify that the order applied to its residents.

Reentry

The eye of the storm passed about 40 miles east of Pinellas County during the early morning hours of September 11; Irma was downgraded to a tropical storm by 5:00 a.m. The county lifted the mandatory evacuation orders at 11:00 a.m.

The coordination of the timing of reentry onto the barrier islands caused issues in some locations. In some cases, citizens were allowed entry onto barrier islands before local fire and emergency medical services had returned. There was also confusion about the timing of bridge openings, resulting in traffic backups as citizens tried to return home before bridges were reopened.

Recommendations

1. PCEM should identify and implement upgrades to the Know Your Zone application to better manage the expected traffic.
2. PCEM should consolidate hurricane-related information on the county website to facilitate public access and include links to other resources (e.g., GasBuddy).
3. County agencies should plan to increase CIC staffing, especially when a surge in calls is expected (e.g., after release of an evacuation order).
4. In the lead-up to the next storm, the EOC should distribute FAQs to those entities expecting to receive citizen calls, and post this information on the county website.
5. Pinellas County Marketing and Communications should plan to increase its capacity to translate and disseminate information in languages other than English.
6. The county and municipalities should ensure law enforcement and businesses understand the evacuation windows and are able to plan their closings accordingly.

7. County and municipal officials should make clear that the county orders evacuations for anyone in evacuation zones, even if they are in incorporated jurisdictions.
8. The county should clarify the post-event ROC calls with community partners to ensure clear and coordinated plans for shelter demobilization and reentry timing. Pinellas County Public Works should work with area partners to integrate non-county-owned bridges into the county's post-event bridge inspection plan, including prioritization of bridges for inspection.
9. Continue to follow best practices for public communications. Featuring one person as the spokesperson or face of the response is often calming to the public. Best practice format for briefings includes a spokesperson to open and close the briefing with overarching and leadership items while subject matter experts cover the current status, issue information, and technical questions.

Healthcare facilities

Evacuation zones A and B contained 49 healthcare facilities—including 4 hospitals, 15 nursing homes, and 30 assisted living facilities. All of these facilities successfully evacuated with assistance from Pinellas County agencies and healthcare partners. The hurricane provided an opportunity to test facility evacuation plans and identify lessons learned. Key areas to work on in the future include increasing the capacity to house evacuated patients, tracking healthcare facility status, and discharging patients and special-needs evacuees.

> "[Pinellas County Emergency Management] helped us…with the evacuation of 81 patients… [They] knew exactly what we needed to successfully return to our facility…"
>
> -County nursing home

Evacuation and sheltering

Hospitals participated in the ROC calls, which helped keep them informed about the status of evacuation recommendations and allowed them to make preparations. Their participation in the ROC calls continued after the storm.

By the numbers

- 3,250 patients evacuated from 49 facilities
  - 30 assisted living facilities
  - 15 nursing homes
  - 4 hospitals
- 238 healthcare facilities affected by power outages
- 8 senior facilities received visits from polar pods
- 840 pounds of ice delivered to 11 assisted living facilities
- 2 facilities evacuated with county assistance due to heat issues

Although the hospitals have evacuation plans, they experienced some challenges evacuating patients. At least one healthcare facility did not send staff or supplies to accompany its evacuated patients, placing a burden on receiving hospitals. In addition, some facilities receiving evacuated patients reached capacity, and facilities in the evacuation zones had difficulty finding alternative locations for their patients. The capacity problem was exacerbated by patients evacuated from Southern Florida to Pinellas County.

Hospitals also served as shelters for residents evacuated from their homes who had registered as special needs and could not be cared for adequately in a special-needs shelter. Other residents self-evacuated to hospitals, believing they needed that higher level of care. However, some of the residents seeking shelter in hospitals did not require hospital-level care, nor were they adequately prepared. For example, some brought pets to the hospital, but not pet food or crates. Others came without personal medications, medical equipment, or special dietary food supplies. When hospitals needed to supply medication, equipment, and special dietary foods, they had to admit

> "I just want to tell you thank you for doing a wonderful job holding it together and matching the needs of so many partners to the benefit of the citizens of Pinellas County. You have made me extremely proud to be on a winning team!!!!!"
>
> -County hospital

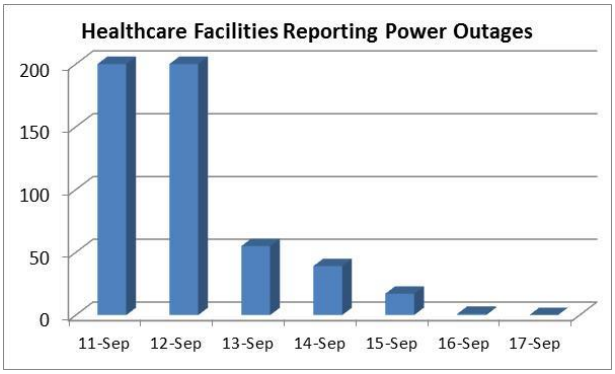
evacuees as patients, rather than simply providing a safe haven.

