



REPORT AND RECOMMENDATIONS

Disaster Response and Recovery Working Group

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of the Federal Communications Commission
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1 Overview

On August 9, 2018, the Federal Communications Commission (“FCC” or “Commission”) issued a Public Notice seeking nominations for membership to the Broadband Deployment Advisory Committee (“BDAC”) Disaster Response and Recovery Working Group (“DRRWG” or “Working Group”).¹ Working Group members were announced by the Commission on November 1, 2018.² A complete list of Working Group members is provided below in Appendix A.³

The Commission tasked the DRRWG with making recommendations on measures that can be taken to enhance the resiliency of broadband communications infrastructure **before** a disaster occurs, strategies that can be used **during the response** to a disaster to minimize any impact to broadband communications services, and actions that can be taken to more quickly restore broadband communications infrastructure **during disaster recovery**.⁴ The DRRWG is also tasked with developing best practices for coordination among wireless providers, backhaul providers, and power companies during and after a disaster.⁵ In addition, the Working Group’s recommendations will be key to the Commission’s reevaluation of the Wireless Resiliency Cooperative Framework.⁶ A complete list of charges provided to the Working Group by the Commission is attached as Appendix B.⁷

To accomplish these tasks, the DRRWG organized itself into three subgroups:

- Subgroup A - Government Processes and Procedures
- Subgroup B - Infrastructure Standards and Resiliency
- Subgroup C - Mutual Aid and Coordination

Each subgroup identified ongoing activities that industry and government stakeholders take to ensure the resiliency of broadband infrastructure before a disaster, to mitigate and/or minimize any impact on broadband communications services during a disaster, and to expeditiously recover and restore broadband communications services after a disaster. Categories of activities considered include:

- Government processes and procedures;
- Broadband infrastructure design and deployment standards;
- Best practices for governments and industry stakeholders;
- Mutual aid activities;
- Information gathering and sharing practices;
- Coordination practices and procedures; and
- Development of resiliency assessment tools.

¹ See *FCC Solicits Nominations for New Disaster Response and Recovery Working Group of the Broadband Deployment Advisory Committee*, Public Notice, GN Docket No. 17-83, at 1 (rel. Aug. 9, 2018).

² See *Chairman Pai Announces Members of BDAC Disaster Response and Recovery Working Group*, News Release (rel. Nov. 1, 2018) (“DRRWG News Release”).

³ See Appendix A “Disaster Response and Recovery Working Group Members.”

⁴ See *FCC Announces Membership of the Broadband Deployment Advisory Committee’s Disaster Response and Recovery Working Group*, Public Notice, DA 18-1121 (rel. Nov. 1, 2018).

⁵ *Id.*

⁶ See DRRWG News Release at 1.

⁷ See Appendix B “Disaster Response and Recovery Working Group Charges.”

The subgroups then assessed each activity to develop recommendations—taking into account different types/sizes of industry and government stakeholders—for planning and enhancing the resiliency of broadband infrastructure before a disaster occurs, response strategies to maintain service and minimize any impact to broadband communications during a disaster, and recovery actions to restore affected broadband infrastructure after a disaster. Throughout the drafting process, the Working Group’s preliminary findings were presented to the BDAC for discussion, and relevant feedback was considered and incorporated into this final report.⁸ The Working Group’s findings and recommendations are detailed below.

2 Defining Disasters and Emergencies

Broadband infrastructure resiliency and restoration efforts vary depending on the elements of each emergency or disaster event. While no two emergencies or disasters are the same, certain types of events share similar characteristics. For example, some disasters, such as hurricanes, can be predicted in advance, and thus provide opportunities for preparatory activities that potentially mitigate the effects of the disaster. However, other disaster types, such as tornadoes, earthquakes, and wildfires, occur with little prior notice. Additionally, some disasters last only a few minutes, while others may last days or even months. Thus, categorizing different types of emergency and disaster events is important for assessing the effectiveness of resiliency activities relative to the respective disaster type.

The Working Group acknowledges that preparation, response, and recovery must be individually tailored to the specific characteristics of each disaster or emergency event. However, for purposes of this report, the best practices and recommendations provided below generally address all emergencies and disasters that affect physical communications infrastructure.⁹ Descriptions of the types of emergency and disaster events and key stakeholders considered by the Working Group are listed below.

2.1 Key Definitions

2.1.1 Emergency Types

Emergency Event – Unforeseen or uncontrollable combination of circumstances or the resulting state that calls for immediate action.

2.1.2 Disaster Types

Disaster Event – Sudden calamitous event bringing great damage, loss, or destruction.

Notice Disasters – Predicted weather events (named storms, hurricanes, seasonal flooding, arctic temperature events, power shutdowns, etc.).

No-Notice Disasters – Fast moving wildfires, earthquakes, volcanic activity, flash flooding, tornados, man-made emergencies (oil spills, electrical fires, dam failures, transportation failures, riots, strikes, civil disturbances, etc.).

Short-Term Disasters – Events lasting no longer than 48 hours (named storms, hurricanes, tornados, minor earthquakes, volcanic eruptions, solar events, etc.).

⁸ See Disaster Response and Recovery Working Group, Presentation to Broadband Deployment Advisory Committee (Sept. 19, 2019), <https://www.fcc.gov/sites/default/files/bdac-disaster-response-recovery-09192019.pdf>; Disaster Response and Recovery Working Group, Presentation to Broadband Deployment Advisory Committee (Dec. 3, 2019), <https://www.fcc.gov/sites/default/files/bdac-disaster-response-recovery-12032019.pdf>.

⁹ The scope of this report does not include cyber incidents. This topic is being addressed by other working groups such as the Federal Communications Commission’s Communications Security, Reliability, and Interoperability Council (“CSRIC”).

Long-Term Disasters – Events lasting longer than two days (wildfires, major earthquakes/aftershocks, on-going volcanic activities, flooding, etc.).

2.1.3 Emergency and Disaster Phases

For purposes of this report, the Working Group delineated three distinct emergency and disaster phases that should be considered by all stakeholders in developing and implementing emergency and disaster plans. In developing the following phase definitions, the Working Group sought to balance industry and government perspectives:

Planning Phase – Before an emergency or disaster occurs or is impending, this includes activities such as meetings, developing plans, implementing mitigating actions, conducting exercises, and other such daily blue sky activities.

Response Phase – During an emergency or disaster including the execution of plans and temporary actions taken to maintain or provide connectivity. This can include the staging of equipment prior to an anticipated disaster, adjusting employee working hours, or other actions taken due to anticipated effects prior to the start of a disaster.

Recovery Phase – After an emergency or disaster concludes during which conditions have stabilized and efforts or actions are focused on restoring pre-disaster conditions.

2.1.4 Key Stakeholders

The Working Group defined key stakeholders for purposes of this report. While the list of terms provided below is not exhaustive, it clarifies the intended use of terms throughout the following sections.

Communications Stakeholders – Communications companies including but not limited to the providers of wireless (fixed and mobile), wireline, backhaul services, satellite, broadcast and emerging communications technologies.

Power Stakeholders – Investor-owned, cooperatively-owned, and publicly-owned electricity providers.

Industry Stakeholders – Communications and power stakeholders.

Government Stakeholders – Federal, state, and local government entities with duties related to, or oversight of, disaster preparedness, response, or recovery.

3 Recommendations

3.1 Summarized Recommendations

The Working Group's recommendation categories are summarized below for reference. Each recommendation category is described in more detail in the following Sections 4, 5, and 6.

