National Weather Service - Medford, Oregon

Summer 2023
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The Crater Chronicle

NWS Medford Helps Local High School Execute Graduation Ceremony

Spencer Higginson, *Service Hydrologist*

On June 7, Crater High School in Central Point, Oregon held on their football field their graduation ceremony for the 2023 graduating class. With the ceremony being held outdoors, the Crater High School athletic director Dave Heard stayed in close contact with the National Weather Service Weather Forecast Office (WFO) in Medford, Oregon. The forecast all week had shown that there was the potential for thunderstorms around the area.

My name is Spencer Higginson and I am the Service Hydrologist at the Medford NWS office. I live in Central Point and have children who attend Crater High School. Over the years, I've become good friends with Dave Heard as we've played basketball together and I do the announcing and run the clock at Crater High School sporting events, working directly with Dave. Several years ago, Dave was asking me for some weather info as he was trying to decide if a game should be canceled due to smoke from wildfires. I gave him what info I had but then I told him that anytime there was weather that could impact students and families, he could call the office for help with making those important decisions. He was surprised that we were that accessible and began communicating with the WFO when there was a need. Over the ensuing years, he has mentioned on many occasions how much he appreciates the help the WFO has provided. He has saved teams many hours on the road by canceling games before departure, knowing that the

Photo Credit: Dave Heard, Central Point High School Athletic Director

Summer began on June 21st at 7:57 am PDT.

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smoke would be too dense to safely play. He has also been able to avoid difficult and costly rescheduling because he received assurance from the office that a storm would already have moved through or the passes would not be impacted or whatever the case may be. He values that relationship.

Now back to the graduation ceremony on June 7, 2023. The ceremony was set to begin at 8:00pm. I was at the ceremony to celebrate the graduation of my second son from Crater High School. The crowd began filling in and as 8pm approached, the skies looked like we'd have a trouble-free evening. They marched the graduates down to the field and they took their seats. First thing they did was the national anthem. About 5 seconds into the song we heard a pretty loud but distant rumble. The clouds to the south looked a little dark but not too threatening. Then the principal got up and began speaking. About 45 seconds into his comments there was a bright flash and an immediate and very loud crack of thunder. The sky was much darker and trees had begun blowing in the increasing wind.

They immediately took the students into the gym and announced that people could go to their cars if they wanted. Dave continued to communicate with the WFO but was busy running things at the school. I was also in communication with the WFO and was able to update Dave a couple of times. Several times, after speaking with the office or me, he announced "I just spoke with the National Weather Service and...(enter most recent update here)." After about 45 minutes, Dave shared with the audience that the National Weather Service had informed him that the storm was tracking away from the high school and that the required 30 minutes without a lightning strike was approaching. We got started again at about 9pm. There was about 30 minutes of rain during the 1 hour lightning delay but it wasn't heavy rain. A light mist fell about half way through the ceremony but it wasn't enough to be disruptive.


Photo Credit: Dave Heard, Central Point High School Athletic Director

At the end of the ceremony, Dave sent me pictures showing how many people were there being impacted by the weather. He wanted us to see how many people were being helped by the NWS forecasts and the decision support services that the WFO provided. As we were texting back and forth we discussed the NWS and Dave said, "Their help got us through this as fast and as safe as possible!"

There are many people who put effort into a forecast. It starts with the long-term and then the near-term forecasting. Many people set the stage for when a weather event finally arrives. When this event finally did arrive, the two forecasters on duty during the graduation ceremony (Alexis Hermansen and Brian Nieuwenhuis) handled the storm and the communication very well. They had a lot of people relying on them and they pulled it off. Another forecaster who was off-duty went out to see the thunderstorm and he said it was the best storm he's seen in the area in his 12 years in Medford so this wasn't an insignificant event. So, while Alexis and Brian had a lot going on during the thunderstorm, they kept Dave (and me) updated throughout and gave Dave the info he needed to make the decisions he did. Aside from the lightning delay, things went very well. So while I may be a bit biased being an employee of the National Weather Service, in this case I was more of a recipient. As a member of the public, I say, thank you National Weather Service Medford and well done!

NWS Medford Expands Partnerships for Oregon's Wildfire Awareness Month

Brad Schaaf, *Lead Forecaster*

With fire season having just started for portions of the Pacific Northwest and northern California, the team at NWS Medford have continued to expand their efforts for Wildfire Awareness Month. This is the second year that the NWS in Medford teamed up with the *Keep Oregon Green Association* along with several other state and federal agencies. Together, we messaged a comprehensive safety awareness campaign all throughout the month of May.

Contributions for the campaign included a cost/loss analysis of creating a defensible space. This is based on the idea that people might take action if they learn that building a defensible space can save them money and heartbreak in the long-run.

