National Weather Service - Medford, Oregon

Summer 2020
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The Crater Chronicle

NWS Medford Welcomes New Meteorologist-In-Charge: Christine Riley!

At the National Weather Service (NWS) Medford, we are excited to welcome Christine Riley as the new Meteorologist-In-Charge. She officially started this position in March 2020. As Meteorologist in Charge, she will manage the staff and programs at the National Weather Service office here in Medford, OR.

Christine has a wide breadth of experience in the field of meteorology. Her interest in meteorology began early on as a young child when she would watch wide-eyed from her deck as thunderstorms rolled by. Growing up, she watched TV programs and read books on weather. In college, she decided to follow her passion and pursue a career in meteorology. She graduated from U.C. Davis with a Bachelor's of Science in Atmospheric Science. Knowing her passion lay in working in operational meteorology, she pursued a career in the National Weather Service upon graduation. Prior to joining the team in Medford, she worked as the Warning Coordination Meteorologist in Cleveland, OH. Prior to that, she worked for the National Weather Service as a lead forecaster in Hanford, CA, a general forecaster in Monterey, CA, an entry level meteorologist in Norman, OK and a student volunteer in Sacramento, CA.

Christine Riley snowshoeing at Crater Lake with her children.

When asked what she likes most about her work, she enthusiastically said, "People!" and especially "seeing people thrive and be fulfilled." Christine is enjoying getting to know her new staff as well as enjoying learning the forecast area. She finds working with people to be the most challenging and most rewarding part of her job. She has a strong vision for NWS Medford to "create a workplace that fosters mentoring where everyone feels valued and talents are fully utilized". She is skilled at and emphasizes the importance of incorporating diverse skills and using a team approach to ensure staff are motivated, excited about what they do and are able to thrive and contribute their best. This will help everyone at NWS Medford to serve our community and achieve the goal of the National Weather Service to create a Weather Ready Nation.

Christine enjoys a love of outdoors and of swimming. So in her off time, you may find her hiking or pursuing her long time passion as a competitive swimmer. Please join us in welcoming Christine Riley!

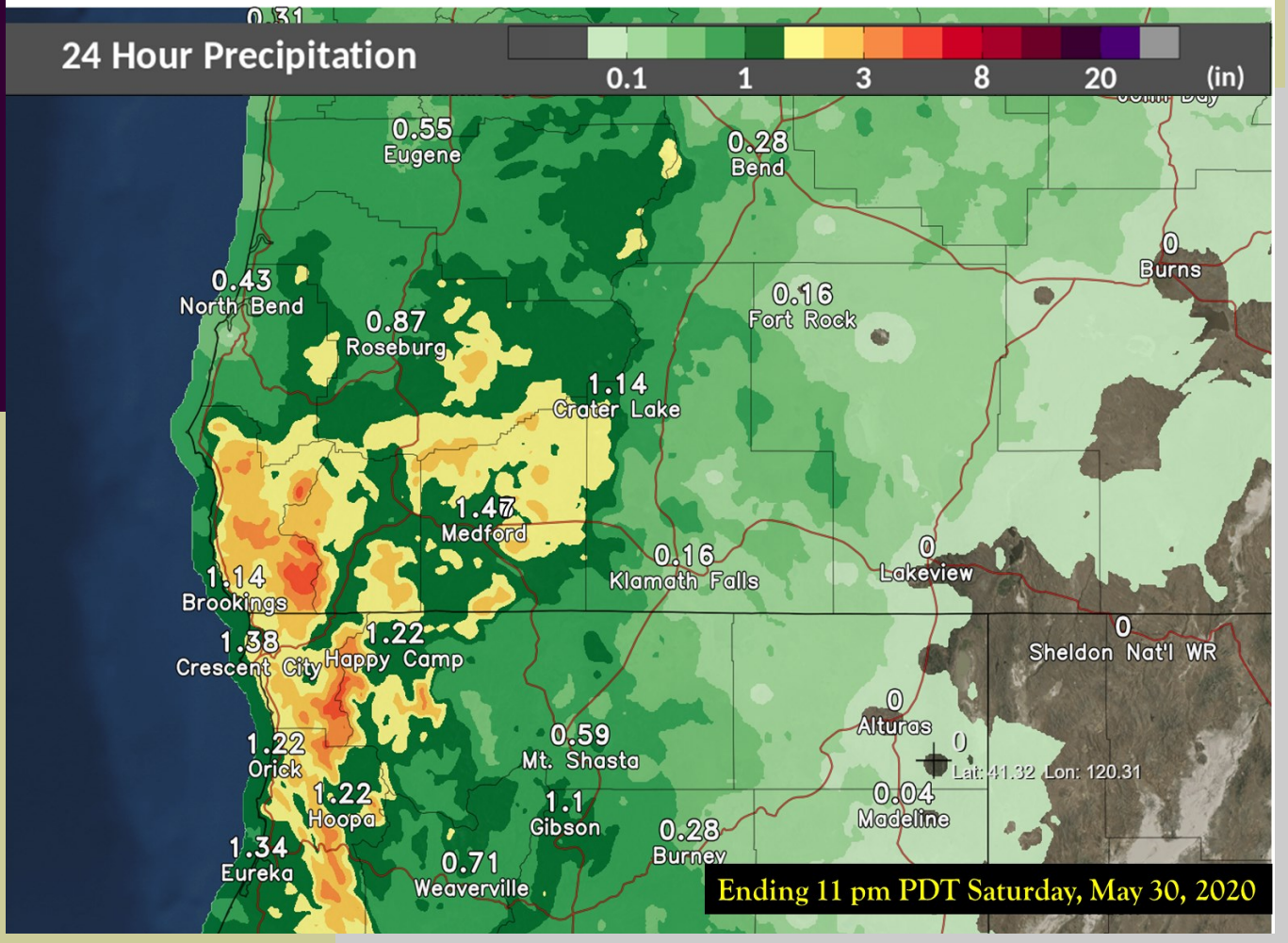
Summer began on June 20th at 2:43 pm PDT.