Planning Phase Recommendations:

- *PLAN 1 - Relationship Building and Maintaining Formal Relationships*
- *PLAN 2 - Deployment of Resilient Broadband Infrastructure*
- *PLAN 3 - Information Sharing*
- *PLAN 4 - Development and Refinement of Response Plans*
- *PLAN 5 - Government Approval Processes*
- *PLAN 6 - Commercial Power Supply*

Response Phase Recommendations:

- *RESP 1 - Emergency Preparedness Plans*
- *RESP 2 - Emergency Operations Center Coordination*
- *RESP 3 - Information Sharing*

- *RESP 4 - Expediting Service Restoration Approval Processes*
- *RESP 5 - Aerial Imagery*

Recovery Phase Recommendations:

- *RCOV 1 - After-Action Assessments*
- *RCOV 2 - Expediting Service Restoration Approval Processes*
- *RCOV 3 - Information Sharing*
- *RCOV 4 - Debris Removal*

4 Planning Phase

4.1 Ongoing Activities

The following section highlights key actions that are often taken by industry and government stakeholders in preparation for emergency and disaster events. Accordingly, the Working Group recommends the following steps as best practices for emergency and disaster planning.

4.1.1 Network Planning and Deployment

In preparation for emergency and disaster events, industry stakeholders should engage in network planning and deployment to enhance the resiliency of broadband communications services.

For example, communications stakeholders often take a regional approach to tailoring their network deployments for each unique environment (i.e., take into greater context the mix of urban and rural areas, major events happening in that region, where local and state governments prioritize resources and response, expected evacuation orders for certain areas, and what risks come with seasonal weather (heavy snow, rain, storms, earthquakes, tornados, hurricanes, fires, etc.)) as part of efforts to ensure the robustness of communications infrastructure. In addition, cell sites are an assembly of multiple modules that are considered in network planning and deployment (i.e., roadway or site access, foundations, buildings, vertical structures, antenna mounts, on-site power).

These efforts have aided in the maintenance and rapid restoration of networks during and following a disaster or emergency event. Communications network planning and deployment considerations may include accounting for:

- Potentially heightened demand near state and local government emergency management centers and Emergency Operations Centers (“EOC”), hospitals, or on hurricane evacuation routes; and
- Reliability considerations in Service Level Agreements (“SLAs”) and specifications for backhaul (e.g., fiber, microwave point-to-point, and satellite).

Additionally, tower owners work diligently to meet appropriate structural hardening standards in order to ensure the resiliency of communications networks. To illustrate, Revision H of the American National Standards Institute (“ANSI”) and Telecommunications Industry Association (“TIA”) 222 Structural Standard for Antenna Supporting Structures, Antennas, and Small Wind Turbine Support Structures is the current industry standard for structural hardening.¹⁰ The standard defines reliability requirements for communications structures consistent with the American Society of Civil Engineers (“ASCE”) 7-16 standard and the 2018 International Building Code (“IBC”) for establishing reliability requirements for buildings and other

¹⁰ See *TIA Announces Publication Of TIA-222-H Standard For Antennas And The Supporting Structures For Antennas And Small Wind Turbines*, TIA (Oct. 26, 2017), <https://tiaonline.org/press-release/tia-announces-publication-of-tia-222-h-standard-for-antennas-and-the-supporting-structures-for-antennas-and-small-wind-turbines/>.

structures.¹¹ Revision H speaks to the resiliency of communications network towers and maintaining antennas in the event of catastrophic events.

4.1.2 Site-Based Preparatory Work

In advance of an emergency or disaster event, industry stakeholders should engage in site-based preparatory work including inspecting and preparing network facilities and equipment.

For example, in advance of a disaster event, industry stakeholders prepare towers and other facilities for potentially catastrophic events by taking steps including but not limited to:

- Securing all attachments to towers and poles;
- Topping off generator fuel tanks and fuel stores;
- Validating battery reserves;
- Preparing for refueling shuttles of each respective fuel type;
- Validating and coordinating 24/7 site access or scheduling;
- Preparing sandbagging material and operations for expected water level rise;
- Clearing combustible materials from sites in fire-prone areas;
- Confirming pumps are functioning in advance of flooding;
- Securing sites under construction;
- Moving mission-critical equipment to high ground, avoiding flooding risks, ensuring reliable power, and fuel storage for response;
- Installing ground stations for fixed wireless backhaul; and
- Integrating third-party deployables with wireless provider and fiber backhaul networks.

4.1.3 Planning for Pre-Positioning Network Resources and Personnel

Industry and government stakeholders should develop and implement plans to pre-position network equipment and restoration teams in advance of a predicted disaster or emergency event.

Industry and government stakeholders require the flexibility to take a tailored approach to pre-positioning based on the nature and possible scope of a disaster or emergency event. These activities are incident specific and seek to avoid potential harm to personnel and equipment in the immediate area of a disaster. For example, some disasters may call for pre-positioning deployables (e.g., generators, fuel tanks, Cell on Wheels (“COW”), Cell on Light Trucks (“COLT”), Flying COWs, aerals, mobile equipment repair centers), while others may not, such as where site capacity can be activated or reconfigured remotely. These activities also account for potential loss of fiber or microwave backhaul (e.g., potentially providing mobile satellite links, temporary microwave or aerial broadband solutions, and support for the efforts of third-party fiber backhaul providers).

Industry and government stakeholders also coordinate to identify potential staging areas prior to a disaster or emergency to facilitate the process for restoring service for communications networks. Where possible, government and industry stakeholders evaluate staging areas for all the needs of stakeholders to conduct full response operations (e.g., parking for large equipment, fuel tankers, generators, cranes, tents).

4.1.4 Planning for Support of Restoration Teams on the Front Lines

Before an emergency or disaster event, industry and government stakeholders should prepare to support restoration teams on the front lines by providing necessary materials and services.

¹¹ See *id.*

Industry and government stakeholders prioritize making fuel, physical access, security, and power available in support of restoration teams on the front lines of an emergency or disaster. These activities may include developing a checklist for pre-positioning housing, food, fuel, medical, security, backup power, and other aid that will allow restoration teams to focus on maintaining and restoring service to affected communities. Other planning activities may include addressing credit limits, cash advances, and other travel and logistical considerations.

4.1.5 Planning for Support of Communities Affected by Emergencies and Disasters

Where feasible, industry and government stakeholders should prepare to provide materials or expertise that they may have unique access to that would be helpful to communities affected by disaster and emergency events.

For example, in past affected areas, industry stakeholders have elected to pre-position equipment and services in support of communities that will be affected by a disaster or emergency event. Industry pre-positioning may include providing resources such as replacements for lost phones, charging stations and 120- and 12-volt chargers, Wi-Fi connectivity, and other resources that the entity may be able to provide in support of affected communities.

Industry stakeholders have also provided media campaigns prior to a disaster to inform the public about:

- Preparing for the storm with information provided by the Department of Homeland Security (“DHS”) and local authorities;
- Recovery planning and long-term resiliency plans; and
- Coordination with other stakeholders, including first responders (e.g., police, fire, EMS, and emergency communications personnel), emergency management agencies, and essential service providers (e.g., communications, electric power, natural gas, and water).

4.1.6 Engagement at Emergency Management Agencies

In preparing for future emergency or disaster events, industry and government stakeholders should engage at state emergency management agencies to enhance coordination, rapid response, and education activities.