From left to right: Chris Chambers (Wildfire Division Chief), Luke Wimmers (Ashland Fire and Rescue), Alexis Hermansen (NWS MFR), Connie Clarstrom (NWS MFR)

A team of meteorologists also took time to interview Wildfire Division Chief, Chris Chambers from Ashland Fire and Rescue, about steps people can take to harden their homes against fire and create a defensible space. As part of the interview, Chris took us to a home in Ashland, OR that demonstrated what a defensible space looks like. This example was important because it showed how you can protect yourself along the wildland urban interface. This interview premiered on May 2nd on YouTube.

Chris has been instrumental in helping us learn more about steps we can take to make our community more resilient. We will continue to build our relationship with our fire partners and communities to help them prepare for fire season. From this interview, we plan on making several YouTube shorts this summer to keep fire safety at the forefront of everyone's minds. Even though fire season has started, you can still take precautions throughout the fire season to prepare yourself.

Coming and Going, More Staff Changes at WFO MFR

Misty Firmin, Lead Forecaster

In the last edition, I wrote about the amount of staff changes underway here at NWS Medford. The list continues as another of our Electronics Technicians is leaving for a civilian position with the Air Force and moving to Okinawa, Japan.

> *"Although I was only part of Team MFR for a short three years, it has been without a doubt some of the best years of my professional career. I truly enjoyed the collaborative nature of the NWS and the natural beauty of our CWA. I consider myself very fortunate to have worked alongside such friendly and welcoming coworkers and will miss the relaxed professionalism of our office"*

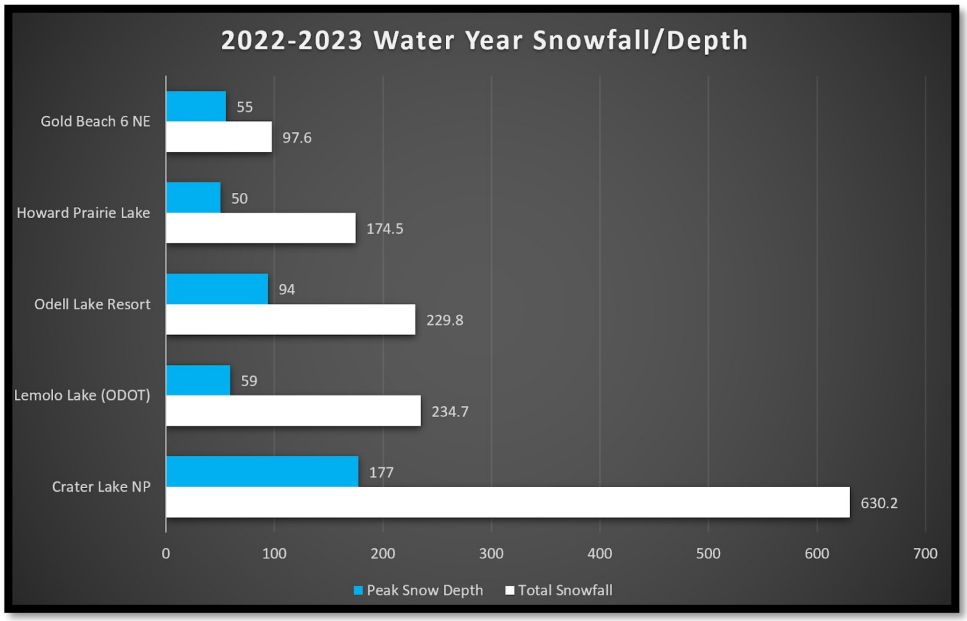
Funny enough, we're already in the process of hiring another Electronics Technician, to replace the one who retired a few months ago, and both he and the gentleman leaving us share the same name…"*so it'll be like nothing ever changed*".

Last Winter Was Snow Joke For Our Observers!

Tom Wright, *Observation Program Leader*

Snow usually ranges from a rare sight to an occasional nuisance over the lowlands of southern Oregon and northern California. For the vast majority of us, six inches of snow is a lot, but imagine getting that every day for a month like Crater Lake did (on average) in their snowiest month of this year (March).

And then imagine snowshoeing out into that every day (and for much of the season, climbing a snow bank taller than you are) to measure snowfall and snow depth, melt it all down to get a precipitation observation, and then clear and replace all the equipment for the next day. Because that's what our observers do in our mountain locations, 365 days a year.



While this past winter didn't produce record snowfall for our area, the snow really piled up. The graphic above shows the total snowfall for the season (white) and the peak snow depth (blue) for a few of our snowiest locations. And yes, you read the top of that graphic right. We have an observer a mere 6 miles northeast of Gold Beach (2,572 feet above sea level) that really did get almost 100 inches of snow!

Many thanks to all our observers who make the effort to gather data for us every day across our 50K square mile service area. It really cannot be overstated how difficult it is to keep good records like these, especially in snow over your head!