Inside This Issue

Late Season Soaker

Marc Spilde, *Forecaster*

On Saturday, May 30, 2020, an unusually wet storm system moved northward along the West Coast. Tapping into copious moisture pooling from the Cascades westward, this system delivered rain amounts more typically associated with late fall and early winter, as opposed to late spring. Amounts of 1.00-1.50 inches were common, with some locations reaching or exceeding 2.00 inches. The 1.47 inches of rain that fell at the Medford Rogue Valley International Airport almost doubled the daily rainfall record of 0.74 inches set on May 30, 1993. It also went down as the 2nd wettest day in May ever recorded in Medford, second to only the 1.67 inches of rain that fell on May 18, 1956. To get an appreciation for just how wet this system was, the 1.47 inches that occurred that day in Medford was more than what normally occurs during the entire month, which is 1.31 inches! Due to preceding dry conditions, there were no flooding impacts and, other than some minor rises on area streams, creeks and rivers, ponding of water on roadways and reduced visibility at times were the main hazards. Even though this system brought needed water to area reservoirs and reduced fire risk, it wasn't nearly enough to quell the long term drought the area has been in dating back to last year. Records in Medford have been kept since 1911.



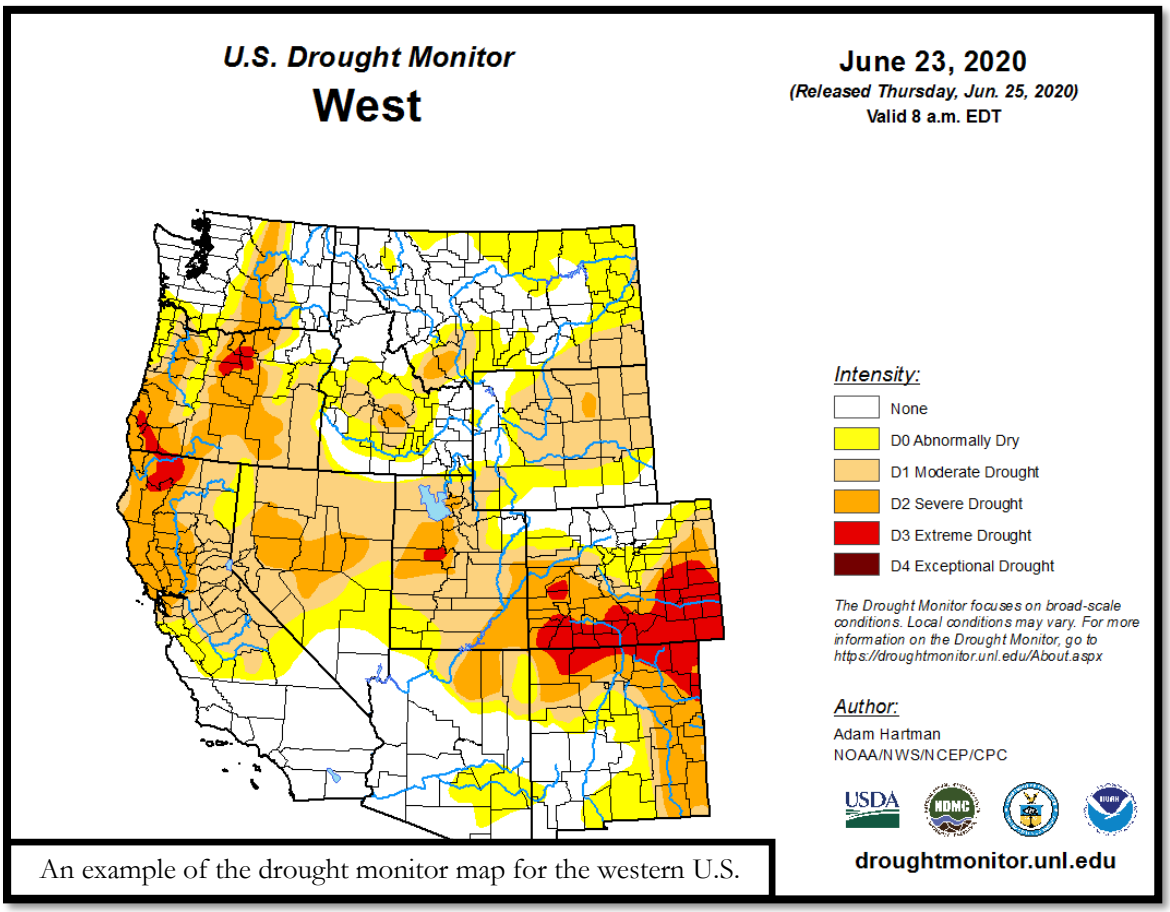
Defining Drought Can Be as Clear as Mud

Ryan Sandler, *Warning Coordination Meteorologist*

Believe it or not, it's not easy to figure out how bad a drought is. Traditional ways to measure drought are done using three methods: by comparing observed precipitation with what's normal **(climatologic)**, by comparing soil moisture and crop conditions with what's normal **(agricultural)**, or by looking at how much water is contained in snow, the level or flow rate of moving water, water in reservoirs, or groundwater levels **(hydrologic)**.

The official drought status is designated by the United States Drought Monitor (USDM). The USDM has been a team effort since its inception in 1999, produced jointly by the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln, the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Department of Agriculture (USDA). However, our meteorologists and hydrologist in Medford also provide input to the official drought authors for conditions in southern Oregon and far northern California.