Although the county maintains a registration system for special-needs persons in case of evacuations, many registered at the last minute or not at all, making it difficult for hospitals to anticipate the number of special-needs evacuees they would have to accommodate. In addition, some special-needs evacuees who arrived at hospitals may have been more appropriately cared for in a special-needs shelter or even in a general shelter.

Monitoring facility status

Although the state maintains the FLHealthSTAT system to collect information on the status of hospitals, it is internet-based, and healthcare facilities could not access it during power outages. As a result, healthcare facilities could not report whether they had power or not, and if not, what capabilities they did and did not have on generator power. For example, some hospitals that were on generator power could light exit signs, but could not maintain their cooling system. As a result of these challenges, personnel in the county's EOC monitored over 300 healthcare facilities by phone and maintained information on facility status. This effort was critical to understanding short- and medium-term shortfalls, such as whether the facility required post-storm evacuation or needed supplies such as ice.

When EOC personnel could not reach facilities by phone, they requested wellness checks from local fire departments. These wellness checks were critical in facilities that required assistance, such as cooling stations, and prevented significant issues. For many fire departments, however, these checks were burdensome and may have been impossible had the emergency been more severe.



Patient discharge

Once the storm had passed through, hospital capacity was further stressed by the high volume of emergency transports from residences and from special-needs shelters that could not care for high-acuity patients. Discharges proved challenging as hospitals tried to first confirm that patients and special-needs evacuees would have access at home to power, food, medications, home healthcare, and other needs. In many cases, hospitals had to rely on local fire departments or city personnel to conduct home checks, because it was difficult to get accurate information from the power company, whose system was overloaded and unable to provide that level of detail.

Recommendations

1. Issues experienced during Hurricane Irma would have been worse if additional zones had required evacuation. Therefore, PCEM and the Florida Department of Health in Pinellas County should continue education and training with healthcare facilities on the importance of memoranda of agreement for sheltering and what specifically they should include (such as what staffing and supplies must come with patients and what specific facilities are making the agreement).

2. Pinellas County Marketing and Communications should continue to pre-script public messaging to prepare those sheltering at hospitals to care for themselves and their pets.
3. PCEM and partner agencies should review special-needs admission and transportation plans to more efficiently facilitate the movement of evacuees to appropriate facilities and reduce capacity problems.
4. The Florida Department of Health in Pinellas County and PCEM should work with partner agencies to ensure that emergency procedures for healthcare facility tracking are adequately planned for and shared with all facilities.
5. The Florida Department of Health in Pinellas County should work with hospitals to develop detailed procedures for hospital decompression following emergencies.
6. In order to alleviate overburdened hospitals, the Florida Department of Health in Pinellas County should work with hospitals, nursing homes, and home healthcare agencies to increase capabilities at special-needs shelters. Alternatively, they should identify other medically managed facilities, such as nursing homes, to shelter high-acuity evacuees.

Sheltering

Planning to shelter people and pets is a complex and difficult process, and it involved a wide range of stakeholders, including county emergency management, school board, animal services, transit authorities, nonprofit partners, fire districts and municipal fire departments, and CIC staff. However difficult the mission, it is imperative that the general population, as well as those with special needs, have a safe place to go to during and immediately after an incident.