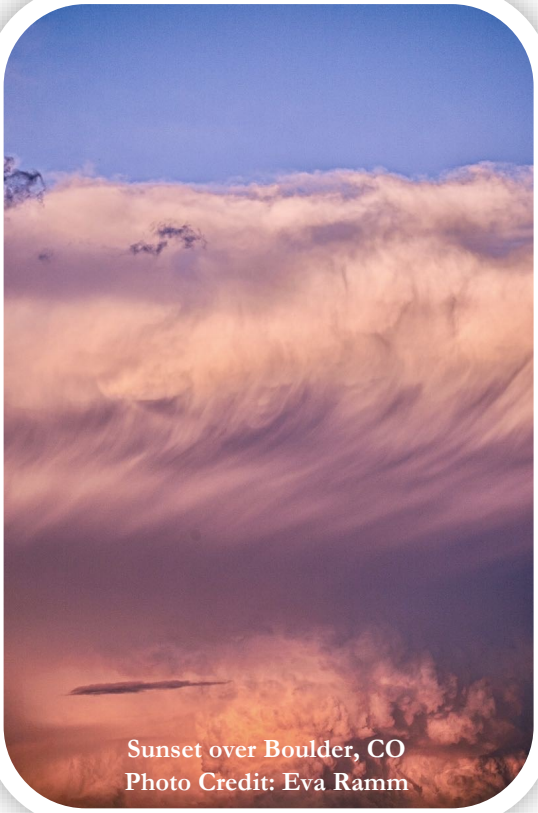
Summer Sunsets

Danny Schmiegel, *Summer Pathways Student*

The season of summer means a lot of different things for different people. For many, summer weather is a reason to stay outside longer, actively hiking or passively reading. Yet for me, summer always means one thing in particular: stunning, colorful sunsets.

The Rogue Valley's unique geography and climate allow for the creation of tall thunderstorms. Since the start of June, these storms were seen most afternoons to the east of the valley. These convective storm clouds, called cumulonimbus, can stretch multiple miles into our atmosphere, producing rain, lightning, and occasional hail. These tall, white clouds can float above the surface for hours and usually persist into sunset and twilight.

As the day ends and the sun sets lower on the horizon, the sun's light that travels into the atmosphere must pass through a longer distance of air before reaching the surface. The light hits and refracts off multiple extremely small air molecules. This refraction is governed by the idea of "Rayleigh's Scattering". This fancy physics term means that as



Sunset over Boulder, CO
Photo Credit: Eva Ramm

the light of the sun goes through more air, the air seems to filter out "blue" light. This scattering of the blue light is what gives the clouds their orange, pink, and eventually purple colors throughout the evening. The scattering also is the cause of the bright red color of the sun right before it slips under the horizon and the phenomena of "golden hour".

The color of the clouds at sunset takes an astonishing journey. It begins with the light of the sun, over 94 million miles away, entering our atmosphere and being scattered into its oranges, pinks, and purples by microscopic air molecules. This filtered light then bounces off the white surface of the previously mentioned towering storm clouds and enters our eyes. This process happens every day, yet like snowflakes, no two days are ever the same. So make sure to enjoy the summertime activities you love to do in the beautiful Rogue Valley, and try to watch as many free, natural, astronomically driven light shows as you can every evening.

WFO Medford Heats Up with Community Partner Exercise

Brad Schaaf, *Lead Forecaster*

On May 9th and May 16th, NWS Medford hosted a hybrid functional and tabletop exercise with some of our core partners that included Emergency Managers from Douglas, Siskiyou, and Jackson County; as well as Emergency Managers from the Cow Creek Tribe, the cities of Medford and Ashland, and Jackson County Health. Meteorologists practiced putting together a webinar briefing and weather stories using brand new tools designed by the NWS, and received feedback from these partners on the forecast information presented to them.

This sparked important conversations regarding how our partners wanted to communicate, as well as what methods would help them develop objective ways to balance their investments and help make their jobs easier. We learned specific heat-related thresholds our partners use in decision making and reviewed our partners' understanding of the NWS Heat Risk. We also gained insight on how Emergency Managers share our information with their partners. Overall, this will help us with how we message future heat waves that are becoming increasingly common across the Pacific Northwest and northern California.