In planning for future disaster and emergency events, relevant stakeholders, including government, communications, and power representatives, may engage with state emergency management agencies to take several steps, including:

- Providing contact information so that EOCs can more easily launch coordination activities during a disaster or emergency;
- Participating in select “blue skies” exercises and planning events organized by state emergency management agencies to help prepare for and facilitate coordination between stakeholders during an emergency or disaster;
- Educating state and local response teams on how services are restored during an emergency;
- Working with state emergency management agencies to receive expedited permitting or approvals for staging of equipment and temporary facilities during a disaster; and
- Providing temporary waivers for disaster recovery such as the storage of large amounts of fuel, extended operation of diesel generators, or operation of mutual aid generators from out of region.

4.1.7 Plans for Expediting Service Restoration Activities

If possible, communications providers should seek waivers from government stakeholders and coordinate on progress reports with power and pole owner representatives prior to an emergency or disaster event to expedite service restoration activities. Government, power, and pole owner representatives should facilitate the expeditious review of such requests.

Necessary waivers and coordination efforts that may be sought by communications providers prior to a disaster or emergency event include:

- Municipal and state waivers from regulatory permitting processes for emergency reconstruction of the prior infrastructure (temporary infrastructure is limited to what is required to restore the service and be reviewed at the end of the emergency);
- Protocols between power, pole owner, and communications stakeholders that describe progress report intervals for disaster response and recovery regarding electric restoration;
- FCC waivers for experimental technology use if necessary to operate specialized response and recovery equipment;
- Access letters to be in an area during curfew or restricted areas for communications restoration and refueling of generators;¹²
- Waiver letters to legally haul fuel for the response vehicles and generators, install generators temporarily until power is restored to the area, and bring trucks and equipment to an area on a temporary basis;¹³
- Overflight permissions for aerial broadband systems and for the inspection of critical infrastructure assets; and
- Emission and/or noise abatement waivers necessary for elongated operation of available generators and operation of marshaling yards to restore service.

4.1.8 Response Plan Review and Best Practices for Industry Stakeholders in Preparing for Disasters and Emergencies

Communications stakeholders should routinely review emergency response plans and best practices for communications network providers in preparing for disasters and emergencies.

In preparing for disaster and emergency events, communications stakeholders routinely review:

- Best practices of associations such as the Alliance for Telecommunications Industry Solutions (“ATIS”) Network Reliability Steering Committee, which developed a checklist for emergency preparedness and response;¹⁴
- Best practices of federal advisory committees such as the Communications Security, Reliability, and Interoperability Council’s (“CSRIC”) best practices for enhancing resiliency of communications networks;¹⁵ and
- Response plans on a regional basis. These response plans are updated by government stakeholders based on real world events, after action reports, and from exercises that are conducted with regions, counties, and city governments throughout the year.

¹² Access letters/authorizations are issued by the affected jurisdiction/state (DHS CISA provides communications entities access to endorsement letters) to allow infrastructure providers to safely access areas that may be cordoned off due to curfew or other restrictions to the population at large to restore services.

¹³ Waiver letters or exemptions are issued by a variety of federal, state, or local jurisdiction authorities to allow infrastructure providers to expeditiously and safely perform duties to restore critical services. This may include the transport of fuel and exceeding sound, noise, or emission levels in an effort to provide or restore services. This may also allow for temporary placement of generators or the connection of generators to infrastructure equipment while commercial power is being restored and stabilized.

¹⁴ See ATIS-0100019, Emergency Preparedness and Response Checklist.

¹⁵ See CSRIC Best Practice 9-9-0655 (states, among other things, that communications providers should coordinate with power companies).

4.1.9 Best Practices for Coordinating with Local Governments to Prepare for Disasters and Emergencies

Industry stakeholders should routinely review and update best practices for coordinating with local governments to prepare for disasters and emergencies.

For example, as part of the Wireless Resiliency Cooperative Framework,¹⁶ CTIA—in partnership with a group of communications, local government, and public safety stakeholders—developed best practices for enhancing municipal preparedness.¹⁷ These best practices are enhanced through numerous exercises that communications stakeholders participate in across the country at the national, regional, state, and city levels. Best practices for coordinating with local governments to prepare for disasters and emergencies often include steps to:

- Facilitate airport, seaport, and roadway prioritization of materials for reconstruction;
- Coordinate with governments issuing access and waiver letters for communications stakeholder disaster response teams;
- Coordinate with government stakeholders developing expedited processes to facilitate the transport of materials, fuel, personnel, and trucks to restore communications services;
- Coordinate snow clearing on streets to access cell sites or other infrastructure; and
- Addressing curfews and checkpoints, tolling, parking, tree trimming, and other regulations.

4.1.10 Prepare and Plan to Foster Reasonable Mutual Aid

In advance of an emergency or disaster event, industry stakeholders should prepare and plan to foster reasonable mutual aid.

Various sub-sectors of the communications industry (e.g., wireline, wireless, cable, satellite, and broadcast) have mutual aid and cooperative agreement regimes. One example from the mobile wireless industry is the Wireless Resiliency Cooperative Framework. Signatories to the Wireless Resiliency Cooperative Framework are committed to help facilitate the provisioning of reasonable mutual aid during and in the aftermath of an emergency or disaster.¹⁸ Accordingly, in advance of an emergency or disaster event, communications providers prepare and plan to foster reasonable mutual aid. As such, communications stakeholders may provide generators and other equipment and services during disasters to affected facilities like hospitals, Emergency Communications Centers (“ECC”)¹⁹, and first responders.

¹⁶ See Letter from Scott Bergmann, CTIA, to Marlene H. Dortch, Secretary, FCC, PS Docket Nos. 13-239 and 11-60 at 1 (filed Apr. 27, 2016) (“Wireless Resiliency Cooperative Framework”).

¹⁷ See *Wireless Network Resiliency Cooperative Framework, Best Practices for Enhancing Emergency and Disaster Preparedness and Restoration*, CTIA, <https://www.ctia.org/the-wireless-industry/industry-commitments/wireless-network-resiliency-cooperative-framework> (last visited Feb. 21, 2020) (“Framework Best Practices”).

¹⁸ See Wireless Resiliency Cooperative Framework at 2.

¹⁹ The Working Group notes that an “Emergency Communications Center” or “ECC” is a facility with capabilities that include intelligence collection and monitoring, 9-1-1 multimedia traffic processing, full scale dispatch, and incident command capabilities. The rules and regulations of the FCC often use the term “Public Safety Answering Point” or “PSAP.” The literal language of the term “Public Safety Answering Point” has become outdated in a broadband environment, as 9-1-1 centers are increasingly and appropriately being called ECCs. The term Emergency Communications Center is indicative of the increased workload that a Public Safety Telecommunicator (“PST”) faces as the 9-1-1 industry increasingly receives and processes more information.

4.2 Planning Phase Recommendations

The Working Group makes the following recommendations for planning phase development:

PLAN 1 - Relationship Building and Maintaining Formal Relationships: Industry and government stakeholders should foster opportunities for ongoing relationship building activities between key personnel from all interested stakeholders, including informing public and private entities on disaster preparedness practices.

Building and maintaining formal relationships across stakeholders is needed at all levels (from planning to implementation). This includes Dig Once programs and broader participation in Call Before You Dig programs, including government participation. Other activities may include joint meetings between stakeholders to share preparatory and response activities and to review after-action reports. These activities should engage industry stakeholders with DHS and sector specific agencies to further enhance collaboration. Industry stakeholders and state emergency management agencies should also participate in annual emergency planning review.

Industry stakeholders should provide education to state emergency management agency personnel on power and communications services during a disaster. Where appropriate, state emergency management personnel should share these educational opportunities and materials with additional relevant government stakeholders.

PLAN 2 - Deployment of Resilient Broadband Infrastructure: Communications stakeholders should continue to develop and invest in resilient infrastructure and the tools needed to support communications throughout planning, response, and recovery activities.

