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OR Winter Storms AASR

February 2020

**State of Oregon
Winter Storms
Public Safety, Interoperable, and Broadband
Communications
After Action Supplemental Report**

This document was prepared for the State of Oregon by the DHS Cybersecurity and Infrastructure Security Agency (CISA), Interoperable Communications Technical Assistance Program (ICTAP) as part of Work Order # WO19-267. Additional information about the program can be found at <https://www.dhs.gov/safecom/ictapscip-resources>.

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EXECUTIVE SUMMARY

The Oregon Winter Storm took place during 23-26 February 2019. The Oregon OEM completed and published an overall After-Action Report in June 2019. This Supplemental After Action Report (SAAR) focuses solely on public safety, interoperable, and FirstNet/broadband communications. This primary focus of this SAAR is the impact on Lane, Douglas, and Coos Counties as well as to document and assess how well the various mission-critical communications systems performed during the storms period, highlight the communications systems/components that performed well (and any lessons learned), and develop recommendations that would improve the ability to provide for uninterrupted mission-critical communications.

Overview

In connection with and following a series of weather events that included Winter Storm Ryan (hereinafter referred to as the storms period), various communications systems experienced outages and performance issues. This SAAR attempts to identify the issues experienced and develop recommendations to minimize their impact in the future.

This SAAR was developed under the Department of Homeland Security (DHS) Cybersecurity and Infrastructure Security Agency (CISA) Interoperable Communications Technical Assistance Program (ICTAP). Significant assistance in its development was provided by Kristi Wilde, FirstNet Western Region Representative.

Information was solicited from seven (7) State of Oregon agencies/organizations, and a number of groups/units within some of those agencies/organizations.

Key Findings

In most instances, the recommendations in this SAAR were generated by the stakeholders who contributed directly or indirectly to this report. Affected departments, agencies and/or organizations should review the recommendations and then prioritize the most appropriate ones, generate action items to accomplish them, assign them to the most appropriate individuals and/or consulting firms providing for an appropriate amount for implementation.

Major recommendations include:

- Providing a consistent level of dependable backup power to all radio sites
- Conducting a full-scale communications exercise
- The timely activation of EOCs and conducting the proper operational planning during emergency conditions using NIMS templates
- To the extent deemed appropriate, the ODOT/OSP statewide radio system should be expanded vs. investing in interoperable communications systems at the county or municipal levels.

Conclusion

Overall, the response to the storm conditions and their aftermath during February 2019 were as good as could be expected under the difficult conditions and circumstances. We do believe, however, that the implementation of the recommendations included in this SAAR will provide a higher level of performance when the next significant challenge to mission critical emergency communications presents itself.

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1. INTRODUCTION

The mission of the Department of Homeland Security (DHS) Cybersecurity and Infrastructure Security Agency (CISA) Interoperable Communications Technical Assistance Program (ICTAP) is to unify and lead the nationwide effort to improve emergency communications capabilities across all levels of government. More information about CISA/ICTAP and other CISA work products related to interoperable communications can be found at <https://www.dhs.gov/safecom/ictapscip-resources>.

The State of Oregon Office of Emergency Management (OEM) generated and published an After Action Report (AAR) in June 2019 (see Appendix A, Documents Incorporated by Reference). A supplemental after action report (SAAR) was later requested with a focus on public safety, interoperable and broadband communications, with emphasis on Coos, Douglas and Lane counties.

1.1 Incident Overview

Incident Name

Oregon Winter Storms – February 2019

Incident (Storm) Dates

February 23-26, 2019

The following agencies or organizations represent the major stakeholders that were contacted to provide information, documentation and/or reports:

- Oregon OEM
- Oregon Forestry Department
- Oregon National Guard
- Oregon Public Utilities Commission
- Oregon Department of Transportation
 - Wireless Systems Group
 - Statewide Radio Systems Group
 - Land Mobile Radio (LMR) Group
 - County Radio Systems Group
- Oregon State Police
- FirstNet

2. INTRODUCTION AND STORM INFORMATION

2.1 Purpose

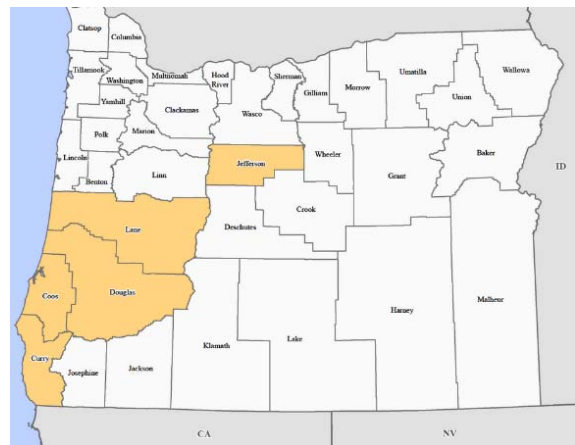
From February 23 to 26, 2019, the State of Oregon was impacted by Winter Storm Ryan. This severe winter event consisted of a series of severe winter storms in a short period of time. A combination of snow and rain resulted in the accumulation of up to thirty (30) inches of heavy, wet snow in some areas of the state.

A review of the National Weather Service and National Operational Hydrologic Remote Sensing Center provided the following information regarding the weather events in Oregon between February 23, 2019 and February 26, 2019:

- Beginning on February 23, 2019 rain and snow fell along a frontal boundary that stretched from the south-central Oregon coast to the northeastern part of Oregon.
- The heaviest snow fell east of the Cascades with six (6) to eighteen (18) inches of accumulation during the late afternoon of February 23, 2019.
- The heavy snow continued through February 26, 2019 in many locations across the state with Lane, Douglas, and Jefferson counties being the most severely impacted.
- The amount of heavy snow that accumulated in Lane County was close to twenty-two (22) inches. Douglas County received four (4) to twelve (12) inches of snow that laid on top of saturated soils. Overall, this was determined to be the biggest snow event since 1965.

Listed below are some of the more significant effects of the storms, primarily in Coos, Douglas and Lane Counties:

- Heavy snow caused trees and/or tree limbs to fall into spans of power lines and encased power lines with snow and ice causing:
 - Thousands of downed trees
 - Major power outages
 - Major transportation corridors were blocked, isolating numerous communities and stranding motorists and passengers on public transportation
 - Numerous mudslides and landslides were reported



- One power company reported that their entire customer base was without power due to downed transmission lines. Some customers were without power for up to six (6) days.
- AMTRAK train carrying one hundred eighty-three (183) passengers was disabled for thirty-six (36) hours after getting stuck on the tracks.