> "I went to a local shelter in Largo and was treated with the utmost respect. They even made sure we had something to eat."
>
> -County resident

By the numbers

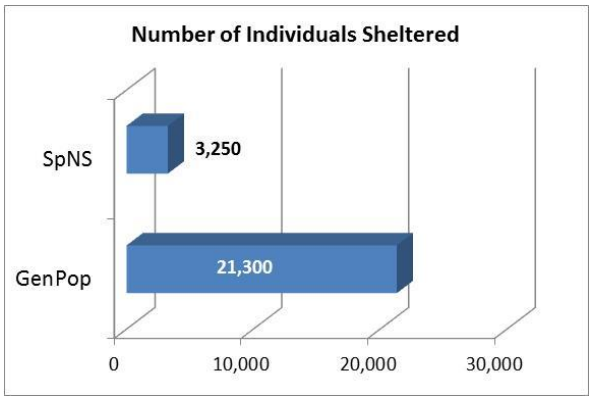
- 2,743 special-needs residents registered for evacuation during the event
- Over 24,000 residents stayed in 17 shelters during the storm
  - Over 21,000 of the general population
  - Over 3,000 citizens with special needs
- Over 2,000 pets sheltered
- 710 homeless citizens transported to shelters
- 220 fire/EMS calls for services in shelters, resulting in 156 citizens transported from shelters to hospitals
- 6 staffed pick-up sites for transportation to shelters
- 49 human services staff dedicated almost 1,600 hours to support the Hurricane Irma response

During the worst of Hurricane Irma, the county cared for more than 24,000 residents and 2,000 pets in shelters. As the sheltering plan was validated, and citizens stayed safe, the county learned a great deal from the most significant sheltering operation in 13 years. In the aftermath of the hurricane, the county, school board, health department, and fire and EMS services have an opportunity to engage in more extensive planning to increase capabilities. They can also continue their dialogue with the public on where to go and what to expect while this experience is still fresh in people's minds.

> "The shelters were so important. [It] seemed like as the need arose, shelters kept opening for residents."
>
> -County resident

Getting people to the right shelters

Pinellas County accommodated residents in two types of shelters: general population (GenPop) and special-needs shelters (SpNSs). County staff and local partner organizations provided assistance to those who needed transportation to shelters, including groups of people from homeless shelters in the evacuation zones.



Many aspects of the county's communications and coordination efforts effectively facilitated the sheltering process. Community partners noted that they had a good understanding of who they needed to coordinate with at the county's EOC when they needed assistance or had questions. In addition, the CIC played an important role in answering questions from the public about shelter locations and types, with the goal of directing people to the most appropriate shelter for their individual needs.

Anticipating needs and getting people to the right place was a challenge, however. Only 10 percent of eventual SpNS evacuees had preregistered for evacuation assistance. Days before the storm,

home healthcare agencies inundated Emergency Management with hundreds of special-needs registration forms, many for residents who did not need or want to be registered. Processing these forms took additional staff and time from the county and the fire departments into whose jurisdictions they fell. Home healthcare agencies did not visit their patients in the special-needs shelters, further exacerbating the staffing shortage.

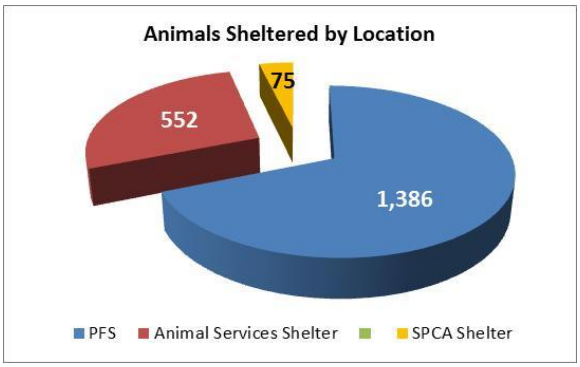
There were also misunderstandings about which shelters were open, and about their capacity. Citizens did not always recognize that not all potential shelters were opened. In addition, some shelters were reported to be full, causing some preregistered residents to be turned away. In some cases, only the parking lots were full. It is counter to policy to turn away persons seeking shelter.

Finally, the response community identified gaps in shelter staff, equipment, and supplies. The county did not have enough cots for all of the special-needs evacuees they received, and not all residents arrived with basic necessities for the duration of the storm. Oxygen was a critical commodity, and some shelters reported difficulty maintaining an adequate supply. Home healthcare agencies did not visit their patients in the special-needs shelters, further exacerbating the staffing shortage. More specialized personnel, such as additional nurses and nursing aides, as well as behavioral health practitioners, were needed across the county.

Accommodating pets

As evacuations continued, Pinellas County Animal Services (PCAS) staff worked diligently to accommodate pets in coordination with its partners, such as the SPCA Tampa Bay. PCAS staff were critical in supporting operations, from setting up crates to caring for animals when their owners could not. As the three planned pet-friendly shelters (PFS) filled, PCAS worked quickly to open an unplanned fourth shelter to ensure that all pets would be safe during the storm. As the storm approached, even shelters that were not designated as pet-friendly accepted evacuees with pets, so that no one would be left without shelter.