One aspect is the development of new and enhanced standards for constructing resilient broadband infrastructure as technologies continue to evolve over time. Government stakeholders should review infrastructure permitting and pole attachment regulations to facilitate the deployment of resilient broadband infrastructure. Pole owner representatives should review existing processes for pole attachments. Wireless providers are encouraged to develop agreements with other providers to enhance wireless resiliency during an emergency.

PLAN 3 - Information Sharing: Industry and government stakeholders should continuously evaluate whether the existing venues and processes for collecting and sharing information (e.g., the Cybersecurity and Infrastructure Security Agency's ("CISA") National Coordinating Center ("NCC") for Communications, state level EOCs, and the Disaster Information Reporting System ("DIRS")) are sufficient or should be adapted to meet the needs of the various stakeholder groups, while protecting the public's interest in protecting the security of communications infrastructure from bad actors. Information sharing processes should be continually developed for sharing of situational awareness among interested stakeholders, including communications providers, power companies, public safety officials, and federal, state, and municipal government stakeholders.

PLAN 4 - Development and Refinement of Response Plans: Industry and government stakeholders should continue to develop and refine joint response plans that clearly define roles for communications stakeholders, power stakeholders, and public safety and governmental entities during and after an emergency or disaster event. Identifying existing materials and providing education to all levels and stakeholders, including the public, should be prioritized.

PLAN 5 - Government Approval Processes: Industry and government stakeholders should continue to develop and utilize governmental processes to facilitate preparatory activities in advance of emergency or

disaster events, including expedited permitting processes for the transport of fuel, generator operations, communications and construction supplies, and temporary housing and workforces. Such processes should also include procedures for obtaining event-specific, time-limited waivers and physical access to infrastructure.

Government stakeholders should review ordinances and rules from various government levels for conflicts and work with industry stakeholders and others for resolutions. More network deployment leads to more redundancy and resiliency. Government stakeholders should work with industry to review environmental ordinances—e.g., noise and diesel fuel run-time limitations—that may impact network resiliency.

PLAN 6 - Commercial Power Supply: The Commission should work with appropriate regulatory bodies and power stakeholders to facilitate policies that result in the delivery of safe and reliable communications and electricity supply, where applicable. Vegetation management to create clearance space, as well as network modernization, densification, and maintenance are critical for a highly reliable and resilient society.

In the event of any planned or preemptive power shutoff, such as a coastal area expected to flood, it is critical that advanced and accurate notice be given by responsible power representatives to communications and government stakeholders. Power stakeholders should communicate with communications and government stakeholders as far in advance as possible to allow for appropriate planning and response. This is vital to help prevent communications outages for customers, government representatives, and first responders who might be affected by power outages. In addition, such power outages should be a last resort and limited in geographic scope to the greatest degree possible and to the minimum duration reasonably necessary.

5 Response Phase

5.1 Ongoing Activities

The following section highlights key actions that are often taken by industry and government stakeholders to maintain network infrastructure, minimize the downtime of broadband networks, and support affected communities during the response to a disaster. Accordingly, the Working Group recommends the following steps as best practices for industry and government stakeholders during the response phase of an emergency or disaster.

5.1.1 Network Monitoring and Site-Based Inspection and Repair

In response to an emergency or disaster event, industry stakeholders should enhance network monitoring and site-based inspection and repair when safe to do so and depending on the circumstances of the event to maintain services and minimize the scope or duration of the impact to broadband communications services.

During an emergency or disaster event, industry stakeholders engage in enhanced network monitoring and site-based inspection and repair when deemed safe to do so. For example, communications stakeholders continually monitor the status of their networks, including during an emergency or disaster, by utilizing a variety of equipment, techniques, specialized work groups, and experts. In addition, communications stakeholders may inspect and repair towers and other network facilities during an emergency or disaster—if safe to do so, and depending on the circumstances of the event—by taking steps such as:

- Identifying potentially affected infrastructure while taking into account reliability considerations relating to backhaul (e.g., fiber and wireless point-to-point);
- Inspecting (including through the use of technologies such as drones) communications towers and other antennas, wired infrastructure, refueling depots used by restoration teams to refuel, and roadways necessary for crews to access affected areas;

- Making repairs to affected communications network infrastructure and supporting third party backhaul providers in repair efforts; and
- Communicating and coordinating with power companies regarding power restoration, street tree clearing, downed wires, mutual-aid line and tree trimming crews, debris removal and road opening crews, especially concerning safety, access, and fiber backhaul cables.

5.1.2 Pre-Positioning Network Resources and Personnel

In response to an emergency or disaster event, industry and government stakeholders should pre-position network equipment and restoration teams in response to evolving circumstances in an impacted area.

Industry and government stakeholders require the flexibility to take a tailored approach to pre-positioning based on the possible scope of a disaster or emergency event. These activities are incident specific and dependent on an assessment that such action will mitigate potential harm to personnel and equipment in the immediate area of a disaster. For example, some disasters may call for pre-positioning deployables (e.g., generators, fuel tanks, COWs, COLTs, Flying COWs, aerals, mobile equipment repair centers), while others may not, such as where site capacity can be activated or reconfigured remotely.

Pre-positioning locations will depend on several factors including the nature and predictability of the incident (e.g., hurricane, wildfire, power shutdown) and often at a regional rather than highly localized level to prevent damage to the assets and flexibility to deploy them where needed. When possible, pre-positioning should occur at the predetermined locations as decided by government and communications stakeholders prior to the disaster or emergency event.

5.1.3 Deployment of Pre-Positioned Resources and Implementation of Preparedness Plans

In response to an emergency or disaster event, industry stakeholders should deploy pre-positioned network equipment and restoration personnel—where safe to do so—at certain critical locations (e.g., ECCs, EOCs, hospitals, shelters).

In certain instances, as determined by industry stakeholders, pre-positioned network equipment and restoration personnel are deployed in response to an emergency or disaster. Every disaster or emergency is unique and may impact stakeholders differently, and as such, it is critical to allow stakeholders flexibility in arranging resources and crafting recovery solutions. For example, communications stakeholder restoration teams may deploy generators, COWs, COLTs, Flying COWs, aerals, and fuel tanks, as deemed necessary in developing disaster remediation solutions. These incident specific activities account for potential loss of fiber or microwave backhaul (i.e., potentially providing mobile satellite links, temporary microwave or aerial broadband solutions, and support for the efforts of third-party fiber backhaul providers). Communications stakeholders perform these activities by utilizing previously identified and prepared staging and pre-staging areas.

5.1.4 Support for Restoration Teams on the Front Lines

During an emergency or disaster, industry and government stakeholders should support restoration teams on the front lines by providing necessary materials and services.

During an emergency or disaster event, industry and government stakeholders prioritize making fuel, physical access, security, and power available in support of restoration teams on the front lines and consult checklists developed prior to the event. For example, industry stakeholder's support for restoration teams during and after an emergency or disaster event often includes maintaining and deploying temporary heated/cooled housing shelters and sleeping accommodations, and providing food, laundry, medical, and other aid.

Support of front line personnel also includes vehicle support such as dedicated refueling, supply of compressed natural gas, hydrogen, gasoline, diesel, or electric recharging in remote or impaired theaters. Vehicle mechanical maintenance, such as tire changes for damage from debris strewn roads, high dust, flooded, or other harsh environments must be considered. In many cases, these efforts can directly or indirectly support first responders and other state and local emergency management efforts.

5.1.5 Support for Communities Affected by Emergencies and Disasters

Where feasible, industry and government stakeholders should provide materials or expertise that they may have unique access to that would be helpful to communities affected by disaster and emergency events.