The precipitation described above, along with flooding, landslides and mudslides resulted in Presidential Disaster Declaration DR-4432.

According to the Oregon Office of Emergency Management (OEM), five (5) counties reported public damage that added up to thirty million dollars. The most severe damage impacted public utilities, roads, and culverts. The weather and resulting damage negatively impacted debris removal efforts and emergency protective measures. Heavy snow knocked down trees or tree limbs into spans of power lines and encased lines with snow and ice causing major power outages.

2.2 SAAR Development Process

The primary method of collection of information to generate this SAAR was determined to be development of a list of major communications-related stakeholders, development of specific questions and information/document requests from each, emails to each of the major stakeholders with those requests and then follow-up with those major stakeholders that did not respond. See Attachment 2, Agencies and Organizations Contacted, for a list of those that were contacted.

Unfortunately, various factors limited the number of responses we received. As such, the focus of our efforts to generate this SAAR were the following:

- Discussions with the Acting Statewide Interoperability Coordinator (SWIC)
- Review of media coverage of the winter storms and their impact
- Review of the AAR published by Oregon OEM
- Review of numerous storm-related emails, documents and situation reports
- Internet research related to the impact of the storms on communications
- Notes generated from the interviews conducted by the FirstNet Western Region representative (Kristi Wilde) with a number of senior-level public safety and communications managers from Coos and Lane Counties.

2.3 Information Sources

This SAAR is a compilation of information received from the different sources referenced above. In addition, there are two other components that were consulted in the preparation of this report:

1. **References.** Various documents have been incorporated by reference and have been listed at the end of this report. Where available, links have been provided to access the document directly.
2. **Infographic(s).** The underlying reason for development of this SAAR document was to provide information that could be included in one or more infographics of

the effects of the winter storms on public safety, interoperable and broadband communications. As such, those have been created from the information included in this SAAR and included as an attachment.

3. COMMUNICATIONS RELATED ISSUES & CONCERNS REPORTED

Throughout the information, emails and reports provided to us, we saw evidence of the impact the storm conditions and their aftermath had on communications. In some cases, these were directly related to the nature and extent of the storm conditions, while others identified areas where improvements are warranted.

Below are some of the more significant communications related issues reported in Coos, Douglas and Lane Counties. There has been no attempt to prioritize them.

Communication Modes - The regional winter storm event caused communications outages in cell/landline telephone, land mobile radio (LMR), broadband/cellular and FirstNet. Below is an outline of which communication modes are generally used by each type of stakeholder.

- **Public safety** relies on Verizon for routine communications throughout much of the state.
- **First responders** rely on LMR for response/incident related mission critical communications. There are a mix of statewide, county and local LMR systems on various frequency bands in use.
- **FirstNet** is hopeful to supplement or provide mission critical communication services in the future.

Overall Issues – It was reported that the storms impacted the operations of at least seven significant communications systems. That number excludes any federal agency systems where outage information was not available. It is also highly likely that many local agency radio systems were impacted but were not reported to or investigated at the state level.

As trees came down from the weight of the ice and snow, they blocked access roads and knocked down power lines, sometimes involving miles of cable. The loss of electrical power caused the initial system outages, which were followed by the failure of backup power equipment or systems. Numerous sites had generator failures, inadequate backup power and failed as their batteries and fuel were depleted.

- **Backup Power** – As stated above, backup power sources and access to the radio sites were the most challenging factors for public safety, interoperable and broadband/FirstNet communications during the storm period and its aftermath. For the LMR system operators and users, the greatest challenge was the inability to maintain back up power at the tower sites for the length of time required. This was most commonly a problem with generator fuel supply, battery power, and/or

ability to access the sites with additional fuel or resources. Virtually all radio sites were negatively impacted to some degree.

- **ODOT/OSP Statewide System Backup Power** (See Attachment 3 – Oregon Statewide Radio Final Project Report for more information on this system.)
 - The Oregon Department of Transportation (ODOT) and Oregon State Police (OSP) radio system (hereinafter referred to as the ODOT/OSP system) sites were designed to have forty-eight (48) hours of battery backup and ten to fourteen (10-14) days of generator power.
 - The generators have a monitoring network that reports on generator status and propane levels at the site. This enables propane to be ordered without having to visit the site to determine fuel levels.
 - None of those ODOT/OSP sites suffered outages although several were without commercial power for up to a week.
 - Difficulties occurred at the sites where backup power is provided by third parties. See Attachment 4, Backup Power Issues, for more information.
- **Backup Power for Other Communication Systems**
 - Some systems have little or no backup power supply.
 - At other sites, a common backup generator provides power to the multiple resources (i.e., to AT&T cellular and to an LMR system); however, generator maintenance and on-site fuel supply was unpredictable.
- A variety of landowners, often not involved in public safety or mission critical communications, maintain the radio sites. This was a complicating factor for those responsible for gaining access to towers, addressing power or other issues, and continuing to maintain these sites during the extended duration of the storm.
 - *Example:* The owner of the Coburg Hills site, used by both the UHF and VHF systems, removed the generator from the site and left a voicemail rather than ensuring that a 'live person' acknowledged receiving the message. Once known, a Search and Rescue (SAR) tracked vehicle was used to haul a generator up to the site. This generator required daily onsite monitoring and fueling to maintain continuous operations.

Communications Issues – While the foregoing were the overall issues experienced, some of the specific communications related issues and concerns have been included in this section, separated by county. ESF-2 reported that there were widespread communications outages reported in the affected area in both Lane and Douglas Counties. See Attachment 5, Situation Report Information, for details and more information.

For a detailed listing of storm related communications issues and concerns, especially in Lane County, see Attachment #6, List of Outages by Site.