The USDM is a map released every Thursday, showing parts of the U.S. that are in drought. The map uses five classifications: abnormally dry (D0), showing areas that may be going into or are coming out of drought, and four levels of drought: moderate (D1), severe (D2), extreme (D3) and exceptional (D4). Their most current map can be found at https://droughtmonitor.unl.edu/CurrentMap.aspx



An example of the drought monitor map for the western U.S.

Drought designation can result in assistance programs to be activated. The USDA uses the drought monitor to trigger disaster declarations and eligibility for low-interest loans. The Farm Service Agency uses it to help determine eligibility for their Livestock Forage Program, and the Internal Revenue Service uses it for tax deferral on forced livestock sales due to drought. State, local, tribal and basin-level decision makers use it to trigger drought responses, ideally along with other more local indicators of drought.

Southern Oregon and northern California are suffering some of the worst drought conditions in the country. Recent rain in late May and early June only put a small dent in the long-term drought. Drought across our region is severe to extreme due to well below average precipitation, low snowpack, low river levels, drier than normal soils, and low reservoir levels. We must also consider the drought impacts to users; such as farmers, ranchers, orchardists, viticulturists, and municipal water agencies.

There are a lot of variables affecting the drought intensity level and there isn't always agreement among experts as to what the exact drought level should be. However, due to an increasing number of local observations, new tools, and even satellite measurements we have made improvements in classifying how severe a drought really is.

Are You Ready for Fire Season 2020?

Brett Lutz, *Lead Forecaster*

Although the 2020 Fire Season is upon us, you *do* still have time to prepare for the core of it. As of the writing of this article on June 28th, 2020, the vast majority of the forecast area was still in Low to Moderate Fire Danger. However, we expect most, if not all of the forecast area will move into High Fire Danger during the month of July, so now is the time to complete your preparations. While human caused fires are of great concern due to their closer proximity to populated areas, the majority of wildfires in the Medford National Weather Service Forecast Area, especially large ones (>50 acres), are lightning caused. Lightning amount in southwest Oregon and northern California typically peaks in July and August, so now is the time to make sure you're prepared.