> "Throughout the storm, as we learned many of our planning assumptions were incorrect, the PCAS and SPCA were able to adapt because our staff knew one another and how to collaborate effectively."
>
> -SPCA



Hurricane Irma demonstrated that the county needs more capacity for sheltering pets. Additional facilities and staffing will be required, in addition to more pet supplies such as food and crates. The hurricane also highlighted some gaps in pet-sheltering plans, such as the best way to get pets and their special-needs owners to the appropriate shelter, how to triage residents to a pet-friendly shelter or a special-needs shelter, whether SpNSs had to be collocated with pet shelters, and how the PCAS can provide medications to animals whose owners have special needs and cannot provide them to their own pets.

Tracking the sheltered population

The lack of accurate records of individuals and their locations in shelters created several challenges. Hundreds of requests for wellness-check information by friends and relatives outside of Florida were difficult to answer. Home healthcare agencies that needed to serve their special-needs clients could not easily find where they were located. After the storm had passed, the county reunited pets and owners and facilitated their return home. But the process was slowed as fire district and department personnel charged with finding those registered for transportation assistance lacked the capability to track a special-needs evacuee to a particular shelter.

Demobilizing shelters

The timing of shelter demobilization must be a balance between the different mandates of diverse stakeholders. The school board is entrusted with ensuring that schools are reconstituted and reopened as soon as possible, so that residents can return to normal. Public safety officers, on the other hand, need to ensure that shelters—located in schools—stay open until it is clear that sheltering needs for residents have been met or transitional sheltering provided. This includes ensuring residents will be returning to a safe environment. While power outages are an inconvenience to everyone, they cause safety issues for those who depend on electricity, such as those on oxygen or the elderly who need elevators to reach upper floors. This situation leads to a balancing act, with stakeholders on all sides trying to do the best they can in light of their mandated roles and responsibilities, but demands greater coordination to make sure the transition between response and recovery is a smooth one.

> "We were very impressed by the effectiveness, efficiency and compassion demonstrated by all of the county's administrative, animal services, medical and law enforcement personnel who served at the John Hopkins Middle School shelter during the storm."
>
> -County resident

Recommendations

1. Agencies assigned sheltering responsibilities should explore additional resources for sheltering the public, including equipment, supplies, and staff from nontraditional sources—such as nursing students. Available grant money could cover associated costs of procuring and storing equipment and supplies.
2. As a part of continual preparedness planning, agencies assigned sheltering responsibilities should consider facilities other than schools in which to shelter residents with special needs, eliminating the need to shut the shelters down so soon after hurricane-force winds end.
3. Pinellas County Marketing and Communications should continue efforts to communicate to the public what shelters are open, what they can do to be ready for sheltering themselves and their pets, and what to expect at these public shelters.
4. PCAS and its partners should continue to build pet-sheltering capacity by identifying other possible facilities and staff.
5. Agencies assigned sheltering responsibilities should review plans for collocating pet shelters with special-needs shelters.

6. PCEM, working with other sheltering stakeholders, should explore technological solutions to track people and pets as they move to occupy and depart from shelters.
7. Pinellas County Marketing and Communications and Emergency Management should promote a public campaign to preregister special-needs residents for emergency assistance and find ways to simplify the forms and processes for taking information prior to a storm.
8. PCEM should ensure that organizations that are part of the ROC group and involved in shelter demobilization have executive decision makers involved in planning and on the ROC calls when response decision making is taking place.

Communications and critical infrastructure

On the evening of September 11, more than 100,000 Pinellas County customers were without power. By the next morning, after the center of the storm had passed, the number of customers without power had increased to over 433,000. Due to the extensive and numerous power outages, it took until the evening of September 21 to restore power to all county customers, although 99 percent of power was restored by September 18. Such large-scale power outages have cascading effects on response and recovery operations and critical infrastructure, such as traffic control devices and communications systems. Although challenged at times, Pinellas County successfully implemented practices—some planned and some novel—that will be useful tools in future large-scale power outage events. For example, the county and Duke Energy worked as an integrated team to restore power to critical infrastructure and to residents. In addition, at no time did power outages affect the availability of potable water, as back-up systems functioned as planned and maintained the supply.