- **Lane County** – The LMR systems that were available to Lane County during the storm period included the Lane Regional Interoperability Group (LRIG)

UHF P25 trunked system, VHF narrow banded fire service system and the Lane County SAR repeaters. The following communications related issues and problems were reported:

- As the storm period progressed, increased needs for welfare checks and search and rescue missions heightened the LMR radio traffic needs, especially in somewhat remote areas.
- Significant electrical power outages occurred, followed by significant issues with backup power and communication/antenna sites.
- There was difficulty accessing communication sites for refueling in most areas due to downed trees/power lines and the heavy snowfall amounts.
- Intermittent cell and landline service were experienced in most areas.
- There were staffing issues at emergency operations centers (EOCs) that were activated and staffed which impacted interagency coordination and communications. We understand that mutual aid requests were generated, but it was unclear if those requests were ever filled.
- Ham radio operators from the Amateur Radio Emergency Services (ARES) were dispatched to Elkton, Yoncalla and Drain (Lane County) to establish a communications link to Roseburg (Douglas County). It was unclear if that request was fulfilled.
- Pre-designated common channels on the trunked UHF and conventional VHF systems are used on a daily basis. This allowed for relatively seamless scaling up for the snowstorm event.
- Heavy reliance on SAR repeaters allowed communications between field staff and the Lane County Sheriff's Office (LCSO) Dispatch Center.
- **Douglas County**
 - The Cow Creek Band of Umpqua Tribe of Indians is located within Douglas County. An attempt was made to determine the impact, if any, the storms had on their communications; however, no response was received.
 - No requests for state assistance were generated.
 - At one point nearly 45,000 customers were without power. Power companies worked to restore power throughout the storm period and the days afterward but were hampered by the fact that inbound transmission lines were also knocked down and not yet repaired.
- **Coos County**
 - The issues in Coos County seemed to be more tied to ingress and egress along I-5, the major interstate route through the area.

- There was damage to roads and infrastructure, but no significant communications outages or issues were reported
- There was less impact along Highway 101, the highway that generally follows the coastline.

Situation Report & Other Information

Two situation reports (sit reps) were issued by OEM during the storms period. They were issued on February 26 and 27, 2019. See Attachment 5, Situation Report Information, for the most significant information items included in those sit reps. In addition, the following information is relevant to public safety and interoperable communications during the storms period.

- **Call Volume** – As would be expected, the affected 9-1-1 centers were inundated with requests for service related to the storm.
- **Support for Local PSAPs** – As is the normal procedure, regional 9-1-1 centers (Central Lane Communications, Douglas County 9-1-1, Coos County 9-1-1) used landline telephones to communicate with and between secondary PSAPs.
- **Strategic Technology Reserves** – We understand that none of the twelve (12) Oregon Department of Transportation (ODOT) Strategic Technology Reserves (STR) communications system mobile radio communications trailers were deployed. This may be due to a concern that the trailers were located too far away (La Grande) to be able to be utilized.
- **Southwest 7 Consolidated Communications System** –
 - The ODOT Wireless Communications Section reported that the Southwest 7 consolidated communications system is an outdated term for the Lane Regional Interoperability Group/Linn-Benton Regional Interoperability Group (LRIG/LBRIG) UHF/700 MHz P25 trunked radio system used on a daily basis.
 - The statewide ODOT/OSP radio system appeared to have performed as designed and the only areas where there were communication issues were those where backup power was the responsibility of third parties.
 - None of the other ODOT/OSP sites suffered outages although several were without commercial power for up to a week.
 - It suffered some minor performance degradation due to loss of one of the simulcast sites after the power went down but that was corrected the same day.
 - Similar to the ODOT/OSP system, it lost all communications in the McKenzie River area after the Eugene Water & Electric Board (EWEB) microwave failed which was restored after the generator was repaired.
 - Their actual system/facilities fared well through the storm and the aftermath with the only issue being power related.

- **EOC Activations** – The known activations were as follows:
 - State EOC – Activated on February 27, 2019 and remained at least partially activated until March 7, 2019
 - Douglas County – Virtual EOC activated – dates unknown
 - Lane County – EOC activated with liaison representatives from state and federal agencies (i.e., Bureau of Land Management) – dates unknown
- **Communication Plans** – No evidence of the creation or implementation of any communications plans was noted. No ICS Forms 205 (Incident Radio Communications Plan) were completed.
- **Oregon eFOG App** – This is an electronic version of the Oregon Regional Tactical Interoperable Communications Field Operations Guide (TICFOG). No evidence that the eFOG was utilized during the storms period was noted.
- **Ham Radio** – We were able to confirm the deployment of ARES in Lane County. Rather than acting as back up for relaying requests for public services as they have done in the past, there was one ARES operator stationed in Oakridge at the Fire Station, monitoring the radio traffic.

4. FIRSTNET IMPACTS DURING THE SNOWSTORM

FirstNet coverage is in its second year of the initial five year build out plan in Oregon. As is the case in other parts of the country, most agencies are waiting to adopt FirstNet until such time as AT&T/FirstNet can provide an acceptable level of overall coverage within their jurisdiction.

FirstNet services are, however, being used in all three counties referred to in this SAAR. Some are subscribing to a single device in order to have access to the FirstNet Deployable Fleet in the event of a major disaster or outage such as was experienced in February 2019. That fleet now numbers a total of seventy-six (76) devices, which includes three (3) flying mobile cell site on wheels (COWS) and an Aerostat (aka blimp).

The following are some examples of FirstNet utilization during the storms period:

- **Coos County** - Myrtle Point Police Department, which is located on the Oregon coastline, was the first agency in the state to implement FirstNet. Their police force uses smart devices and tablets in their routine daily operations. During the storm period, no FirstNet-related communication issues were reported.
- **Douglas County** – It was reported that a small number of devices (estimated at 12) from an unknown source were in use during the storm period. Second-hand information reported that they operated normally. Since the storm period, a number of agencies have chosen to become new FirstNet subscribers.
- **Lane County** – Rural Fire Protection District (RFPD) agencies comprise early FirstNet subscribers in this county. Examples include Coburg RFPD, Lowell RFPD, McKenzie RFPD, and Mohawk Valley RFPD.

The following have been reported with respect to the cell phone and broadband/FirstNet service during the storms period:

- All four major carriers have some level of coverage within the state.
- Heavy snow and fallen trees/lines caused widespread outages with Verizon, while AT&T had 22 cell sites down due to loss of electrical power or telephone service at one point in the Roseburg/Eugene area. Teams were deployed to clear trees and traverse several feet of snow in areas to get to sites to deploy portable generators those sites with only power down.
- Most Severely Impacted Area - Eastern side of Lane County, especially along Highway 58 and parts of Hwy 126/McKenzie Hwy.
 - **City of Oakridge** - Lost all phone service and power for an extended time (greater than 2 weeks).
 - **Upper McKenzie Area** - Lost all landline and cell phone service (did not confirm length of time).