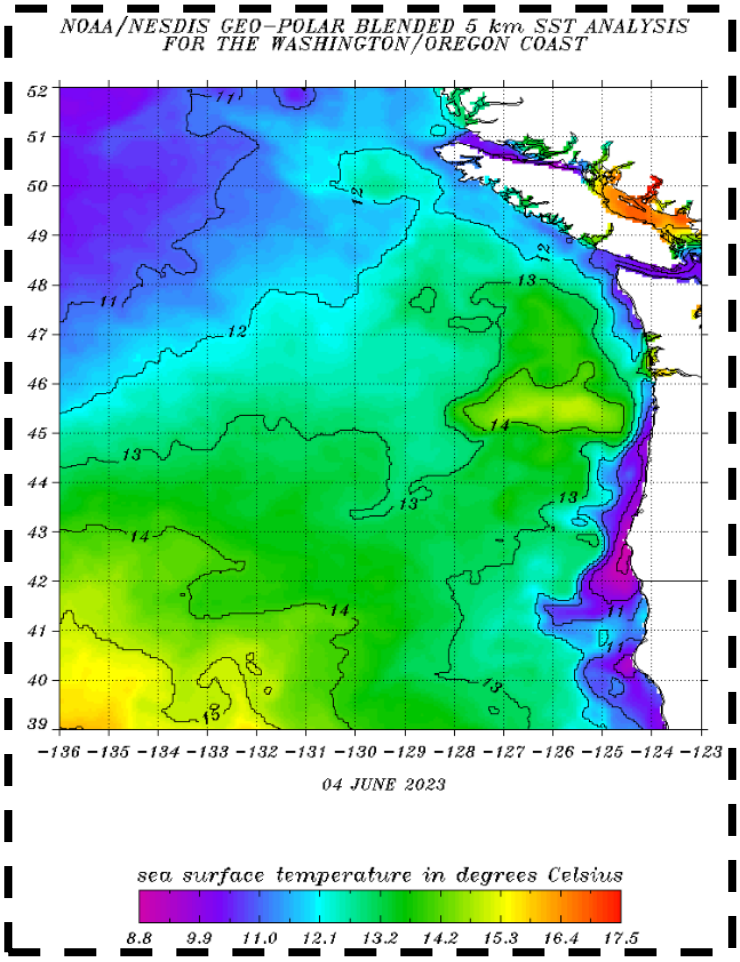
Our work is never done, however, and we will continue to evaluate our understanding of how heat waves impact our communities. We will continue to innovate and adjust our strategy for informing people with the best data possible. The idea being that the data and forecasts we provide will allow the public to make informed decisions to keep themselves and their loved ones safe.

To do this, we must continually test these plans and strategies and continue pouring our best into our relationships with our community partners. This means that we will continue working closely with local Emergency Managers and Public Health Officials who work tirelessly to keep us all safe. We look forward to hosting and attending additional exercises in the future.

Cold Water

Ryan Sandler, *Warning Coordination Meteorologist*

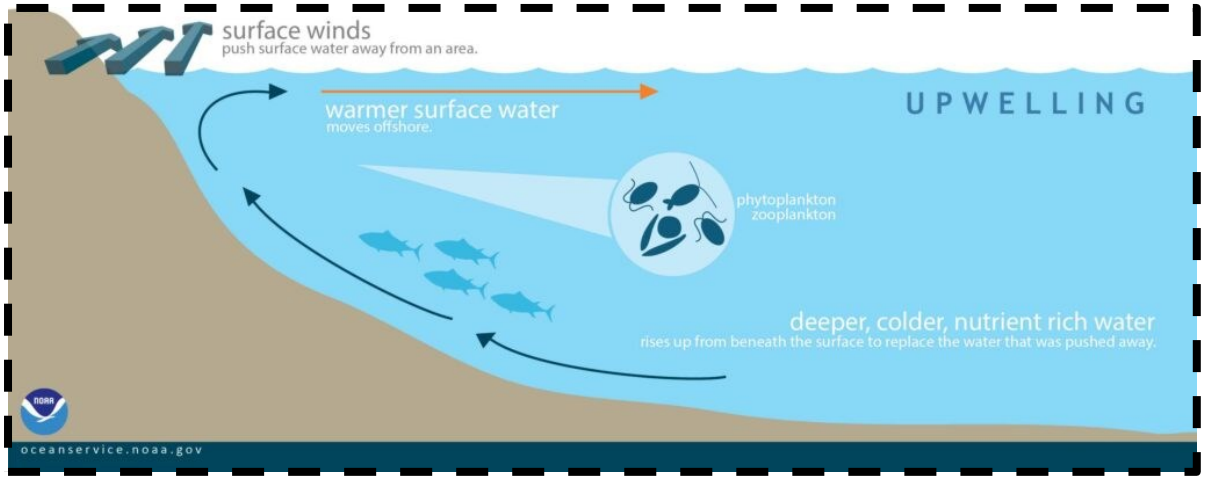
I have a confession to make: on a typical summer day, I won't swim in a pool unless the water temperature is above 80 degrees. I usually just putter around the pool and enjoy the weightlessness of the water and a good stretch. So it should come as no surprise that I've never fully immersed myself in the cold ocean along the Oregon coast.