> "After the power came back and we were able to call the Pinellas County [CIC], the woman who answered our call was like an angel. Whoever she was, bless her."
>
> -County resident

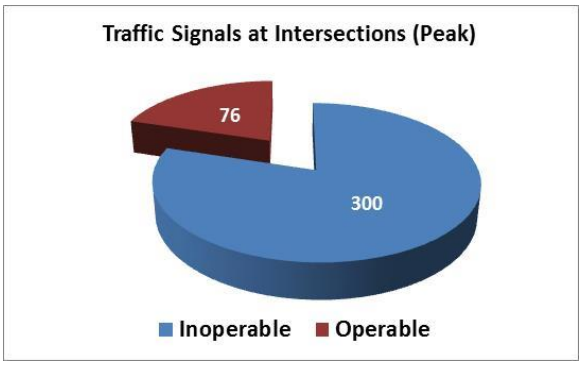
The 9-1-1 line also remained 100 percent operational, supplying agencies with critical information and providing medical pre-arrival instructions that saved lives, even when first responder units had suspended operations due to storm conditions. Residents had continued access to meals and water during post-storm power outages, as the Salvation Army provided 9,685 meals and the county provided 171 pallets of water.

By the numbers

- 80 percent of customers lost power
- 200 pump stations offline
- Over 300 traffic lights were inoperable (80 percent)
- Over 200 healthcare facilities lost power
- 425 traffic control officers deployed
- 15 primary county bridges inspected and

Post-storm traffic control

Without power, 80 percent of traffic signals in the county were inoperable. Some traffic signals have backup power, but the reserves only last a few hours.



In response to the outages, the Pinellas County Sheriff's Office and local police departments deployed 425 traffic control officers to manage traffic as recovery operations got underway. The traffic control officers improvised to get stop signs and ad hoc barriers set up at intersections and used those devices to successfully manage traffic. Upon recommendation by Pinellas County Public Works, police used inverters in patrol vehicles to power traffic signals.

This worked so well that Pinellas County Public Works is already pursuing funding to establish a cache of inverter kits that could be used with any vehicle. However, this approach will only work if the lights are still standing. If Pinellas County had experienced higher winds, many of the span wire traffic signals would have broken.

Generators can also temporarily power traffic signals. Since the county has a limited number of generators, the county may need to identify additional funding opportunities for traffic control response.

Communications system outages

Widespread power outages created communications challenges among agencies and jurisdictions, as well as with the public. Agencies resorted to backup communications methods such as radios and landlines. Mobile charging stations offered by the private sector were deployed to assist the public with charging devices.

The loss of internet-based systems caused significant challenges because of the heavy reliance on the internet for communications and information sharing by county and municipal agencies and the public. Much of Pinellas County is still served by the conventional cable system for internet, which was inoperable after the storm. The barrier islands were without internet for four and a half days, and wireless for mobile and data services was operating at very slow speeds in some areas. Other communications systems that rely on internet such as internet calling (voice over internet protocol) were also inoperable in some parts of the county. In general, text messaging remained operational throughout the county.

> "…the battery powered radio kept telling us to go online to find where services were located… Entirely unhelpful when there is not power and no internet."
>
> -County resident

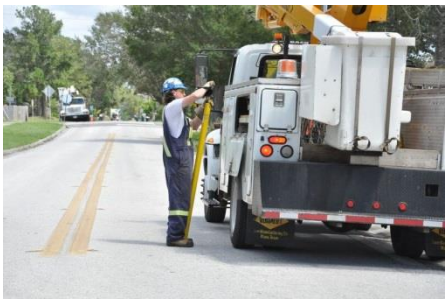
Pinellas County has a number of backup communications systems in place, including 800 MHz radios, ham radios, satellite phones, and landlines; however, not all county entities had the right plans, equipment, or training in place to use them. Given the outages, an over-reliance by county and municipal agencies on internet and cellular-based communications during and after the hurricane led to challenges communicating with county entities and the public.

Electrical infrastructure restoration

Following the storm, Duke Energy's outage management system was overwhelmed and unable to provide regular notifications and status information. As a result of that system loss, it also was not possible for Duke Energy desk officers to provide accurate information regarding the status of power in specific locations, creating the need for site verification of power restoration.