- **City of Lowell** - Lost all phone service on February 25th, then FirstNet broadband service was re-established via an AT&T/FirstNet deployable Satellite Cell Site on Light Truck (SATCOLT) in place on February 27th.
 - SATCOLTS were dispatched from two different areas in order to ensure that one would be able to reach Lowell in spite of access issues caused by the severe winter storms.
 - One of them arrived and was deployed in Lowell.
 - Once in place at the Lowell Fire Station, the Chief chose to have a Band 14 only deployment that covered his responders and his residence so that he could continue to manage operations within their jurisdiction. He reported being very satisfied with the FirstNet deployable service.
 - Given the enormity of the storm and its widespread impact, it is reasonable to assume that other communication sites had similar situations which could not be mitigated in the same manner. We were unable to identify if that was true, or the number and locations of such sites.

5. STRENGTHS IDENTIFIED

While there were widespread communications related issues experienced during and in the immediate aftermath of the disaster period, there were considerable strengths identified during the emergency including:

- The statewide ODOT/OSP radio system appeared to have performed as designed and the only areas where there were communication issues were those where backup power was the responsibility of third parties.
- To enable direct communications between the VHF and UHF systems, a patch was set up on E2 (East Repeater).
- Through a grant, the City of Eugene has since obtained 8 portable repeaters to use on the VHF LMR system.
- Coverage for the LRIG UHF system was generally adequate for operations. This was due in part to overlapping coverage of the trunked system and a more focused operational priority for the duration of the storm.
- In Lane County, pre-designated common channels on the trunked UHF and conventional VHF systems are used on a daily basis. This allowed for relatively seamless scaling up for the snowstorm event. Heavy reliance on SAR repeaters allowed communications between field staff and the LCSO dispatch center.
- Backup Power Enhancements – Since the storm period, LMR system managers have been working and begun to at least partially establish backup solutions reflective of the potential needs of extended power outages. Specifically, the Lane County LRIG sites are planned to have generators and a battery backup system with remote control access that allows the generator to operate long

enough to charge the batteries, then shut off. Through this system, we understand that each site should be able to provide backup power for at least one month. Lane County is working on grant funding to extend this capability.

- Various agencies worked together on several alternatives that attempted to assist the far eastern district of Upper McKenzie Fire (UMF), including:
 - The loan of LRIG UHF radios.
 - McKenzie Fire Protection District worked directly with UMF to assist them with communications.
 - Central Lane Communications (also serving as fire dispatch) was able to hear UMF, but UMF responders were unable to hear dispatch.
 - This small volunteer district used direct communication channels on their VHF radios to talk with one another while in close proximity to each other.
 - Occasionally, the Fire Chief would seek a private business, often out of district, with power to provide, to call in status and communicate with officials outside of the district.
- As radio sites lost back up power, dispatch centers and users were able to rely on regional resources (i.e., repeaters) to continue to monitor, communicate or restore backup power. Examples included:
 - East 2 (for fire service users), Wolf Mountain and Bear Mountain.
 - Lane County SAR (Search and Rescue) repeaters became very useful resources.
 - Lane County SAR resources also provided the small track vehicles (similar to Sno-Cats) that were used to transport resources for LMR site backup and repair.
- There was excellent cooperation between the repair technicians involved, whether government or private, while attempting to maintain or re-establish communications during the storm. For example, it took 3 days for the AT&T team to reach the cell tower site taken down by trees on Lowell Butte (using a Sno-Cat and then hiking in the rest of the way with snowshoes and chain saws). After that crew reached their cell tower, they continued to clear the road in order to establish access to the Lowell Butte LMR tower so that the radio technicians could repair it.
- There is one small VHF LMR site (Nebo) that runs completely on solar power which experienced no outages during the storm period. While weather conditions could have impacted charging through the solar panels, that did not happen.

6. AREAS FOR IMPROVEMENT

Throughout the process of our discussions, research of information available on the Internet and review of the information provided to us, a number of areas were identified where improvements should be considered.

- **Emergency Operations Center Activations** – It appeared that EOCs were either not opened or were opened late. Had they been open on a timely basis, even if it

was a virtual or partial opening, and staffed to the appropriate level, the following may have been adequately addressed:

- **IAPs, Communications Plans & ICS 205 Form** – Throughout our work and discussions, we could find no evidence of any Incident Action Plans (IAPs) or communications plans being developed initially and/or throughout the storm/aftermath periods. A somewhat acceptable alternative would have been to at least generate ICS Form 205, Incident Radio Communications Plan.
- **Communications Planning** – While communications planning at the county level had addressed interoperability during exercises with joint response and special operations providing the means to exercise the talk groups, that proved to be insufficient. The planned duration of available backup power was significantly shorter than the actual duration of the storm and aftermath. This was a significant barrier to seamless communications, especially in Lane County.
- **Alternative Communications Not Developed or Documented** – While the issues of fuel or battery power running out at LMR sites also occurred in Douglas County, their dispatch center did not report establishing any alternative communications during the storm period.
- **Situational Assessment & Common Operating Picture** – The published AAR references “Area for Improvement Situational Assessment 2: Lack of utilization of existent OEM information sharing systems lead to a lack of common operating picture/situational awareness assessment.”
 - We understand that this comment refers to the overall importance of data interoperability.
 - Disparate computer aided dispatch (CAD) systems between dispatch centers impacted the sharing of situational assessment information.
 - That was somewhat offset by shared radio frequency monitoring, telephone calls (land line calls between dispatch centers) and “workaround” techniques which were much less efficient and prone to being incomplete.
 - In addition, it was reported that it took a number of hours for the UMF outage to become known.
- **Backup Power Program** – With the exception of the ODOT/OSP statewide radio system sites, there was no consistency between the radio sites with respect to the nature and extent of backup power provided.
- **Management of Regional Radio Systems** – The managers of the regional radio systems vary widely. For example:
 - The VHF fire system in Lane County is overseen by a user group of fire agencies with administrative and technical support coming from the City of Eugene (Central Lane Communications Center as well as City Public Works).

- The LRIG, LBRIG, and the State Radio Project partner on a regional P25 Trunked Radio System with a Steering Committee representing the major partners. The 7 County V-CALL system is administered by Lane County.
- **Ham Radio Operations – Oakridge Fire Station** – One Ham radio operator was accounted for. There were some references to mutual aid requests for ARES members going unfilled. There were also concerns raised that ARES experienced difficulties establishing communications; however, we were unable to identify the nature or extent of any difficulties experienced.
- **Lane County Command Trailer** – There were a few references to a Lane County Command Trailer throughout the information we were provided with; however, that county command trailer and presumably the communications assets that it carries were not deployed during the storm period.