During an emergency or disaster event, industry and government stakeholders consider implementing procedures and mobilizing materials that the entity may be able to provide in support of affected communities. For example, in past affected areas, industry stakeholders have provided support to communities and consumers affected by disaster and emergency events.

When feasible, this support has included:

- Deploying charging stations;
- Providing Wi-Fi connectivity;
- Providing LTE connectivity, satellite, and aerial broadband solutions;
- Deploying replacement phones and chargers for consumers who have lost or damaged their devices and device charging support;
- Providing refueling support and loaning generators and other recovery equipment to critical facilities like hospitals, ECCs, police departments, fire departments, airports, and emergency shelters; and
- Prioritizing service continuity and expeditious restoration activities that benefit critical community facilities like hospitals, ECCs, police departments, fire departments, airports, emergency shelters, and evacuation routes.

Industry stakeholders have also provided resources that they have access to, even if it is something that is not common to that organization (e.g., food, water, batteries, flashlights, blankets). In addition, industry stakeholders have started media campaigns in the disaster area during a disaster to inform the public about:

- Preparing for the storm with information provided by the DHS and local authorities;
- Recovery planning and long-term resiliency plans; and
- Coordination with other stakeholders, including first responders (e.g., police, fire, EMS, and emergency communications personnel), emergency management agencies, and essential service providers (e.g., communications, electric power, natural gas, and water).

5.1.6 Provisioning of Roaming Under Disaster Arrangements

In response to an emergency or disaster event, industry stakeholders should engage in the reasonable provisioning of roaming under pre-arranged and location-specific disaster arrangements.

Various sub-sectors of the communications industry (e.g., wireline, wireless, cable, satellite, and broadcast) have mutual aid and cooperative agreement regimes. One example from the mobile wireless industry is the Wireless Resiliency Cooperative Framework. Signatories to the Wireless Resiliency Cooperative Framework committed to working with other wireless carriers to implement reasonable roaming arrangements for the duration of an event if existing roaming arrangements and call processing methods do not already achieve

it.²⁰ These arrangements for roaming often begin during a disaster. Recognizing the public policy benefit (and underlying moral hazard²¹) of ensuring that service providers diligently invest in the resiliency of their own networks, such roaming arrangements are triggered when the Federal Emergency Management Agency (“FEMA”) activates “Emergency Support Function #2 – Communications” for a given emergency or disaster and the FCC/DHS activate DIRS, where: (i) a requesting communications provider’s network has become inoperable and the requesting provider has taken all appropriate steps to attempt to restore its own network, and (ii) the home provider has determined that roaming is technically feasible and will not adversely affect service to the home provider’s own subscribers.²²

In addition, communications stakeholders have existing private roaming agreements in place that are available and in use to support a roaming provider’s customers on a host provider’s network during normal daily operations. These are often utilized during emergencies and disasters.

5.1.7 Fostering Reasonable Mutual Aid

In response to an emergency or disaster event, industry stakeholders should prepare and plan to foster reasonable mutual aid.

Signatories to the Wireless Resiliency Cooperative Framework also committed to foster reasonable mutual aid to one another during and in the aftermath of an emergency or disaster.²³ As with roaming, there is a recognized “moral hazard” that unqualified access to other provider’s restoration resources or network can create. Accordingly, the two-prong criteria noted above regarding roaming are applicable in the case of mutual aid: (i) did the provider reasonably invest/prepare and have they exhausted other options, and (ii) can the donor provider support the receiving provider without adverse impact on its own customers.

In addition to the mutual aid fostered under the Wireless Resiliency Cooperative Framework noted above, communications stakeholders have:

- Worked with technologies such as aerial broadband solutions to share frequencies and provide coverage to disaster areas like Puerto Rico after Hurricane Maria;
- Employed aerials as a wireless transmission platform (e.g., high-altitude platforms and tethered drones); and
- Worked with and supported restoration efforts of wireline communications providers to help maintain and restore backhaul connectivity.

5.1.8 Engagement at Emergency Operations Centers

During emergency or disaster events, industry and government stakeholders should engage at state EOCs to enhance coordination and rapid response activities.

In responding to disaster and emergency events, relevant stakeholders, including government, communications, and power representatives, may engage with state EOCs to take several steps, including:

- Designation of communications, government, and power representatives to serve as virtual or in person liaisons to EOCs;

²⁰ See Wireless Resiliency Cooperative Framework at 2.

²¹ Moral hazard is defined as the likelihood of investors to take greater risks because of the knowledge that losses incurred as a result of those risks will be covered by another. See *Moral Hazard*, Merriam-Webster, <https://www.merriam-webster.com/dictionary/moral%20hazard> (last visited Feb. 24, 2020) (“Merriam-Webster”).

²² See Wireless Resiliency Cooperative Framework at 2.

²³ *Id.* at 3.

- Executing, where possible, response plans previously developed during “blue skies” exercises;
- Information sharing regarding the status of ongoing disaster;
- Engaging with local governments, military disaster response units, and across sectors to plan and begin the “make safe” process that is prerequisite to the debris removal process, especially near active communications infrastructure, once it is safe to do so;
- Providing temporary waivers for disaster recovery such as extended operation of diesel generators or operation of mutual aid generators from out of region; and
- Engaging with power company personnel to coordinate restoration of services and support electric mutual aid line and tree clearing crews’ communications needs.

Industry stakeholder EOC participation varies based on the individual circumstances of each emergency or disaster event. For highly localized events, communications stakeholders may also engage with a limited number of local EOCs to enhance coordination and rapid response activities. In general, and especially for larger events, local EOCs may liaison with their state EOC to conserve resources and expedite and coordinate information sharing and restoration.

5.1.9 Expediting Service Restoration Activities

During an emergency or disaster event, communications providers should seek waivers from government stakeholders and coordinate on progress reports with power and pole owner representatives to expedite service restoration activities. Government, power, and pole owner representatives should facilitate the expeditious review of such requests.

While government waivers and other coordination efforts are often sought prior to a disaster, evolving circumstances in an affected area may require communications providers to extend or apply for initial government waivers and request coordination with power stakeholders during an emergency or disaster.

Necessary waivers and coordination efforts that may be sought by communications providers during a disaster include:

- Municipal and state waivers from regulatory permitting processes for emergency reconstruction of the prior infrastructure (temporary infrastructure should be limited to what is required to restore the service and be reviewed at the end of the emergency);
- Protocols between power, pole owner, and communications stakeholders that describe progress report intervals for disaster response and recovery regarding electric restoration;
- FCC waivers for experimental technology use if necessary, to operate specialized response and recovery equipment;
- Access credentials or letters to be in an area during curfew or restricted areas for communications restoration, logistical support, and refueling of generators;
- Operational waiver letters to legally store and haul fuel for the response vehicles and generators, deploy and operate generators temporarily until commercial power is restored to the area, and bring trucks and equipment to an area on a temporary basis;
- Overflight permissions for aerial broadband systems and for the inspection of critical infrastructure assets; and
- Emission and/or noise abatement waivers necessary for elongated operation of available generators and operation of marshaling yards to restore service.

5.1.10 Information Sharing

Industry and government stakeholders should participate in reasonable information sharing activities during an emergency or disaster event.

Signatories to the Wireless Resiliency Cooperative Framework report the total number of cell sites out of service on a county-by-county basis in those areas identified by FCC DIRS activation notices.²⁴ As such, signatories have voluntarily agreed to allow the FCC to compile aggregated data and report this data to the public. DIRS reporting may begin during a disaster after notice from the FCC.