Wildfire Preparedness:

- ***Defensible space:*** Clear flammable items such as grass, leaves, weeds, brush, other debris, and, especially, dead material from around your home. Please visit the National Fire Protection Association (NFPA) at https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA or your local city or county's website for further information on how you can minimize the flammability and fire spread potential on your property.
- ***Emergency Supply Kit:*** Check out https://www.ready.gov/kit for information about what to put in an emergency supply kit that you can take with you should you need or chose to evacuate.
- ***Evacuation Plan:*** Check out https://www.osha.gov/SLTC/etools/evacuation/evac.html for tips on developing an Emergency Action Plan for your home or business. Some good starters for such a plan are:

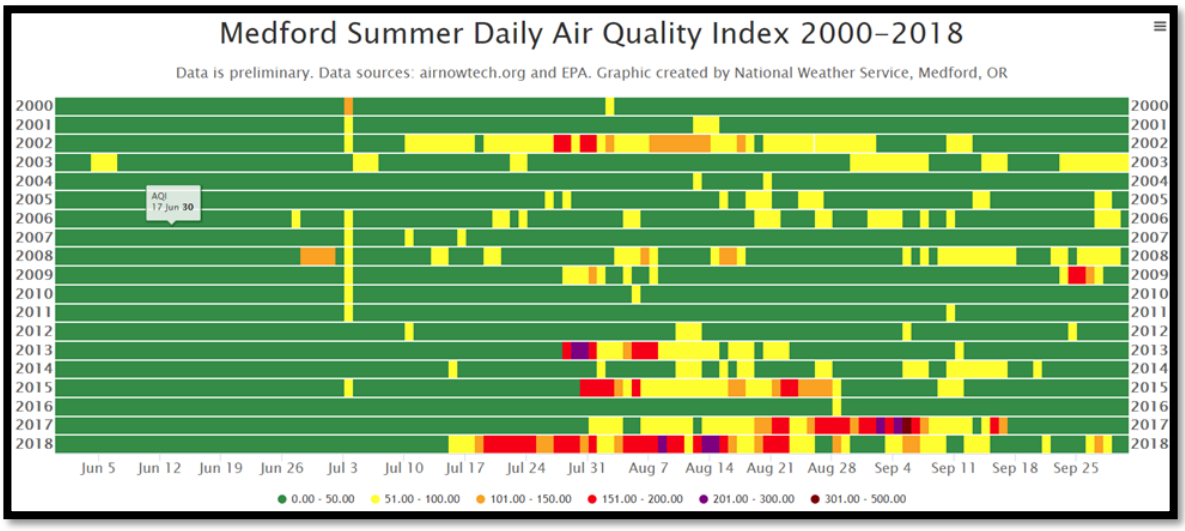
  1) Under what conditions would you leave your home? What are your trigger events/thresholds?
  2) Where will you and your family members go and where will you meet if you become separated?
  3) What will you take with you and under what circumstances?

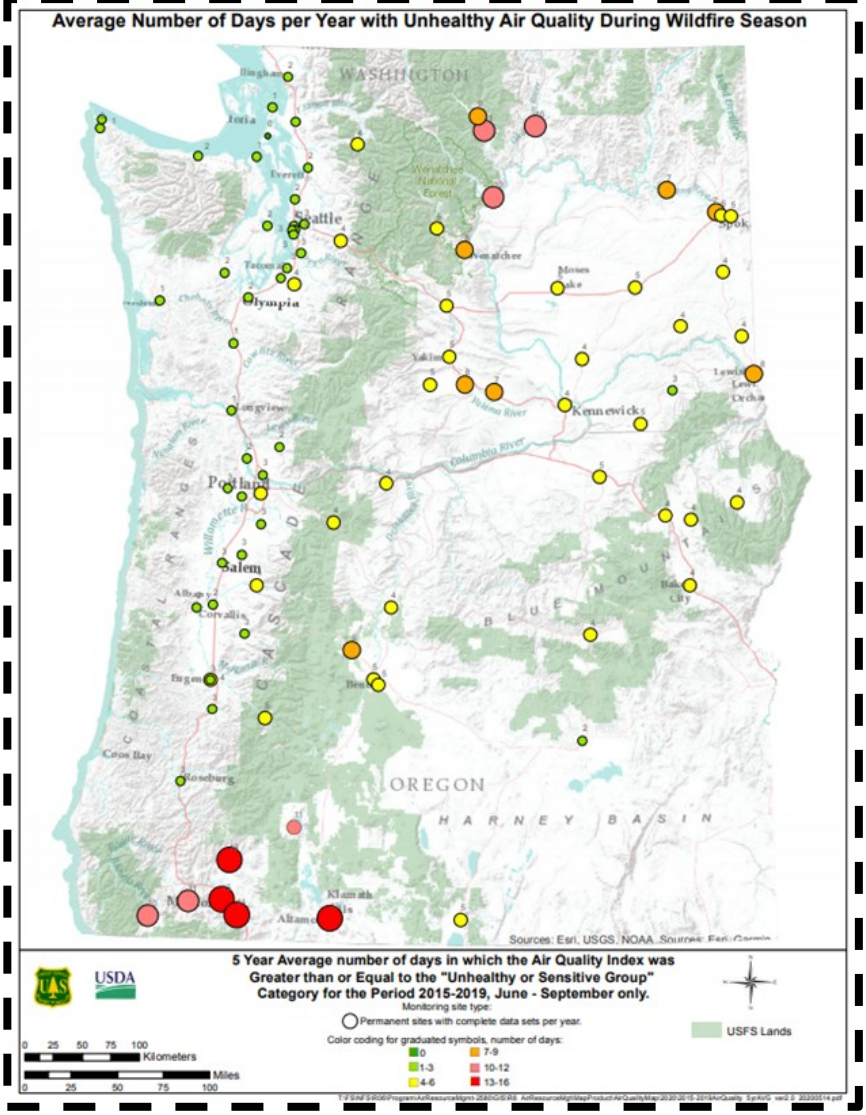
- ***Smoke Preparedness:*** It is most likely that, rather being directly affected by the flames of a fire, you and your loved ones will be affected by potentially hazardous levels of wildfire smoke. Does your home have proper air filtration? If not, where will you go if the air becomes unhealthy for you? For further information on reducing health effects due to wildfire smoke check out https://www.oregon.gov/oha/PH/Preparedness/Prepare/Pages/PrepareForWildfire.aspx