7. RECOMMENDATIONS

Through the process of developing this SAAR, various recommendations were either extracted directly from the information provided or developed as a result of our procedures. Our recommendations for improvement of public safety, interoperable and broadband/FirstNet communications include the following:

1. **Backup Power For Communication Sites** – While the storms seemed to have a significant impact on communications, the impact of the storms was somewhat minor when compared to what could happen in a large scale event, such a collapse of the power grid for an extended period of time, a terrorist event, large earthquake and/or a large storm covering more than a couple of counties. As such, the hardening of the backup power infrastructure for public safety and interoperable communications is extremely important and should have a high priority, including the following:
 - a. **Determine Backup Power Standard** – Using available information, appropriate research and past history, determine the minimum length of time that sites need to be self-powered.
 - b. **Site Inventory and Evaluation** – Develop an inventory of all sites by county, listing their backup power source, days of backup power available, etc., then evaluate their adequacy, when and how they are maintained and ultimately develop an improvement plan to address those with sub-standard backup power systems.
 - c. **Cycling & Monitoring Plan** – In locations where one does not exist, develop and implement a plan to maintain and cycle (under load) backup power systems on a regular basis.
 - d. **Agreements With & Documentation From 3rd Party Site Operators** – In situations where another organization or private company owns and/or is

responsible for the site backup system, require that documentation of maintenance and testing/cycling be provided.

- e. **Consider Solar for Battery Charging** – Given the results of the solar powered site referenced in this document, investigate the cost and feasibility of utilizing solar panels for primary or redundant battery charging.
 - f. **Address Fuel Flow Issues** – It was noted that the cold temperatures resulted in the inability to access all of the propane in some locations. A professional evaluation should take place to determine if the butane content of the fuel was too high (often a condition when liquefied petroleum tanks are filled in the summertime), if tank warmers are necessary or whatever other actions or equipment are necessary to ensure that all the available fuel in the storage tanks can be utilized by the backup power generators.
 - g. **Some Sites Already Being Upgraded** – We understand that some of the necessary improvements to increase backup power run time are either being planned or have already been implemented. This process should continue to be supported and possibly consider making state grant funds available to supplement county level funding.
2. **Full Scale Communications Exercise** –
- a. Often the communications component of comprehensive county or statewide exercises includes simply turning on a few radios and repeaters.
 - b. To better prepare the key stakeholders for the next significant power outage that results from natural or manmade conditions/factors, an extended duration “black sky” power outage exercise should be conducted.
 - c. To properly do so, a detailed exercise plan, the development and delivery of exercise injects, appropriate after-action reviews and the development of appropriate follow-up improvement tasks must all be carefully undertaken.
 - d. The exercise could either be a single statewide event or a series of county exercises on different dates.
 - e. It appears that it has been approximately seven (7) years since the last full-scale communications exercise was conducted.
3. **Additional or Pre-Positioning of State and/or FirstNet Assets** – The deployment of the FirstNet SATCOLT was effective; however, it appears that additional similar assets could have had a significant impact on other, more populated areas.

4. **EOC Activation and Incident Operational Planning** – Limited or full opening of EOCs on a timely basis was necessary during the storm period and aftermath. Doing so would allow for:
 - a. **Command and Control Structure** – While we did identify some reporting of information by Emergency Support Function (ESF) at the state level, it was somewhat unclear to what extent the National Incident Management System (NIMS) was implemented at the county level.
 - b. **Operational Planning** – Timely opening of EOCs and having a NIMS compliant organizational structure in place logically leads to the development of Incident Operational Plans (IAPs) and Communications Plans. This is especially important when the mission critical communications that are used on a daily basis are suddenly unavailable.
 - c. **Situational Assessments** – EOCs tend to be clearing houses for situational assessment information. More importantly, one of the primary responsibilities of the Unified Command Group at the EOC is the allocation of assets and resources to the most appropriate areas.
5. **Statewide Radio System** – Clearly, the disparate public safety radio systems impacted the ability to communicate and obtain timely and accurate situational awareness. The ODOT/OSP statewide radio appears to offer a common platform for routine or interoperable communications. To the extent that is appropriate, the system should be expanded versus investing in county or other local radio systems.
6. **Strategic Technology Reserves (STR)** – None of the 12 ODOT STR communications system mobile radio communications trailers were deployed during the storm period. This may have been due to the trailers being located too far away from where they were needed (La Grande – in the opposite corner of the state). Either reconsider the STR trailer distribution across the state or preposition trailers when storm forecasts warrant doing so.
7. **Self-Sufficiency** – Municipalities and counties must be self-sufficient for at least the first few hours of emergency conditions. Typically, state and federal resources take a number of hours to be deployed, arrive, set up and then ultimately be of assistance. In other cases, those resources may not have the equipment necessary or do not provide the services that your community needs. To better prepare for emergency conditions, municipalities and counties should include initial self-sufficiency in their emergency operations plans (EOP). Also, during the EOP update process, any significant service or assets that are planned to be requested should be confirmed with the controlling agency or organization.
8. **Local Contractor Agreements** – It may be prudent to develop working relationships with local contractors and perhaps pay a retention fee that would

- give the State priority access to certain services (i.e., snow clearing, tree removal, etc.), when needed to reestablish mission critical communications.
9. **ODOT Network Operations Center** – The ODOT Network Operations Center (NOC) is not staffed after hours and on weekends. That resulted in the Bear Mountain site generator being offline not being detected for a number of hours. Ideally, there should be an ODOT representative at the State EOC with access to real time information about the status of each site.
 10. **Utilization and Availability of ARES/Ham Radio Operators** – There appears to be a robust network of American Radio Relay League (ARRL) Sections and Ham radio operators throughout Oregon. The most appropriate use for this valuable asset should be identified in the state EOP; specifically, ESF 2-Communications, should be updated to reflect their roles and responsibilities. Furthermore, they should play an active role in future county and statewide communications exercises.
 11. **8CALL90 Radios Installed in Lane County** – The ACU-1000 from Bear Mountain, along with the UHF, 700 MHz, and 800 MHz radios associated with it, were appropriately removed many years ago. We understand that the future plan is to replicate the equipment in the Lane County command trailer in a somewhat reduced fashion. We recommend that this project be prioritized if it is determined that having these assets in Lane County would have mitigated the communications issues experienced during the storm periods.

8. CONCLUSION AND NEXT STEPS

Overall, the response to the storm conditions and their aftermath during February 2019 were as good as could be expected under the difficult conditions and circumstances. We do believe, however, that the implementation of the recommendations included in this SAAR will provide a higher level of performance when the next significant challenge to mission critical emergency communications presents itself.