While writing this article in early June, I'd have to travel way down to the southern tip of Baja California to Cabo San Lucas, Mexico to find water at or above 80 degrees. Let's just say I'm less adventurous and thrifty, so I choose to vacation on the beautiful southern Oregon coast. As I'm planning my trip, I find the NOAA graphic shown to the right to check out current sea surface temperatures, which are 10 to 11 degrees Celsius. My first thought is why isn't this chart in Fahrenheit? My next thought is that's only 50 to 52 degrees Fahrenheit which is ridiculously cold, especially for early June.

So why is the water off the Oregon coast so darn cold in the summer? One word…upwelling. From late spring into early fall, winds along the coast typically blow from the north or northwest. It's no coincidence that bicyclists ride from north to south when biking the Pacific Coast Highway so they can benefit from a tailwind. These north-to-northwest winds also have a tremendous impact on the ocean water near the coast. These northerly winds blowing across the ocean surface push water away and farther out to sea. Water then rises up from beneath the surface to replace the water pushed away as shown by the graphic below. The water from below is colder than the surface water it just replaced and this nearly continuous process occurs during much of the warm season.

Going back to the NOAA sea surface temperature graphic above, you can see the water temperature near Gold Beach on June 4th, 2023 was about 10 deg. C (50 deg. F). If you had gone out to sea a few hundred miles off Gold Beach the water temperature was 14 deg. C (57 deg. F). That's still really cold but 7 deg. F warmer than right along the Gold Beach coast due to upwelling. By late summer, this sea surface temperature difference typically becomes greater. By late summer, a few hundred miles off the Oregon coast, the ocean warms into the 60s while the coastline remains in the lower 50s. Due to upwelling, you won't find albacore tuna very close to the Oregon coast because this fish is found in waters warmer than 60 degrees. Maybe upwelling should be renamed tuna repellent.



Reducing Alarm Fatigue

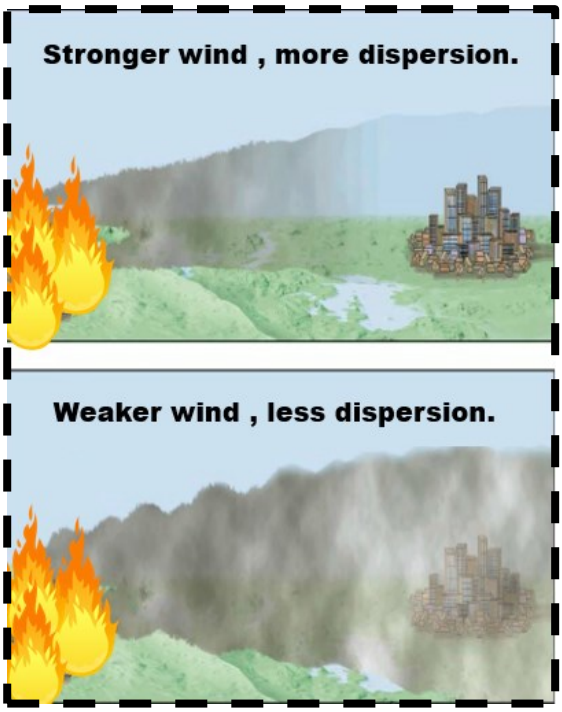
Miles Bliss & Brad Schaaf, *Fire Weather Team*

As the National Weather Service's job is to warn people of impending weather hazards, we need to be cognizant of over warning. Over warning can lead to a type of fatigue called alarm fatigue. The fatigue can cause people to become desensitized to warnings, miss alerts, or delay their responses to situations where the warning is indeed warranted.

It was brought to our attention by members of Cal Fire, US Forest Service, and the Bureau of Land Management that this was occurring with the red flag warnings for hot, dry and windy days across Modoc County. The recommended response to over warning and to reduce its impact was to better tailor the warning, reducing the occurrence.

The new criteria for relative humidity and winds will be for relative humidity to be less than or equal to 15 percent, and wind gusts must be greater than or equal to 30 mph for 3 hours or more. This criteria was chosen because the previous criteria used a slower wind speed that was more frequently observed, triggering more frequent warnings. The change to the criteria will also make the Modoc County fire weather zone in better coordination with other northeast Cal. and eastern Sierra fire zones. In addition, we will still be issuing red flag warnings for abundant lightning on dry vegetation.

During red flag warnings, we still encourage you to familiarize yourself with your fire plan; avoid using equipment that can create sparks or embers, like barbecue grills, fire pits, power tools, or mowers; check on your go kit to make sure you have everything you might need; and make sure you aren't dragging chains or parking on dry vegetation when you're traveling.