Air Quality Statistics for Summer Wildfire Smoke:

Air quality data for Medford, Oregon going back to the year 2000 indicates late July through early September to be the time period when we're most likely to experience significantly diminished air quality in the Rogue Valley and across the surrounding area from wildfires. There is significant variability in the timing and extent of impacting smoke from year to year with summers like 2019 being virtually smoke free and summers like 2018 to be mostly smoky.

Data compiled by the USDA National Forest Service from the 2015-2019 Fire seasons indicates southwest Oregon has experienced the most smoke for all data points in both Washington and Oregon, on average. This is likely because we live in an area very prone to wildfire, have lots of vegetation and open space including large swaths of forest, and our mountain-valley topography is close to the stabilizing influence of the cooler Pacific Ocean. This topography, combined with the influence of





the Pacific, limits the vertical movement of air along and near the surface during much of fire season.

Wildfires located along or near the Coastal Mountains such as the Biscuit Fire (2001), Douglas Complex (2013), Chetco Bar Fire (2017), and Klondike Fire (2018) tend to be particularly problematic because the normal airflow across much of southwestern Oregon comes across that Coastal Mountain area on most summer afternoons and evenings. Combine that with lots of material to burn due to high average annual rainfall in the Wet Season and it becomes apparent as to why fires burning in that area can be so problematic for air quality.

Specifically, during the last 5 years Medford, Ashland, Shady Cove, and Klamath Falls have all experienced, on average, between 13 and 16 days of air quality equal to or worse than "Unhealthy for Sensitive Groups" from June through September. During the exceptionally severe wildfire smoke summer of 2018 Shady Cove had 40 such days, Klamath Falls had 38, Ashland had 36, and Medford had 33 according to the USDA National Forest Service. Interestingly, often-times summer wildfire smoke gets trapped below valley inversions that are below mountain crest level. Therefore, it is possible to escape the wildfire smoke much as you can escape the low clouds and fog in winter- That is by going up in elevation into the mountains, especially above 6,000 foot elevations early in the day, before upslope winds get going.

The Outlook for Fire Season 2020:

The National Interagency Fire Center (NIFC) is forecasting "Above Normal" fire activity across our forecast area for July, August, and September per their National Significant Wildland Fire Potential Outlook issued June 1st, 2020. Their updated outlook is due out July 1st, 2020 and can be accessed via the following link once available: https://www.predictiveservices.nifc.gov/outlooks/monthly_seasonal_outlook.pdf

Wildland vegetation conditions as of June 28th, 2020 for southwest Oregon and northern California in the Medford NWS Forecast Area are gradually drying out, but Fire Danger remains mostly Low to Moderate. As we go into July we expect to see conditions continue to dry since little to no precipitation is expected. Current indications are that temperatures will be mostly near to below normal for the first half of July 2020 and there will be some threat of showers and thunderstorms, at times, from about July 3rd through at least mid-month. While cooler than normal temperatures help to reduce moisture loss by the vegetation, windy periods can offset this loss, especially when relative humidity values are low. Therefore, we expect that fires are very likely to be an increasing concern as we move through the month of July. This is typical for the forecast area. It's also typical that, as we approach the end of July and go into August, dryness of the vegetation and significant lightning potential combine to increase the risk of wildfires starting, spreading, and becoming large. This threat typically continues until the change of the seasons starts to bring more frequent precipitation, cooler temperatures, and higher humidities.