The most significant recommendations relate to:

1. Providing a consistent level of dependable backup power to all radio sites
2. Conducting a full-scale communications exercise
3. The timely activation of EOCs and conducting the proper operational planning during emergency conditions using NIMS templates
4. To the extent deemed appropriate, expansion of the ODOT/OSP statewide radio system vs. investing in interoperable communications systems at the county or municipal levels

It is believe that the implementation of the recommendations included herein will significantly improve communications and interoperability in Oregon during the next extended power outage or “dark sky” event.

APPENDIX A DOCUMENTS INCORPORATED BY REFERENCE

- **Oregon OEM AAR** – Publication date of June 5, 2019
https://www.oregon.gov/oem/Documents/2019_February_Winter_Storms_AAR.pdf
- **Oregon State Radio Project – Final Implementation Report 1217**
https://www.oregon.gov/ODOT/Maintenance/Documents/SRP_Final-Project-Report.pdf
- **Statewide Communications Interoperability Plan (SCIP)**
https://www.oregon.gov/oem/Documents/Oregon_SCIP.pdf
- **March 2019 SCIP Update** <https://www.oregon.gov/siec/Pages/Interoperability-Communications-Plan.aspx>
- **Presidential Disaster Declaration**
<https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-approves-oregon-disaster-declaration-2/>
- **Oregon State Emergency Operations Plan**
https://www.oregon.gov/oem/emresources/Plans_Assessments/Pages/CEMP.aspx

APPENDIX B AGENCIES AND ORGANIZATIONS CONTACTED

The following agencies or organizations represent the major stakeholders that were contacted to provide information, documentation and/or reports:

- Oregon OEM
- Oregon Forestry Department
- Oregon National Guard
- Oregon Public Utilities Commission
- Oregon Department of Transportation
 - Wireless Systems Group
 - Statewide Radio Systems Group
 - Land Mobile Radio (LMR) Group
 - County Radio Systems Group
- Oregon State Police
- FirstNet

APPENDIX C OREGON STATEWIDE RADIO SYSTEM IMPLEMENTATION PROJECT

The Oregon Department of Transportation (ODOT) and State Police (OSP) Radio Project (hereinafter referred to as the ODOT/OSP system), which replaced and modernized aging public safety communications systems statewide, marked its official completion on June 30, 2017. After seven years of planning, developing and building the complex, technology-enriched system, ongoing operations and maintenance responsibilities were then transferred to the ODOT Wireless Communications Section. A link to the December 2017 Oregon State Radio Project – Final Implementation Report has been provided in the Documents Incorporated by Reference section of this SAAR.

The radio system allows for shared efficiencies with other state agencies including the Oregon State Police as well as other first responder agencies. The major components of the new system include new narrowband mobile and portable radios, a digital microwave system, new consoles and logging recorders at statewide dispatch centers, a new trunked radio system and a new network management system. Specifically, the system includes:

- 213 sites with microwave, conventional or trunked repeaters, where physical improvements made to 161 of those sites
- Over 5,500 subscriber units (mobile/portable radios) deployed
- Interoperable communications between the trunked system and 6 counties via ISSI connections
- One combined statewide radio system for the Oregon State Police and Oregon Department of Transportation

County Radio Systems - Example

As referenced above and elsewhere in this SAAR, the counties also have their own county radio systems. By way of example, here is an overview of the Lane County radio systems:

- **Lane County - LRIG/UHF System**
The Lane Regional Interoperability Group (LRIG) system in Lane County is a trunked P25 UHF system with 4 primary partners:
 - City of Eugene, City of Springfield, Lane County, and Eugene Water & Electric Board (EWEB) (the largest public utility in the state).
 - Users include a consortium of public safety, public works and public utility agencies.
 - The larger law enforcement agencies using this system include the Eugene Police Department, Springfield Police Department, Lane County Sheriff's Office and the University of Oregon Police Department.
 - This system was initially designed to provide land mobile radio (LMR) coverage for a major portion of Lane County, essentially beginning at the

- tunnel east of Mapleton on Hwy 126 (west) to the eastern boundaries near Carmen Smith Reservoir.
- The system now partners with the Linn-Benton LMR system and the Oregon State Radio System. Multi band radios simplify communications with fire and EMS services using a VHF system.
 - **Lane County - VHF/Fire**

The VHF system was initially built out as a partnership between the Lane Fire Defense and Central Lane Communications – a regional consolidated dispatch/9-1-1 emergency communications center.

 - The fire agencies agreed upon a channel plan that would ensure interoperability with State Forestry, the State Fire Marshal’s Office, and established regional frequencies for specific purposes.
 - The goal was to have common equipment, reliability, and ease of multi-agency response. With that in mind, the channel plan includes the nationally designated V-Call channels.
 - Lane County regularly dispatches multi agency strike teams and task forces to major wildland fires both within and outside of Oregon and uses this system for operations.
 - **Seven County V-Call system**

The 7 County V-Call System was established by US Representative Peter Defazio in order to facilitate operations that might move between the counties within his congressional district. Those counties are Benton, Coos, Curry, Josephine, Lane and Linn.

Talk Group information for the three systems mentioned above can be located on the Radio Reference website.

APPENDIX D SITUATION REPORT INFORMATION

Two situation reports (sit reps) were issued by OEM during the storms period. They were issued on February 26 and 27, 2019. The following are the most significant information items included in those sit reps, which have not already been mentioned elsewhere in this report:

| <u>ESF 2 (Communications) Report</u> | | |
|---|---|---|
| <u>Location</u> | <u>Status</u> | <u>Impact or Restoration Estimate</u> |
| ESF-2 Reported that there were widespread communications outages reported in the affected area in both Lane and Douglas Counties | | |
| Lane County – Overall | Significant issues with backup power and access to certain sites. See Attachment #4. | N/A |
| Cities of Oakridge and McKenzie River (Lane County) | Reports having no communications, power, phone or internet connectivity | Oakridge - Took at least 4 days to restore comms and then EOC operated out of the Fire Department Mackenzie River – Not Provided |
| Cities of Drain, Elkton and Yoncalla (Lane County) | Without power and had no landline communications or wireless communications | Not Provided |
| Douglas County - Overall | Public safety radio system compromised at multiple locations; Continued landline/cell outages in numerous areas | Not Provided |
| Douglas County Communications – Overall | Douglas County Public Works has no communications due to the UHF system being down. | Priority was the public safety system. |
| Douglas County Communications – Canyon Mountain repeater site | Offline | Restored after a few days, but there was an electronics issue between Nebo and Canyon sites causing reception and transmission problems |