> "We were without power for several days which is expected, I appreciated that they opened up community centers to help."
>
> -County resident

Despite their challenges, Duke Energy worked with PCEM to prioritize restoration of power to critical infrastructure and facilities, including healthcare facilities, facilities with vulnerable populations, and critical county services. Calls to Pinellas County from citizens and critical infrastructure operators demonstrated a lack of understanding of the priority for power restoration. Power restoration operations went smoothly, but due to the scale of the outages, it took time to get all power restored. In addition, it was difficult to estimate time for restoration, as the storm damaged many components of the power infrastructure.



Network service providers had to wait until power was restored to identify outages and begin their restoration operations. Even after power was restored and downed lines cleared, network service providers were hesitant to begin restoration operations, as they were unsure if an "all clear" message from an EOC liaison was considered official.

Water and wastewater

Both water and sewer services lost electrical power to many of the critical treatment and distribution facilities during the storm. The water system was able to maintain supply and water quality throughout the duration of the storm and recovery period due to back up generators at those facilities. The wastewater collection system lost power at over 200 pump stations in the collection system, not all of which were fitted with backup power causing sewer overflows in various locations. After the all clear Pinellas County Utilities crews responded to those stations.

> "Although we were without power [for a week], we never had a sewer or water problem...many thanks go out to you and your employees for keeping us safe from having sewer or water problems."
>
> -County resident

Fuel resiliency

Prior to Hurricane Irma, Pinellas County initiated fuel resiliency planning efforts. These efforts proved judicious, as Pinellas County effectively managed fuel for first responders and monitored and maintained the fuel supply at critical facilities.

> "[We need] a possible way to better organize a method to get fuel leading up to the storm."
>
> -County resident

Through the fuel resilience planning efforts, Pinellas County also had a good understanding of its emergency power generation capabilities, which were used throughout the response to bring power back to county facilities and provide services to citizens. For example, generators were coupled with cooling stations to provide relief to assisted living facilities without grid power.

> "[Having] gasoline on hand… that was my greatest fear in the evacuation…the long lines, the closed stations."
>
> -County resident

Many assisted living and nursing home facilities were not adequately prepared for emergency power generation. New legislation (Florida Senate Bill 896) will require nursing homes and assisted living facilities to have generators and enough fuel for 96 hours during an emergency power outage. Although this requirement may remedy some of the challenges experienced during Hurricane Irma, it may also bring new challenges for the county, as these generators will need fuel to keep them running.

Recommendations

1. Pinellas County and municipalities should codify the use of inverters and vehicles to power traffic lights during power outages and continue to pursue developing a cache of inverter kits. The county should identify which vehicles can be used to support the kits to free police vehicles for other duties.
2. Pinellas County Public Works should review priority intersection designations and plans for traffic control support in the event of large-scale damage to traffic control signals.
3. All Pinellas County departments should review and update backup communications plans and train on those plans. Plans need to ensure they include contact info for all emergency needs such as the EOC, partner agencies, and private sector.
4. Pinellas County Marketing and Communications and Duke Energy should collaborate on increasing public messaging

about the prioritization order for power restoration and the teamwork aspect of that work.

5. Pinellas County Business Technology Services and PCEM should expedite implementation of the new Everbridge notification system with county departments and municipalities to assist with employee communications. County and municipal agencies should expand plans to use multiple mechanisms to communicate with the public during outages, such as radio, newspapers, and signs.
6. Pinellas County Business Technology Services and PCEM should meet with the network service providers before the next hurricane season to determine what their requirements are for beginning post-storm restoration operations, including who has authority to provide an all clear for the county. Network service providers should also consider providing a representative to the EOC after incidents with major outages.
7. Pinellas County should continue to work on the fuel resiliency program and communicate with community partners such as healthcare facilities and the school board about expectations for fuel management and generator maintenance.

Debris management

Pinellas County and its partners quickly cleared debris from roads and personal properties. Concurrently, damage assessment teams worked rapidly, covering over 97,000 residences. Debris removal operations were not without challenges, however, due in part to the statewide impact of the storm, which led to competition for debris removal contractors. Additionally, actions of private citizens and poor performance of some contractors led to operational challenges and extended the timeframe of debris removal.