This season NIFC is expecting above normal fire activity in the area due to the combination of pre-existing moisture deficits as is indicated by the United States Drought Monitor, and increased probabilities of above normal temperatures and near to below average precipitation during the 2020 Fire Season. While this forecast makes sense, it's important to keep in mind that there are many factors that influence the local severity of any given fire season. These primary factors that modulate fire season are preceding dryness, lightning abundance and concentration, timing, duration and magnitude of heat waves, rain events, high winds, and poor overnight humidity recoveries. For all of these items except preceding dryness, it's very difficult to forecast them more than 2 weeks to a month in advance. Forecast quality, firefighting efforts, and firefighting resource availability are also major factors that modulate the severity of fire season. Therefore, while there is an increased threat of an above average fire season, we still could get lucky and have another quiet season. However, it's best to be prepared than not, so make those fire season preparations as soon as possible!

Meet the Electronic Technicians of NWS Medford!

Connie Clarstrom, *Lead Forecaster*

Have you ever wondered who keeps the weather equipment running at the National Weather Service (NWS)? At NWS Medford, often the answer is - our electronic technicians, Matt Wymore and James Wilson! To find out more, we asked them about their job.

Matt has been an electronics technician at NWS Medford for over 18 years. James joined NWS Medford more recently, this year. They both have a background in applied electronics and both have served in the military. At NWS Medford, Matt and James work on a variety of equipment in diverse settings. About 75% of the time, they work in the field and Matt and James both agreed that being outside was one of the things they most like about the job. Also they enjoy being able to support the National Weather Service program and serve their community.

NWS Medford Electronic Technicians: Matt Wymore (right) and James Wilson (left)

The types of work Matt and James perform often involve troubleshooting or preventive maintenance of equipment, such as the Automated Surface Observation System (ASOS) weather stations, weather radio transmitters, and the NEXRAD weather radar. They frequently have to coordinate with air traffic controllers, Federal Aviation Administration (FAA) personnel, contractors, national guard and members of the public while working. To protect them during their work, they wear personal protective equipment (PPE) such as hard hats, gloves and non-flammable clothing as needed. Also, they take extensive safety training such as winter survival and snowcat training. This is essential since during the winter months they have to drive a snowcat up to the top of Mount Ashland to service the NEXRAD radar.

We asked them to share what their most interesting or unique jobs have been. James said that one of the most interesting jobs he worked was repairing the waveguide switch on the NEXRAD radar. The waveguide takes the transmitted radar pulse and guides it up to the antenna. It is a critical component of the radar. Matt responded that one of the most unique experiences was repairing a power loss to an ASOS weather station in Siskiyou County. He worked with the electrician to find where the cable was damaged. They tracked the signal part way, they followed clues to estimate the location. Their tracking worked and after digging a hole in the field, they were able to repair the damage and return the essential ASOS back to operation.

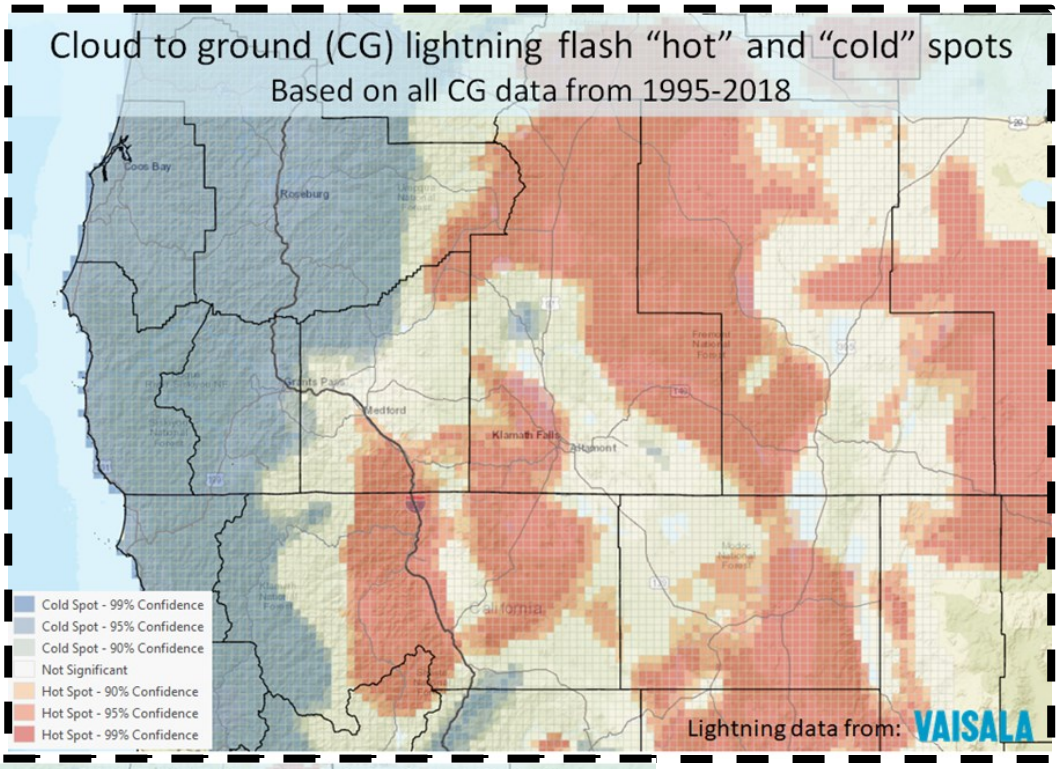
Both Matt and James agree that keeping things running for the NWS and serving the public makes for a rewarding job. Whether at the coast, up on Mount Ashland, or in a remote area, they are ready to put their skills to work!