| <u>ESF 2 (Communications) Report</u> | | |
|--|---|---|
| <u>Location</u> | <u>Status</u> | <u>Impact or Restoration Estimate</u> |
| Douglas County Communications – Mt. Scott repeater site | Offline | Not Provided |
| <u>Public Utilities Commission Report</u> | | |
| <u>Provider</u> | <u>Status</u> | <u>Impact or Restoration Estimate</u> |
| <u>Cellular & Broadband Providers</u> | | |
| Verizon | 6 cell sites down due to commercial power issues | Not Provided |
| AT&T | Not Provided | Not Provided |
| Sprint | Initially had 23 cell towers down, and still had 13 offline | The towers were primarily along the I-5 corridor between Eugene and Roseburg |
| CenturyLink | No estimates of the extent of their outages was provided | Restoration dependent on both facility access and restoration of electricity and power infrastructure |
| Frontier | No response to requests for updates | Not Provided |
| Douglas County – Overall | Continued landline/cell outages in numerous areas | N/A |
| Yoncalla and Drain (Lane County) | Reported having no cell service | Cell service restored after 3 to 4 days |
| McKenzie River area (Lane County) | Reported having no phone or internet connectivity | Reports of an attempt to deliver a Cellular on Wheels (COW) to establish communications, but unclear if it ever arrived |
| | | |

| <u>ESF 2 (Communications) Report</u> | | |
|---|---|---|
| <u>Location</u> | <u>Status</u> | <u>Impact or Restoration Estimate</u> |
| <u>Electrical Power Providers</u> | | |
| Numerous Bonneville Power Administration and PacifiCorp transmission line problems were reported and that limited the ability of local utilities to restore power for a period of time | | |
| PacifiCorp | At least 30,000 customers without power | They expect all outages should be restored by Sunday morning. |
| Lane Electric | 7,500 customers without power | They estimate it will take a week to 10 days to restore all service. |
| Emerald PUC | Approximately 5,800 without power. | Full restoration took a week or more |
| Springfield Utility Board | Estimates 400 customers without power. | No estimated time for restoration as they are still determining how many outages and confirming where in the system they are. |

APPENDIX E DETAILED LIST OF OUTAGES BY SITE

| <u>Location</u> | <u>Problem Description</u> | <u>Impact/Outage Situation</u> | <u>Actions Taken</u> |
|----------------------|--|--|---|
| Bear Mountain | <ul style="list-style-type: none"> Experienced some downtime at least partially attributed to being in transition from a UPS battery backup to a 48vdc system - the UPS could only deliver power for approximately 2-4 hours. The propane fuel in the on-site tanks (2 ea. 500 gal.) could not be fully utilized due to the lower temperatures which reduced the tank pressure. A local propane dealer in Creswell was unable to refill the aux propane tanks due to not having a qualified dispenser on hand (all qualified personnel were out on delivery). | <ul style="list-style-type: none"> The generator kept the site operational for several days. There were a couple of periods when the site was out of service when the auxiliary propane tanks were switched out. | <ul style="list-style-type: none"> On Feb. 28th a plan was developed to extend the generator run time by shedding some of the load. All users sacrificed equipment to extend the generator runtime. LCSO tech and SAR hauled 4 ea. 25 gal. propane tanks (on loan from the state) to the site with the SAR Argo tracked vehicle in order to extend generator runtime until the road could be cleared. Charter Cable hired a private contractor to clear the road so a propane truck could reach the site for refueling. |

| <u>Location</u> | <u>Problem Description</u> | <u>Impact/Outage Situation</u> | <u>Actions Taken</u> |
|---------------------|---|--|---|
| Coburg Ridge | Lost power on Monday, Feb. 25th and ran on battery backup for approximately 16 to 25 hours (depended on type of equipment). | The Radio Shop was not able to access the site on Feb. 25th due to snow and trees blocking the road. Not having a backup generator severely impacted this site. | <ul style="list-style-type: none"> • A partial path was cleared on Feb. 26th that allowed the Radio Shop to hike in the last ~1/2 mile and start the generator at ~ 1200. A generator refueling plan adopted. Site was out of service for ~ 15 hours. • Eugene Attorney's Office is expected to deal with this during ongoing contract negotiations with the landowner. |
| Hagan | This site lost commercial power in the afternoon of Feb. 24th and ran on battery until approximately 1215 on Feb. 25th. An intake tube on the generator was blocked by snow so the generator did not start. | <ul style="list-style-type: none"> • The microwave also connects the Vida site to CLCC so Fire East at Hagan and Vida were out of service. • The loss of the Hagan radio site had a severe impact on UMF and to a lesser degree MKF. | EWEB techs were unable to reach the site on Feb. 26th but returned with Sno-Cats and a generator tech on Feb. 27th and got the generator going at about 1615. |
| Hansen Butte | Lost power and telco connectivity. | Minimal | East 6 provided backup communications when the Bear Mtn. site was out of service. |