Smoke Dispersion Factors

Charles Smith, *Forecaster*

Forecasting smoke is a tricky task for many reasons. First, one needs to estimate and monitor how the source of smoke, like a wildfire, might change over time. The pollution source is one of the more important factors as it can change rapidly in a few hours of time. Obviously, a wildfire burning at a higher intensity in large timber will output more smoke than a handful of campfires. The second import parameter is assessing the instability in the atmosphere. Since smoke is a concentration of small particles, the more space it has to move and become mixed, then the less dense it will end up being in a section of the atmosphere. The atmosphere is typically very mixed in the summer so smoke should disperse fairly efficiently through the depth of the atmosphere. The third parameter is wind. In very windy conditions there is a lot of turbulence in the atmosphere. A lot of turbulence can rip apart and disperse smoke over a larger area. In addition, the turbulence in wind can transfer particles to solid surfaces, essentially removing the smoke from the atmosphere. Ironically, all these things that help disperse smoke and remove it from the air, actually help fires burn at a higher intensity, which in turn can make the fire produce more smoke.

Particularly Dangerous Red Flag Warning

Miles Bliss, Marc Spilde, Brad Schaaf, *Fire Weather Team*

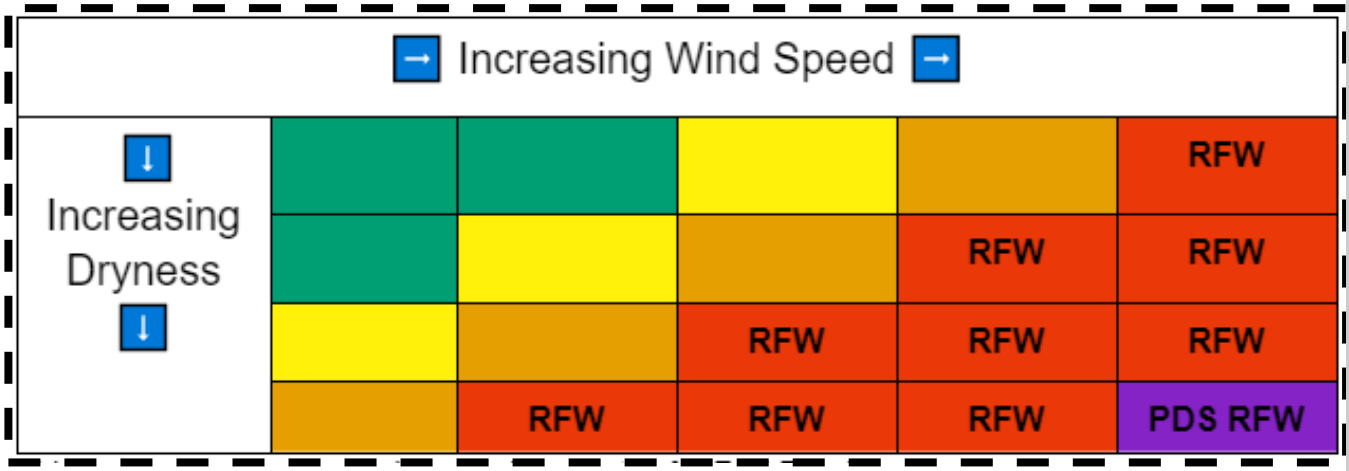
The National Weather Service has been enhancing the way we alert people to particularly dangerous fire weather conditions. Much about the warning was modeled after the PDS (particularly dangerous situation) tornado warnings available to forecasters on the Great Plains, who want to draw attention to large tornadoes that are heading towards population centers or critical public infrastructure.

In addition to the normal Red Flag Warnings we already issue, we now have the ability to inform the public of an unusually high threat of wildland fire and rapid fire spread, due to a combination of very dry fuels, very low humidity levels, and strong winds. We call this style of Red Flag Warning, a Particularly Dangerous Situation, or PDS Red Flag Warning.

As the West experiences more fires right along the rural-urban interface or, directly in an urban setting, it is important to have the right tools to highlight a situation that deserves everyone's attention. Weather forecast offices now have the option to use the PDS phrasing within the Red Flag Warning headline and body of the Red Flag Warning product. To reiterate, this is not a new product, only an addition to the existing Red Flag Warnings.

These warnings are reserved for only the rarest of events. In the chart below, we are looking for conditions that exist only in the driest and windiest scenarios, unless forecasters think the situation otherwise warrants one. In Oregon and Washington, the NWS offices in Medford, Portland, and Seattle have been meeting to organize criteria for a PDS Red Flag Warning west of the Cascades. Meanwhile, this process has already been completed for the state of California. The general idea behind this product is that we are expecting to issue it "only on rare occasions", perhaps once every three to five years as extreme conditions warrant.