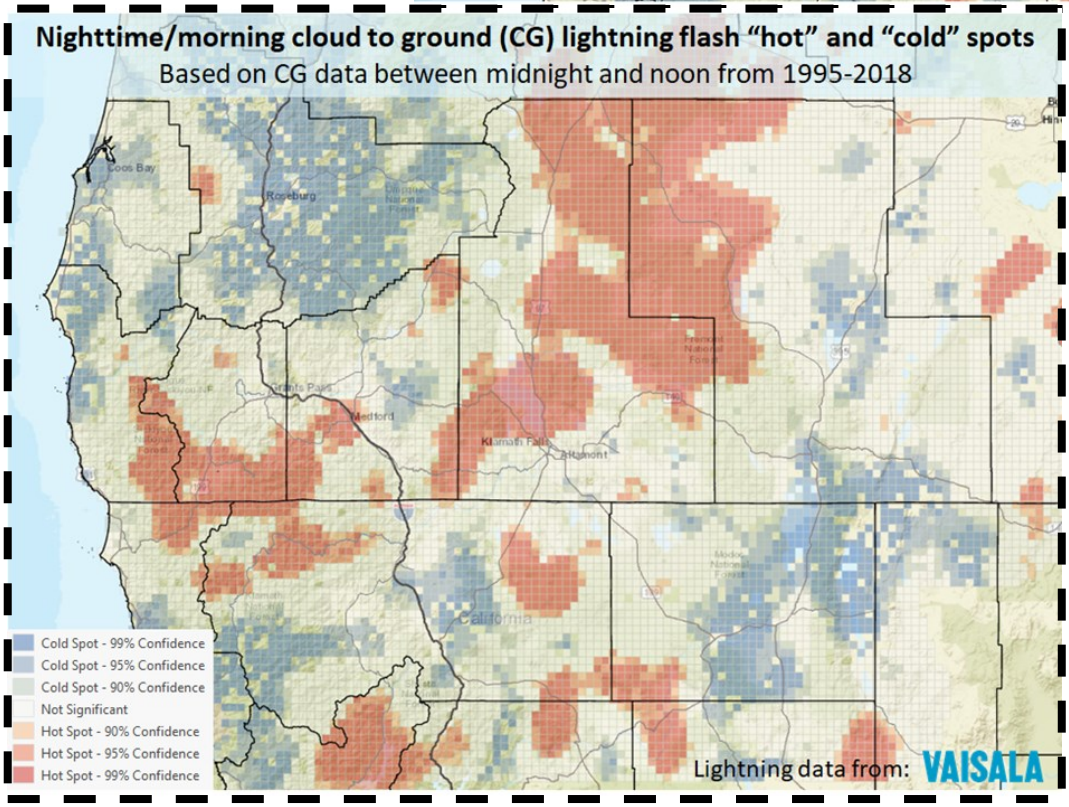
Performing Hotspot Analysis on MFR CWA Cloud-Ground Lightning Flashes:

Identifying Thunderstorm Patterns in Southern Oregon & Northern California

Shad Keene, *Lead Forecaster*

About 90 percent of the wildfire acres burned in our forecast area are lightning-caused[1], so we're acutely aware of how much impact thunderstorms can have on our area's landscape, firefighter safety, and our region's health. We've been digging deep into cloud to ground (CG) lightning climatology for our 9-county County Warning Area (CWA) to help us better understand thunderstorm patterns, and we'd like to share just a few images with you. We've used ArcGIS Pro software[2] to identify "hot" and "cold" spots for lightning. "Hot spots" are statistically significant geographic areas where CG lightning is favored, or occurs more than other areas in our CWA. "Cold spots" are statistically significant geographic areas where CG lightning, you guessed it, occurs less than other areas in our CWA. The red areas on the maps are "hot spots", and the blue areas are "cold spots". Only about 9 percent of the CG lightning flashes in our CWA occur between the hours of midnight and noon, but we believe these storms typically bring with them less rainfall, and they are generally more difficult to predict, so we're especially interested in any nighttime-morning CG flash patterns that past data can help us identify. Above we show maps for all CG flashes and for CG flashes between midnight and noon (left).





There's lots to unpack here in this imagery, and we'll be sharing more later, but first I'll ask you a few questions: "What does this imagery confirm in your thinking about lightning in our area, and what surprises do you note in this imagery?"