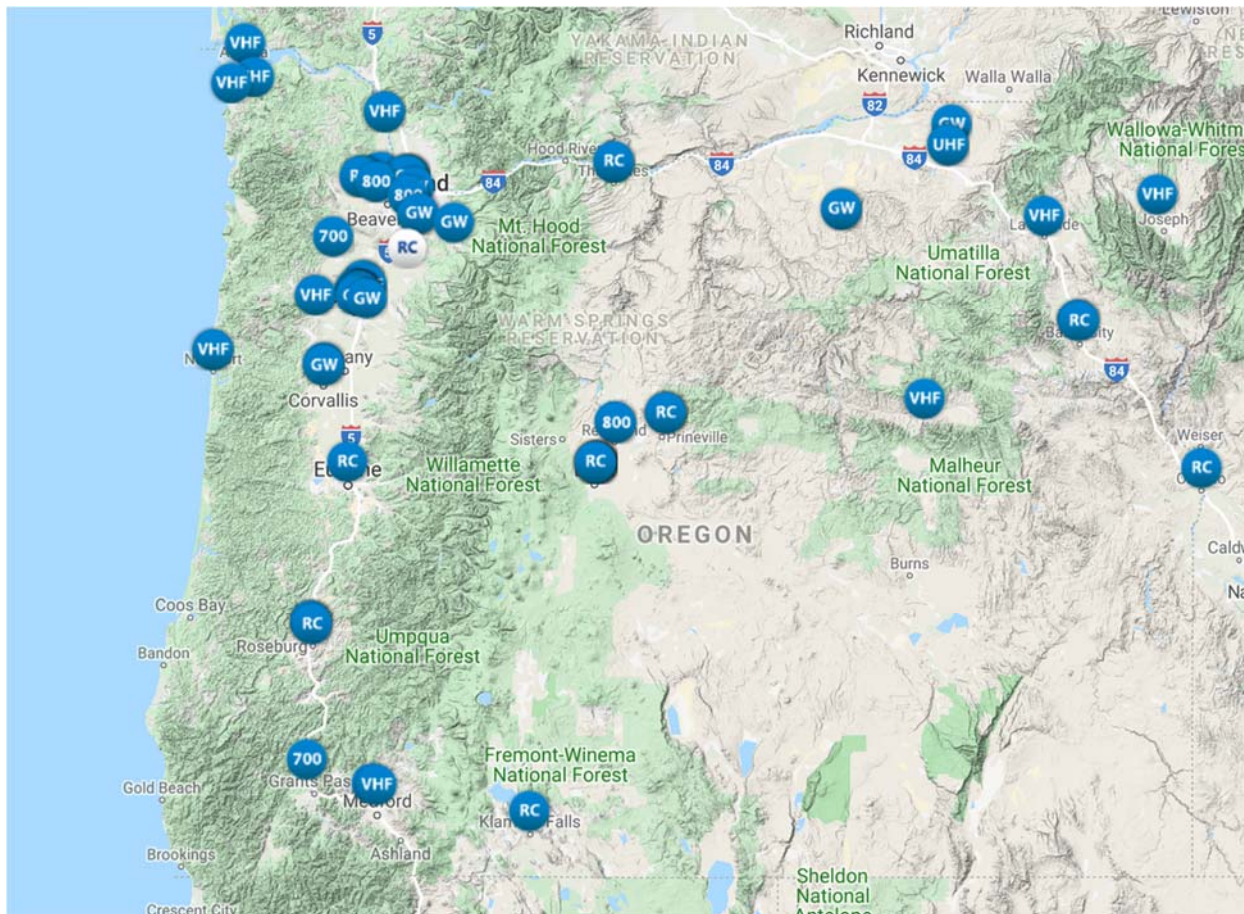
| <u>Location</u> | <u>Problem Description</u> | <u>Impact/Outage Situation</u> | <u>Actions Taken</u> |
|---------------------|---|--|---|
| Lowell Butte | East 3 repeater at the Lowell Butte radio site went out of service at approximately 1200 on Feb. 25th. The site does not have a backup generator and a very limited backup battery capacity. | Minimal | <ul style="list-style-type: none"> • A nearby BPA-owned building provided temporary power until commercial power was restored. • Site was difficult to access due to snow and downed trees. |
| Prairie Peak | Lost commercial power but remained in service with battery and generator power. | Minimal | Lost commercial power but remained in service with battery and generator power. |
| Vida | <ul style="list-style-type: none"> • Lost connectivity on Feb. 25th due to the Hagan outage. • The Vida site ran out of propane fuel on Mar. 1st and ran a few hours after that until the UPS batteries were depleted. • Commercial power went up and down numerous times. The site was inaccessible due to snow and downed trees. The site went down again on Mar. 14th at about 2130 due to power fluctuations which eventually caused a breaker to trip on the microwave UPS. | While microwave connectivity was out of service the Vida repeater provided intermittent radio communications between CLCC and UMF. | Hampered by snow and downed trees, radio techs made a difficult hike to the site on Mar. 15th to reset the microwave UPS breaker which restored connectivity to CLCC. |
| Walker | Lost commercial power but batteries and generator sustained the site. | Minimal | Lost commercial power but batteries and generator sustained the site. |

APPENDIX F MOBILE COMMUNICATIONS ASSETS

A review of the DHS Communication Assets Survey and Mapping (CASM) Tool on December 27, 2019 yielded the information provided below. It shows that the following mobile assets were presumably available during the storms period:

- Portable Radio Cache #10 – Klamath Falls (owned by ODOT)
- Rita Radio Cache – Central Point (owned by ODOT)
- Josephine County SAR Radio Cache – Grants Pass (owned by Josephine County SAR)
- Portable Radio Cache #2 – Roseburg (owned by ODOT)
- Radio Cache #4 – Eugene (owned by ODOT)

One of the things that immediately is visible is that the majority of the mobile communications assets identified in the CASM Tool are in the northern half of the state, with the heaviest concentration being in the northwestern portion of the state. While this may correspond to the highest population areas, it probably negated the opportunity for any significant mobile assets to be usable in southern counties during and after the storm period.



APPENDIX G GLOSSARY

| | |
|----------|---|
| AAR | After Action Report |
| ARES | Amateur Radio Emergency Services |
| CAD | Computer Aided Dispatch |
| CASM | Communication Assets Survey and Mapping |
| CISA | Cybersecurity and Infrastructure Security Agency |
| COWS | Cell Site on Wheels |
| DHS | Department of Homeland Security |
| EOC | Emergency Operations Center |
| EOP | Emergency Operations Plan |
| ESF | Emergency Support Function |
| EWEB | Eugene Water & Electric Board |
| IAP | Incident Action Plan |
| ICS | Incident Command System |
| ICTAP | Interoperable Communications Technical Assistance Program |
| LBRIG | Linn-Benton Regional Interoperability Group |
| LCSO | Lane County Sheriff's Office |
| LMR | Land Mobile Radio |
| LRIG | Lane Regional Interoperability Group |
| MHz | Megahertz |
| NIMS | National Incident Management System |
| NOC | ODOT Network Operations Center |
| ODOT | Oregon Department of Transportation |
| ODOT/OSP | ODOT and OSP Radio System |
| OEM | Oregon Office of Emergency Management |
| OSP | Oregon State Police |
| PIO | Public Information Officer |
| RFPD | Rural Fire Protection District |
| SAAR | Supplemental After Action Report |
| SAR | Search and Rescue |

| | |
|-----------------|---|
| SATCOLT | Satellite Cell Site on Light Truck |
| SWIC | Statewide Interoperability Coordinator |
| STR Trailers | ODOT Strategic Technology Reserve Mobile Communications |
| TICFOG | Oregon Regional Tactical Interoperable Communications Field Operations Guide |
| UHF | Ultra High Frequency |
| UMF | Upper McKenzie Fire |
| VHF | Very High Frequency |