In practice, communications and power stakeholders may also share situational awareness information with first responders and emergency management agencies in other venues including EOCs and the NCC. In some cases, information can be provided to consumers via online information, social media, and other communication methods. In particular, CISA's NCC helps to facilitate critical information sharing activities, including sharing of information relating to the status of power services in an affected area. Consumer information is routinely provided to consumers via online sources, social media, and other communication methods, typically starting in advance of known events, with preparatory information and, during recovery, information about the recovery progress and efforts.

5.2 Response Phase Recommendations

The Working Group makes the following recommendations for response phase development:

RESP 1 - Emergency Preparedness Plans: All industry and government stakeholders should implement emergency preparedness plans as early as possible during an emergency or disaster event. The timely implementation of emergency preparedness plans is critical to maintaining and minimizing any impact to broadband communications services during an emergency or disaster.

RESP 2 - Emergency Operations Center Coordination: EOCs should include representatives from communications and power stakeholders in meetings and discussions related to service response and restoration activities to the extent possible. Robust participation in EOC coordination activities by all affected stakeholders is critical to ensuring timely maintenance and response activities.

RESP 3 - Information Sharing: Communications and power stakeholders should participate in relevant information sharing and analysis centers to improve information sharing and decision-making for response activities. Robust participation will result in the sharing of information about key facilities and outage areas that need priority electric and communications support including the locations of hospitals, ECCs, police and fire departments, municipal EOCs, and shelters.

During a disaster, all affected stakeholders should engage with CISA in coordination with the states, EOCs, and other key infrastructure. Utilization of CISA's NCC as a central point of contact for communications sector response activity information further streamlines communications by removing inefficiencies in stakeholder communication practices.

RESP 4 - Expediting Service Restoration Approval Processes: As noted above, industry stakeholders should utilize governmental and power stakeholder processes to facilitate response and restoration activities, including the deployment of temporary and replacement broadband technologies and access to pre-staging and affected areas by broadband provider personnel and their contractors.²⁵ In addition, local emergency

²⁴ See *id.*

²⁵ An example of a government process to facilitate communications response and restoration is FCC's Telecommunications Service Priority ("TSP") program that directs telecommunications service providers (e.g., wireline and wireless phone companies) to give preferential treatment to users enrolled in the program when they need to add new lines or have their lines restored following a disruption of service, regardless of the cause.

managers should be encouraged to work with state and federal partners to ensure that industry stakeholder access to damaged infrastructure is not impeded during a disaster.

During disaster response, such processes should include procedures for obtaining waivers or approvals to sites. For example, formal government documents, such as letters, often help facilitate temporary housing, damage assessments, electrical repair, restoration of existing and temporary communications infrastructure services, and transport of fuel, generators, and construction supplies. Government and power stakeholders should facilitate the expeditious review of such requests.

RESP 5 - Aerial Imagery: Often local, state, and federal officials will deploy aircraft and drones for aerial reconnaissance to determine how and where to deploy resources for rescue and recovery. It is important to have procedures and policies in place to allow communications and power stakeholders to gather aerial imagery to assess damage to equipment as fast as possible. Industry and government stakeholders should collaborate on how to share aerial response and recovery imagery in an expedited manner.

6 Recovery Phase

6.1 Ongoing Activities

The following section highlights key actions that are often taken by industry and government stakeholders to more quickly restore broadband service and to support affected communities during emergency and disaster recovery. Accordingly, the Working Group recommends the following steps as best practices for industry and government stakeholders during the recovery phase of an emergency or disaster.

6.1.1 Network Monitoring and Site-Based Inspection and Repair

Following an emergency or disaster event, industry stakeholders should enhance network monitoring and site-based inspection and repair when safe to do so and depending on the circumstances of the event to maintain services and minimize the scope or duration of the impact to broadband communications services.

Following an emergency or disaster event, industry stakeholders engage in enhanced network monitoring and site-based inspection and repair when deemed safe to do so. For example, communications stakeholders continually monitor the status of their networks, including in the critical hours and days following a disaster, by utilizing a variety of equipment, techniques, specialized work groups, and experts. In addition, communications stakeholders may inspect and repair towers and other network facilities following an emergency or disaster—when safe to do so, and depending on the circumstances of the event—by taking steps such as:

- Identifying potentially affected infrastructure while taking into account reliability considerations relating to backhaul (e.g., fiber and wireless point-to-point);
- Inspecting (including through the use of technologies such as drones) communications towers and other antennas, wired infrastructure, refueling depots used by restoration teams, and roadways necessary for crews to access affected areas;
- Making repairs to affected communications network infrastructure and supporting third-party backhaul providers in their repair efforts; and
- Communicating and coordinating with power companies regarding power restoration, street tree clearing, downed wires, mutual-aid line and tree trimming crews, debris removal and road opening crews, especially concerning safety, access, and fiber backhaul cables.

6.1.2 Deployment of Pre-Positioned Resources and Implementation of Preparedness Plans

During the recovery phase of an emergency or disaster, industry and government stakeholders should optimize the deployment of prepositioned equipment and personnel and evaluate the necessity for calling in additional network resources as the impact of the event becomes clear.

When safe to do so, industry stakeholders deploy pre-positioned network equipment and restoration personnel beginning during a disaster or emergency and this work continues in the aftermath of the event. Every disaster or emergency is unique and may impact stakeholders differently, and as such, it is critical to allow stakeholders flexibility in arranging resources and crafting recovery solutions. For example, communications stakeholder restoration teams may deploy generators, COWs, COLTs, Flying COWs, aerials, and fuel tanks, as deemed necessary in developing disaster remediation solutions. These incident specific activities account for potential loss of fiber or microwave backhaul (e.g., potentially providing mobile satellite links, temporary microwave or aerial broadband solutions, and support for the efforts of third-party fiber backhaul providers).

6.1.3 Support for Restoration Teams on the Front Lines

Following an emergency or disaster, industry and government stakeholders should support restoration teams on the front lines by providing necessary materials and services.

Following an emergency or disaster event, industry and government stakeholders prioritize making fuel, physical access, security, and power available in support of restoration teams on the front lines and consult checklists developed prior to the event. For example, industry stakeholder's support for restoration teams during and after an emergency or disaster event often includes maintaining and deploying temporary heated/cooled housing shelters and sleeping accommodations, and providing meals, laundry, medical, and other aid.

Support of front line personnel also includes vehicle support such as dedicated refueling, supply of compressed natural gas, hydrogen, gasoline, diesel, or electric recharging in remote or impaired theaters. Vehicle mechanical maintenance, such as tire changes for damage from debris strewn roads, high dust, flooded, or other harsh environments must be considered. In many cases, these efforts can directly or indirectly support first responders and other state and local emergency management efforts.

6.1.4 Support for Communities Affected by Emergencies and Disasters

Where feasible, industry and government stakeholders should provide materials or expertise that they may have unique access to that would be helpful to communities affected by disaster and emergency events.

Following an emergency or disaster event, industry and government stakeholders consider implementing procedures and mobilizing materials that the entity may be able to provide in support of affected communities. For example, in past affected areas, industry stakeholders have provided support to communities and consumers affected by disaster and emergency events, and these efforts have continued in the aftermath of a disaster.

When feasible, this support has included:

- Deploying charging stations;
- Providing Wi-Fi connectivity;
- Providing LTE connectivity, satellite, and aerial broadband solutions;
- Deploying replacement phones and chargers for consumers who have lost or damaged their devices and device charging support;
- Providing refueling support and loaning generators and other recovery equipment to critical facilities like hospitals, ECCs, police departments, fire departments, airports, and emergency shelters; and

- Prioritizing service continuity and expeditious restoration activities that benefit critical community facilities like hospitals, ECCs, police departments, fire departments, airports, emergency shelters, and evacuation routes.