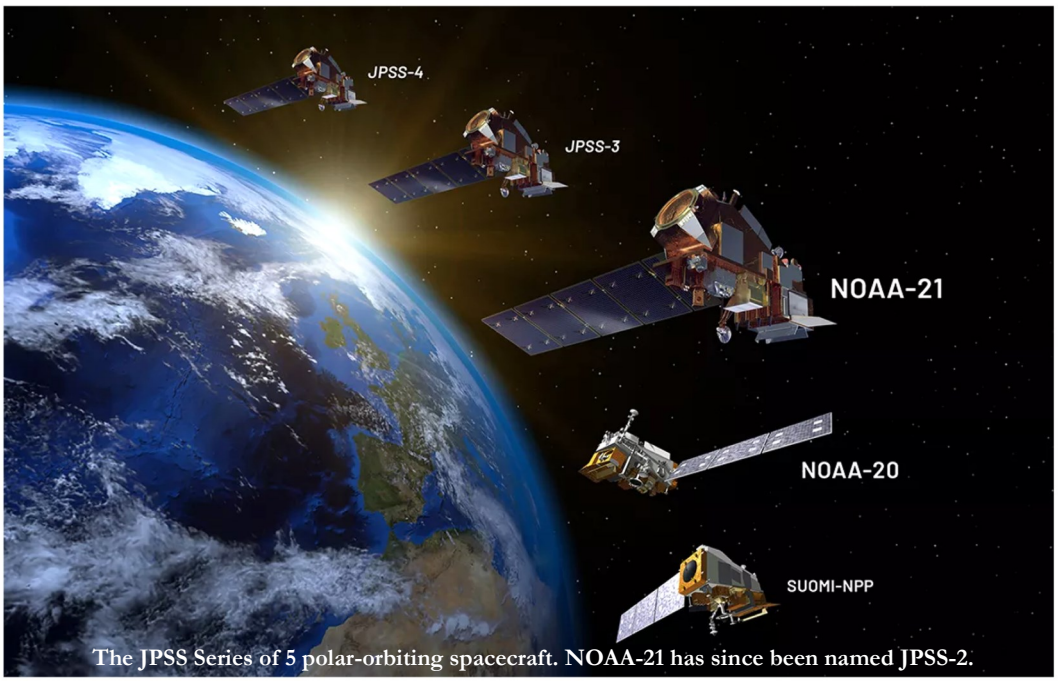
The objective of PDS Red Flag Warnings is to highlight exceptional fire weather conditions (combination of meteorological conditions and fuels) considered rare and/or especially impactful to the public and firefighting community. An example of this sort of event would have been the conditions leading to the Almeda, Obenchain, and other 2020 Labor Day fires across the region.



Weather Satellites Play Critical Role in Observing Fire and Smoke

Mike Stavish, *Science and Operations Officer*

There are two primary flavors of satellites that meteorologists are using today to aid in the observation and prediction of fire and smoke - our polar orbiters known as JPSS (Joint Polar Satellite Series), and the geostationary type known as the GOES-R series. Each breed has unique contributions to forecasting, including fire and smoke observing capabilities critical to providing important decision support services to our community of users.



The JPSS Series of 5 polar-orbiting spacecraft. NOAA-21 has since been named JPSS-2.

Let's first talk about the JPSS series. These (soon to be 5) satellites orbit at 512 miles above earth, and circle the planet about once every 90 minutes from pole to pole. So, unlike the geostationary satellites, the swath of observed data that the satellite collects is narrow and not in constant view. The latency of data is relatively high, hence time between "satellite pictures" is too great to produce a smooth animation of the imagery. The primary instrument for observing clouds, smoke and fire aboard the JPSS series is the VIIRS, or Visible Infrared Imaging Radiometer Suite.

With VIIRS we have 22 bands of high-resolution imagery in 375m and 750 m resolution. These high resolution images provide the clearest and most detailed pictures of current-day operational satellite imagery. One product developed is the VIIRS Active Fire Product, which utilizes the FRP (Fire Radiative Power) algorithm to show active fire detection and characterization. Mapping of fire location and intensity aids forecasters and fire managers in situational awareness and intelligence on how fires are evolving. *cont. on next pg.*