[1]Short, Karen C. 2017. Spatial wildfire occurrence data for the United States, 1992-2015 [FPA_FOD_20170508]. 4th Edition. Fort Collins, CO: Forest Service Research Data Archive. https://doi.org/10.2737/RDS-2013-0009.4

[2]https://www.youtube.com/watch?v=qQNOlfOYtyw

Thunderstorm Risks While Camping

Mile Bliss, *Forecaster*

Clothes sticking to your body, wet feet, and a sense of being stuck come to mind when thinking about camping in the rain. Even though southwest Oregon is considered part of the Pacific Northwest, it doesn't always feel that way. Long stretches of dry weather can make us forget both the inconveniences and the dangers that come with rainy weather, especially thunderstorms.

Have you ever considered the impacts showers and thunderstorms could have on your hiking or camping experience?

When a thunderstorm develops, it doesn't just bring rain. Thunderstorms can bring heavy downpours, strong winds, hail, and of course, lightning. Each of these comes with their own unique risk.

Heavy rain, while never fun, is not always the most impactful thing on the list. The impact from heavy rain is less recognizable, which is why it is discussed first here. Without proper rain gear, water soaks through clothes, and in windy conditions, this can lead to hypothermia. Rain rates, the amount of rain a cloud produces in a given amount of time, can be 0.10"/hr to 0.25"/hr for the common rain cloud. For thunderstorms, rain rates can exceed 2"/hr quite easily in a moisture-rich environment. The difference between these rain rates means that if a thunderstorm sits over one area, or multiple cells pass over the same spot in rapid succession, rain begins to accumulate fast! This can lead to rapid rises in creeks and streams along hiking trails. These rapid rises can sweep people and pets off their feet, creating a situation conducive for injury, especially for young children. When thunderstorms are in your area, be cautious and move to a solid shelter where you can stay dry and out of harm's way.

When a thunderstorm builds in an unstable environment and there is wind shear (winds that change in direction and/or speed with height) a thunderstorm can produce hail and strong winds. In a sheared and unstable environment, thunderstorms bring a risk for high winds and large hail. The turning winds separate the thunderstorm's core into upward (updraft) and downward (downdraft) portions. Strong surface winds are the result of either the downdraft, or the pressure gradient created as the mass of a decaying storm hurtles towards Earth's surface. It is not uncommon for these winds to exceed speeds of 40 mph, enough to knock a grown adult off their feet and toss large unsecured objects. These speeds are also fast enough to break branches and knock over leaning trees. Be aware of your surroundings and find a path towards solid, closed shelter that avoids passing under weak-appearing trees. Hail develops in the updraft. The instability allows the updraft to loft ice (graupel) through the core, which supercooled liquid water collides with, growing the ice. As the hail becomes too large for the updraft to loft, it begins to hurtle towards the Earth. The largest hail melts the least and falls the fastest. Hazards from hail include minor bumps, like being hit with a paintball, to broken bones, and worse. As hailstones increase in size and density, their fall velocity increases such that even glass is not always a strong enough barrier; be aware that a car does not always provide adequate safety against hail.

Finally, thunderstorms bring lightning. Most of us know the dangers of lightning, like igniting wildfires and in rare cases, possible death if struck by lightning. If you hear the shockwave produced from the heat energy contained within a bolt of lightning, AKA thunder, remember to seek shelter.

When camping and hiking, always be aware of where the nearest solid shelter is to you and have a plan to get there when thunderstorms develop, it could save your life!

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Our Vision

Professionals focusing on science, teamwork, and customer service to design and deliver the best decision-support information to our community.

Our Mission

Our team at the National Weather Service Office in Medford strives to deliver the best observational, forecast, and warning information through exceptional customer service, extensive training and education, maintaining quality electronic systems, and relying upon an outstanding team of weather spotters and cooperative observers. We do this within the overall mission of the NWS to build a Weather-Ready Nation:

To provide weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.

Our Values

Trust, Integrity, Professionalism, Service, Teamwork, Ingenuity, Expertise, and Enthusiasm.

About Us

The Weather Forecast Office in Medford, Oregon, is one of more than 120 field offices of the National Weather Service, an agency under the National Oceanic and Atmospheric Administration and the United States Department of Commerce. The Weather Forecast Office in Medford serves 7 counties in southwestern Oregon and 2 counties in northern California, providing weather and water information to more than a half-million citizens. We are also responsible for the coastal waters of the Pacific Ocean from Florence, Oregon, to Point St. George, California, extending 60 miles offshore. The office is staffed 24 hours a day, 7 days a week, and 365 days a year by a team of 26 meteorologists, hydrologists, electronic technicians, hydrometeorological technicians, and administrative assistants.