Industry stakeholders have also provided resources that they have access to, even if it is something that is not common to that organization (e.g., food, water, batteries, flashlights, blankets). In addition, industry stakeholders have started media campaigns in the disaster area following a disaster to inform the public about:

- Preparing for the storm with information provided by the DHS and local authorities;
- Recovery planning and long-term resiliency plans; and
- Coordination with other stakeholders, including first responders (e.g., police, fire, EMS, and emergency communications personnel), emergency management agencies, and essential service providers (e.g., communications, electric power, natural gas, and water).

6.1.5 Fostering Reasonable Mutual Aid

Following an emergency or disaster event, industry stakeholders should prepare and plan to foster reasonable mutual aid.

Various sub-sectors of the communications industry (e.g., wireline, wireless, cable, satellite, and broadcast) have mutual aid and cooperative agreement regimes. One example from the mobile wireless industry is the Wireless Resiliency Cooperative Framework. Signatories to the Wireless Resiliency Cooperative Framework committed to foster reasonable mutual aid to one another during and in the aftermath of an emergency or disaster.²⁶ There is a recognized “moral hazard” that unqualified access to other provider’s restoration resources or network can create a disincentive for a provider to prepare a robust prevention, mitigation, and recovery capability, if it can instead rely on other providers who did make such investment.²⁷ Accordingly, the two-prong criteria from the Wireless Cooperative Resiliency Framework noted in Section 5 regarding roaming are applicable in the case of mutual aid: (i) did the provider reasonably invest/prepare and have they exhausted other options, and (ii) can the donor provider support the receiving provider without adverse impact on its own customers.

In addition to the mutual aid fostered under the Wireless Resiliency Cooperative Framework, communications stakeholders have:

- Worked with technologies such as aerial broadband solutions to share frequencies and provide coverage to disaster areas like Puerto Rico after Hurricane Maria;
- Employed aerials as a wireless transmission platform (e.g., high-altitude platforms and tethered drones); and
- Worked with and supported restoration efforts of wireline communications providers to help maintain and restore backhaul connectivity.

6.1.6 Engagement at Emergency Operations Centers

Industry and government stakeholders should engage at state EOCs in the aftermath of an emergency or disaster to enhance coordination and rapid response activities.

In recovering from emergency and disaster events, relevant stakeholders, including government, communications, and power representatives, may engage with state EOCs to take several steps, including:

²⁶ See Wireless Resiliency Cooperative Framework at 3.

²⁷ See Merriam-Webster.

- Designation of communications, government, and power representatives to serve as virtual or in person liaisons to EOCs;
- Executing, where possible, response plans previously developed during “blue skies” exercises;
- Information sharing regarding the status of ongoing disaster;
- Engaging with local governments, military disaster response units, and across sectors to plan and begin the “make safe” process that is prerequisite to the debris removal process, especially near active communications infrastructure, once it is safe to do so;
- Providing temporary waivers for disaster recovery such as extended operation of diesel generators or operation of mutual aid generators from out of region; and
- Engaging with power company personnel to coordinate restoration of services and support electric mutual aid line and tree clearing crews’ communications needs.

Industry stakeholder EOC participation varies based on the individual circumstances of each emergency or disaster event. For highly localized events, communications stakeholders may also engage with a limited number of local EOCs to enhance coordination and rapid response activities. In general, and especially for larger events, local EOCs liaison with their state EOC to conserve resources and expedite information sharing and restoration.

6.1.7 Expediting Service Restoration Activities

Following an emergency or disaster event, communications providers should seek waivers from government stakeholders and coordinate on progress reports with power and pole owner representatives to expedite service restoration activities. Government, power, and pole owner representatives should facilitate the expeditious review of such requests.

While government waivers and other coordination efforts are often sought prior to a disaster, evolving circumstances in an affected area may require communications providers to extend or apply for initial government waivers and request coordination with power stakeholders after an emergency or disaster.

Necessary waivers and coordination efforts that may be sought by communications providers after a disaster include:

- Municipal and state waivers from regulatory permitting processes for emergency reconstruction of the prior infrastructure (temporary infrastructure should be limited to what is required to restore the service and be reviewed at the end of the emergency);
- Protocols between power, pole owner, and communications stakeholders that describe progress report intervals for disaster response and recovery regarding electric restoration;
- FCC waivers for experimental technology use if necessary to operate specialized response and recovery equipment;
- Access credentials or letters to be in an area during curfew or restricted areas for communications restoration, logistical support, and refueling of generators;
- Operational waiver letters to legally store and haul fuel for the response vehicles and generators, deploy and operate generators temporarily until commercial power is restored to the area, and bring trucks and equipment to an area on a temporary basis;
- Overflight permissions for aerial broadband systems and for the inspection of critical infrastructure assets; and
- Emission and/or noise abatement waivers necessary for elongated operation of available generators and operation of marshaling yards to restore service.

6.1.8 Information Sharing

Industry and government stakeholders should participate in reasonable information sharing activities following an emergency or disaster event.

Signatories to the Wireless Resiliency Cooperative Framework report the total number of cell sites out of service on a county-by-county basis in those areas identified by FCC DIRS activation notices.²⁸ As such, signatories have voluntarily agreed to allow the FCC to compile aggregated data and report this data to the public. DIRS reporting may continue after a disaster or emergency event.

In practice, communications and power stakeholders may also share situational awareness information with first responders and emergency management agencies in other venues including EOCs and the NCC. In some cases, information can be provided to consumers via online information, social media, and other communication methods. In particular, CISA's NCC helps to facilitate critical information sharing activities, including sharing of information relating to the status of power services in an affected area. Consumer information is routinely provided to consumers via online sources, social media, and other communication methods, typically starting in advance of known events, with preparatory information and, during recovery, information about the recovery progress and efforts.

6.2 Recovery Phase Recommendations

The Working Group makes the following recommendations for recovery phase development:

RCOV 1 - After-Action Assessments: After-action assessments are an important component of promoting broadband infrastructure resiliency. There is no substitute for real-world experience, which cannot be fully simulated in drills and exercises. Interested stakeholders should conduct individual, joint, and/or sector specific after-action reviews to help improve resiliency practices and policies, learn from event experience, and improve plans for future events. After-action assessments should be considered by stakeholders and implemented into emergency preparedness plans where appropriate. Any recommendations from after-action assessments should be considered by the relevant committees and stakeholders for implementation into future plans, trainings, and procedures.

RCOV 2 - Expediting Service Restoration Approval Processes: Following a disaster, industry stakeholders should continue to utilize governmental and power stakeholder processes to facilitate service restoration activities, including the deployment of temporary and replacement broadband technologies and access to pre-staging and affected areas by communications stakeholder provider-personnel and their contractors. Like during disaster response, such processes for disaster recovery should include procedures for obtaining waivers or progress reports on electric restoration, as necessary.

RCOV 3 - Information Sharing: Continuing after a disaster, communications and power stakeholders should participate in relevant sector coordination councils to improve information sharing and decision-making. Robust participation will result in the sharing of information about key facilities and outage areas that need priority electric and communications support including the locations of hospitals, ECCs, police and fire departments, municipal EOCs, and shelters.

RCOV 4 - Debris Removal: As debris removal services are activated, it is important that there is coordination and sharing of information between industry and government stakeholders regarding observance of markers for underground communications lines, preservation of infrastructure during debris removal, and cutting and clearing of obstructions to key facilities.