> "[The county was] pretty well prepared for the onslaught of debris and trees/bushes. Huge amounts take a while to get under control."
>
> -County resident

By the numbers

- Cleared and inspected almost 600 miles of road the first day after the storm, including all priority routes
- Removed over 375,000 cubic yards of debris

Priority route clearance

Power restoration and debris clearance operations go hand in hand and need to be an integrated effort. Power companies cannot restore power if they cannot reach the lines because of debris on the road. Similarly, debris cannot be cleared if there are downed power lines nearby, due to safety considerations. Pinellas County had a plan to coordinate these efforts through road clearing task forces. The plan, which had never been implemented, involved pre-staged task forces before storm landfall and pre-established routes for priority road clearance. The task forces consisted of representatives from Pinellas County Public Works, Pinellas County Sheriff's Office, Pinellas County Utilities, and Duke Energy. The response to Hurricane Irma validated Pinellas County's plans, and the first day following the storm, the task forces cleared 600 miles of road and all priority routes.

At the municipal level, similar task forces did not always have as much success clearing roads because few had representatives from the power company. Additionally, other service providers have cable lines on the power poles, and it was difficult for first responders to differentiate between a downed power line and other types of lines. Even after a downed power line had been cut off from the power grid, the lines were often tangled up in trees, and responders could not always tell whether they were live or not. These situations resulted in delays, as debris clearance crews tried to determine if the downed lines were power lines and whether they were still live. This also led to citizens and others calling 9-1-1, Duke Energy, and the EOC about lines that had already been cut off from power.

Debris removal

After priority routes were cleared, debris removal operations commenced. Debris collection was a coordinated effort launched with partners to collect tons of vegetative, construction, and demolition debris from public rights of way. Pinellas County Public Works cleared parks of debris so that they could reopen in short order after the storm. County, municipal, and contracted debris removal teams went neighborhood by neighborhood removing debris from personal properties, after

the property owners moved the debris to the curb. Some municipalities also set up drop-off sites for debris, which helped expedite the process for citizens and haulers. The Florida Department of Environmental Protection helped the county and those municipalities without pre-identified sites to quickly set up and get clearances for debris management sites.

> "I know that your crew has been working tirelessly, since Hurricane Irma, to get all the brush off the side of the roadways…I cannot sufficiently express my thanks and appreciation for this work."
>
> -County resident

Prior to Hurricane Irma, Pinellas County had pre-identified and developed agreements with contractors to assist with debris removal. The contracts established could be used by both the county and municipalities. Due to the statewide impacts of Irma and some state-level decisions that allowed for post-storm bidding for debris contracting in the Florida Keys, the county experienced difficulties getting some pre-established contractors to support Pinellas County operations, as there were competing contracts with cities and other Florida jurisdictions. A number of Pinellas County's contractors decided to support other jurisdictions offering higher compensation. With a shortage of contract support, county employees stepped up to conduct debris removal operations using all county resources available. This allowed debris collection and management to begin over a larger percentage of the county and limited delays.

There were also problems with contractor performance. Some contractors damaged property, and municipalities had to make repairs. Contractors also sometimes selectively removed debris to maximize profits. This resulted in Pinellas County debris removal teams having to go back to locations to remove debris left by the contractors. A lack of performance standards in Pinellas County debris removal contracts contributed to monitoring problems. Monitors who went out with the contractors were supposed to make sure they were performing appropriately. However, the monitors were only checking to confirm that the teams were removing verifiable debris; they were not noting damage to property or debris left behind.

> "The first round of brush removal happened quickly for us. When I called to ask when fences would be picked up, I was told about a week. Sure enough, a week later it was gone! I was very pleased."
>
> -County resident

The public's role

As debris was removed from residences, it became apparent that some residents either did not understand—or decided not to follow—guidelines for storm debris removal. For example, some residents did not know that they would be charged for debris dropped off at solid waste facilities, that storm debris should not be bagged, that vegetative and non-vegetative debris should be separated, or that heavy equipment and claws would be used to

> "Debris removal took way too long. Maybe eliminating dump fees to your facilities could help both the home owner and the county with quicker clean up."
>
> -County resident

pick up debris, which meant that residents should not put it under power lines or on surfaces like gardens and pavers that could be damaged. In addition, some residents who live on private roads did not know that it was their responsibility to remove debris, although the county did end up supporting efforts in those areas as well. Some residents may have lacked knowledge of these requirements due to the communications network outages following the storm.

In some of the most egregious cases, people illegally dumped debris that was not from the storm at debris collection sites. The illegal dumping included disposal of removed trees not damaged by the storm and other items such as old mattresses, furniture, and tires. In response to the illegal dumping, Pinellas County Public Works and Marketing and Communications increased public messaging about illegal dumping, noting that it is a felony offense, and the Pinellas County Sheriff's Office directed patrols to areas where illegal dumping was frequently occurring. However, illegal dumping still continued throughout cleanup operations.