²⁸ See Wireless Resiliency Cooperative Framework at 3.

7 Conclusion

The Working Group supports efforts by the Commission to identify best practices and recommendations for enhancing the resiliency of communications networks and to promote further coordination between stakeholders in times of disaster planning, response, and recovery. In support of these efforts, the members of the Working Group have conducted regular meetings and gathered information from many different sources. As a result, the Working Group provides the best practices and recommendations listed above.

Efforts to advance network resiliency and disaster response are complex and represent an ongoing collaboration between government and industry stakeholders. Communications network services are provided over a large and diverse set of infrastructure that traverses many different types of terrains over thousands of miles. These services are subject to physical disruption like all other critical infrastructure during any emergency or disaster. To combat the realities of physical infrastructure, communications stakeholders invest extensively in network resiliency and restoration capabilities to be used during and following an emergency or disaster. This report pulls together recommendations and best practices in a manner that can apply to a wide variety of disasters that affect the physical infrastructure of broadband providers. The Working Group recognizes that many of these best practices have been implemented by various entities and we commend their efforts and encourage wider adoption. This report is broad and was intended to be relevant to a large group of stakeholders and disasters. This approach keeps plans flexible given the dynamic nature of responding to such events. There is not a one-size-fits-all approach to disaster response and recovery, and this report does not detail practices or recommendations as such. The planning, response, and recovery efforts taken on by each stakeholder will be just as unique as the event and entities involved. The core of all of the provided recommendations is the development of positive relationships between entities. There is no time like the present to strengthen relationships and prepare for the future.

We hope the discussions that occurred during the course of this Working Group can be used as a springboard to continue the dialogue between industry, government, and other stakeholders as we look towards the future of communications and power infrastructure and in maintaining a connected society. Accordingly, it is the further recommendation of the Working Group that efforts to survey stakeholder practices and potential improvements be continued and revisited following future emergency and disaster events in order to better prepare and improve the resiliency of communications networks across the nation.

Appendix A

Disaster Response and Recovery Working Group Members

** indicates a member of the Broadband Deployment Advisory Committee
Alternate members of the Working Group are also provided below.*

Chair:

Red Grasso, First Responder Emerging Technologies Program Director
North Carolina Department of Information Technology

Vice-Chair:

Jonathan Adelstein, President & Chief Executive Officer*
Alternate: Kayla Gardner, Senior Manager of Government Affairs
Wireless Infrastructure Association

Members:

Andrew Afflerbach, Chief Executive Officer and Director of Engineering, CTC Technology and Energy
Alternate: Nancy Warner, General Counsel*
National Association of Telecommunications Officers and Advisors

Allen Bell, Distribution Support Manager, Georgia Power Company*
Southern Company

Megan Bixler, Technical Program Manager
Association of Public Safety Communications Officials (APCO)

Rob Cantu, Director, Cybersecurity
Alternate: Matthew Gerst, Vice President, Regulatory Affairs
Alternate: Ariel Diamond, Associate, DLA Piper
CTIA

Skyler Ditchfield, Chief Executive Officer*
Alternate: Melissa Slawson, General Counsel, Vice President of Government Affairs and Education
GeoLinks

Tony Fischer, Director, Information Technology
City of Germantown, Tennessee

Monica Gambino, Vice President, Legal
Crown Castle

Larry Hanson, Executive Director*
Georgia Municipal Association

David Hartshorn, Chief Executive Officer
Geeks Without Frontiers

Greg Hauser, Communications Branch Manager/Statewide Interoperability Coordinator,
North Carolina Emergency Management Division
National Emergency Management Association

Kurt Jacobs, Corporate Director, Emerging Technology & Solutions
JMA Wireless

Julie Kearney, Head of Regulatory Affairs*
Alternate: Jameson Dempsey, Government Affairs Counsel
Loon LLC

Richard "Kent" Kildow, Director of Business Continuity & Emergency Management
Verizon

Frank Korinek, Director of Government Affairs
Motorola Solutions

Wyatt Leehy, Information Technology Manager
Great Plains Communications

Jim Matheson, Chief Executive Officer*
Alternate: Brian O'Hara, Director, Regulatory Affairs
Alternate: Martha Duggan, Senior Principal, Regulatory Affairs
National Rural Electric Cooperative Association

Kelly McGriff, Vice President & Deputy General Counsel*
Uniti Group

Alexandra Fernandez Navarro, Commissioner
Puerto Rico Public Service Regulatory Board

Chris Nurse, Assistant Vice President for State Legislative and Regulatory Affairs*
AT&T

John O'Connor, Director, National Coordinating Center for Communications
Department of Homeland Security

Eddie Reyes, Prince William County Emergency Communications Center
National Public Safety Telecommunications Council

Sanjay Saggere, Chief Information Officer
Confederated Tribes of the Colville Reservation

Rikin Thaker, Vice President, Telecommunications and Spectrum Policy*
Multicultural Media, Telecom and Internet Council

Pete Tomczak, Manager, Spectrum Coordination and Clearance
FirstNet

Rocky Vaz, Director of Emergency Management
City of Dallas, Texas

Joseph Viens, Senior Director of Government Affairs

Charter

Former Members:

Patrick Donovan, Senior Director, Regulatory Affairs
CTIA

David Marshack, Telecommunications Regulatory Lead
Loon LLC

Wendy Moser, Commissioner, Colorado Public Utilities Commission
National Association of Regulatory Utility Commissioners

Appendix B

Disaster Response and Recovery Working Group Charges

The following charges were provided to the Disaster Response and Recovery Working Group by the Federal Communications Commission:

- A. Taking into account different types/sizes of broadband providers, develop recommendations on measures that can be taken before a disaster to improve resiliency of broadband infrastructure by:
 - Identifying processes and procedures that can be adopted at all levels of government to encourage deployment of broadband infrastructure that is resilient in the face of disasters;
 - Identifying existing design and deployment standards broadband providers can use to make broadband networks more resilient in the face of disasters;
 - Identifying best practices for governments and private industry in preparing for the impact of disasters on broadband networks;
 - Enhancing the ability of broadband networks and service providers to provide mutual aid during and after a disaster to help ensure that broadband infrastructure benefits from a more effective disaster response and a shorter recovery period; and
 - Identifying new data and improving current data gathering on broadband networks to improve emergency response.

- B. Taking into account different types/sizes of broadband providers, develop recommendations focused on minimizing the downtime of broadband networks during disaster response by:
 - Improving processes and procedures at all levels of government to expedite access to broadband infrastructure sites, including credentialing, necessary to restore broadband services;
 - Identifying relevant information with respect to broadband networks and services during the disaster response period and best practices for sharing relevant information by and among relevant stakeholders, including federal, state, and local governments; and
 - Improving procedures to encourage mutual aid and coordination among broadband providers, federal, state, and local governments, and utilities.

- C. Taking into account different types/sizes of broadband providers, develop recommendations to restore broadband infrastructure during disaster recovery by:
 - Streamlining processes and procedures at all levels of government to eliminate barriers to efficient and effective rebuilding of broadband infrastructure and restoration of service;
 - Identifying relevant information with respect to broadband networks and services during the disaster recovery period and best practices for sharing relevant information by and among relevant stakeholders, including federal, state, and local governments;
 - Improving procedures to encourage mutual aid and coordination among broadband providers, federal, state, and local governments, and utilities; and
 - Developing resiliency targets for rebuilding broadband networks (e.g., service levels, resiliency levels).

- D. Develop best practices for coordination among wireless providers, backhaul providers, and power companies during and after a disaster.