Recommendations

1. Pinellas County Public Works should use this experience to update forecasting estimates for storm debris, comparing what was modeled to the real-world impacts of Hurricane Irma.
2. Duke Energy should reconsider the county's request that a power company truck and staff be provided to municipalities to help with debris clearance efforts.
3. Duke Energy should investigate how to better communicate which power lines are safely disconnected so that first responders and clearance crews know whether lines can be handled.
4. Pinellas County Public Works should investigate a means of identifying which service providers have lines on power poles. The county could get data from Duke Energy and continue to invite service representatives to the EOC as well as to participate in road clearing task forces.
5. Pinellas County Public Works should examine novel best practices related to debris clearing, such as community drop-off sites, and determine if any should be codified for future efforts.
6. Pinellas County stakeholders should review the new debris collection and management contract in light of a new FEMA policy created during Irma, and to identify competing contracts with cities and neighboring jurisdictions.
7. PCEM and Pinellas County Marketing and Communications should communicate prior to a hurricane about the public's role in helping with cleanup and debris removal operations and add information about debris removal operations to Pinellas County publications such as the All-Hazards Guide.
8. Pinellas County Public Works should expand and clarify performance requirements for debris removal contractors and monitors, and meet with these groups to reiterate both old and new requirements prior to the next hurricane season.
9. Pinellas County Public Works should solicit information on how each of the debris removal contractors performed and share that information with municipalities.

HURRICANE IRMA
PREPAREDNESS, RESPONSE & RECOVERY

On Sept. 8, 2017, Pinellas County activated its Emergency Operations Center (EOC) to coordinate response to Hurricane Irma. The County experienced strong tropical storm force winds with gusts to Category 1 hurricane strength, heavy rainfall and up to 3 feet of storm surge. The EOC is located within the county's Public Safety Complex, a Penny for Pinellas-funded facility for coordinated emergency response.

OPERATIONS

- **Mandatory Evacuation Orders Issued** for levels A and B and mobile home parks, impacting 354,015 residents
- **250 County Employees** activated at EOC
- **200+ Local, State and Federal Partners Coordinated**
- **Hundreds of Field Crews Coordinated** for field preparations ahead of storm
- **445,400 sandbags** distributed

SHELTERS & EVACUATIONS

- **17 Shelters Opened** throughout the County
- **21,300 General Population Residents** sheltered
- **2,723 Special Needs Residents Registered** for evacuation during the event
- **3,250 Special Needs Residents Evacuated** under the program, 99% were moved by the Fire Departments
- **2,053 Special Needs Residents** sheltered
- **2,013 Pets** sheltered
- **710 Homeless Residents Transported** to shelters
- **49 Healthcare Facilities with 3,250 Patients** evacuated pre-storm (18 of those evacuating pre-storm, with 1,421 patients, were assisted by the county)

POWER OUTAGE RESPONSE

- **200 Utilities Pump Stations Impacted** *Utilities crews activated 24/7 to maintain continued sewer service*
- Most of the **376 County-Maintained Traffic Signals Impacted** *Public Works activated 24/7 to maintain traffic operations, in support of the Sheriff's office*
- **238 Healthcare Facilities**, of the 305 in the county, were impacted by power outages
- **265 Facilities Called Daily** for wellness check due to power outages
- **2 Facilities Evacuated** with county assistance due to heat issues

PUBLIC WORKS

- **595 Miles of County-Maintained Roadways Inspected and Cleared** on first day of response *(all major road networks cleared)*
- All **15 Primary County Bridges Inspected and Cleared** on first day of response *(all others completed by day 3)*

PUBLIC INFORMATION

- Nearly **65,000 Calls Handled by Citizen Information Center** (CIC)
- **400+ News Updates & Tips Shared**
- **50+ News Releases Sent**
- **5 Press Conferences Held**
- **5 Multilingual Videos Created**

COMMUNITY SUPPORT

- **Mobile Cooling Station** brought to senior facilities
- **6 Citizen Information Center on the Road Events** held
- **Food and Ice Distribution Events** coordinated
- **Consumer Protection Signage & Visits** to affected areas

DEBRIS COLLECTION

- **Coordinated Effort** launched with partners to collect tons of vegetative and construction/demolition debris from public rights of way
- **More than 375,000 cubic yards of debris was collected** from unincorporated Pinellas County post-storm