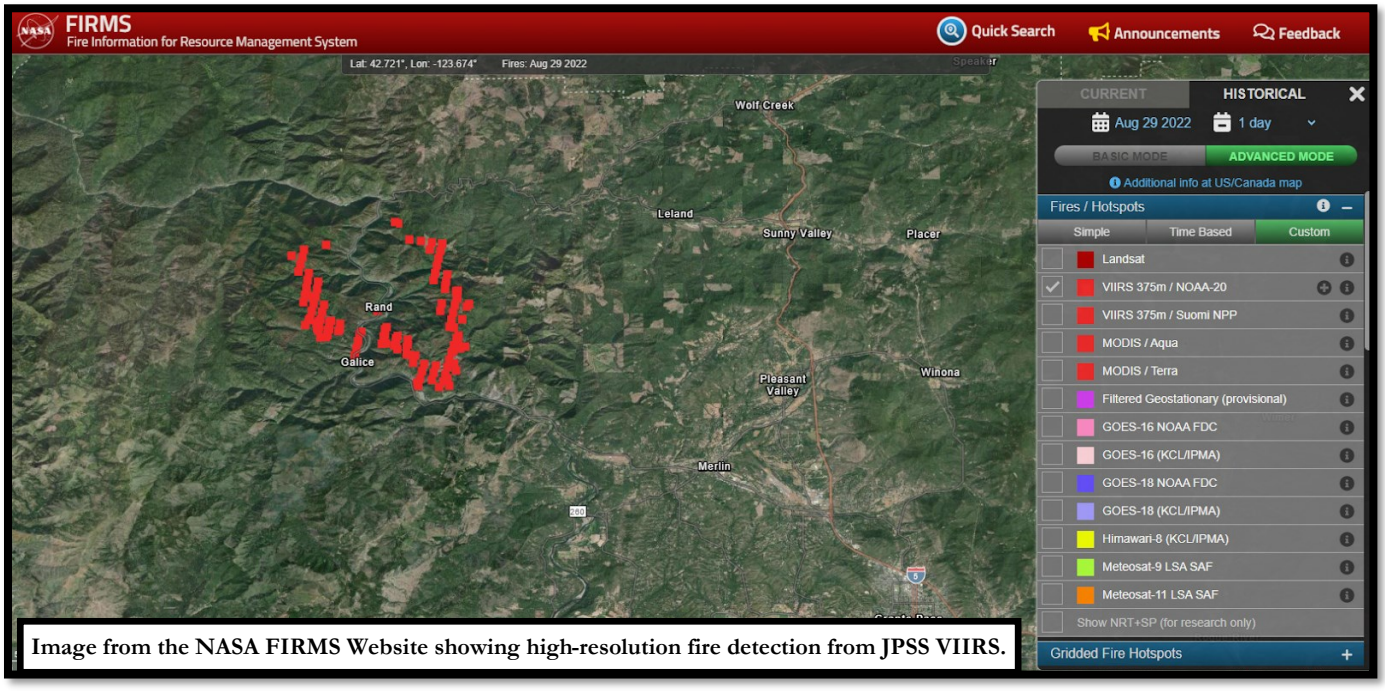
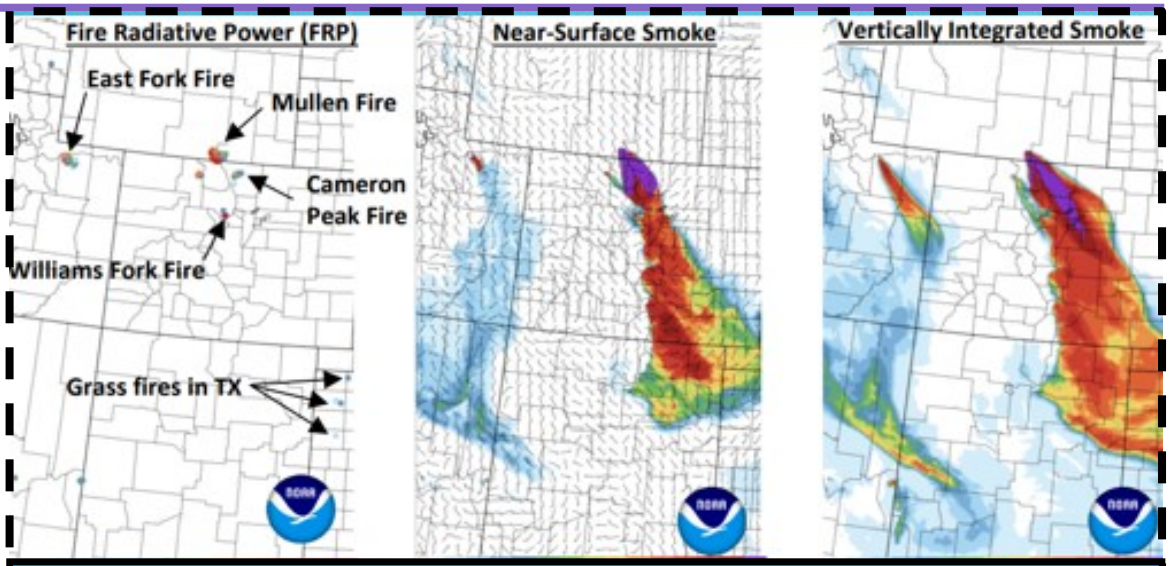


Image from the NASA FIRMS Website showing high-resolution fire detection from JPSS VIIRS.

One widely used current-day guidance used for smoke forecasting is called the "HRRR Smoke" It is a high resolution (3km) model simulation of smoke transport provided for fires detected by the VIIRS instrument and processed via the Fire Radiative Power algorithm.

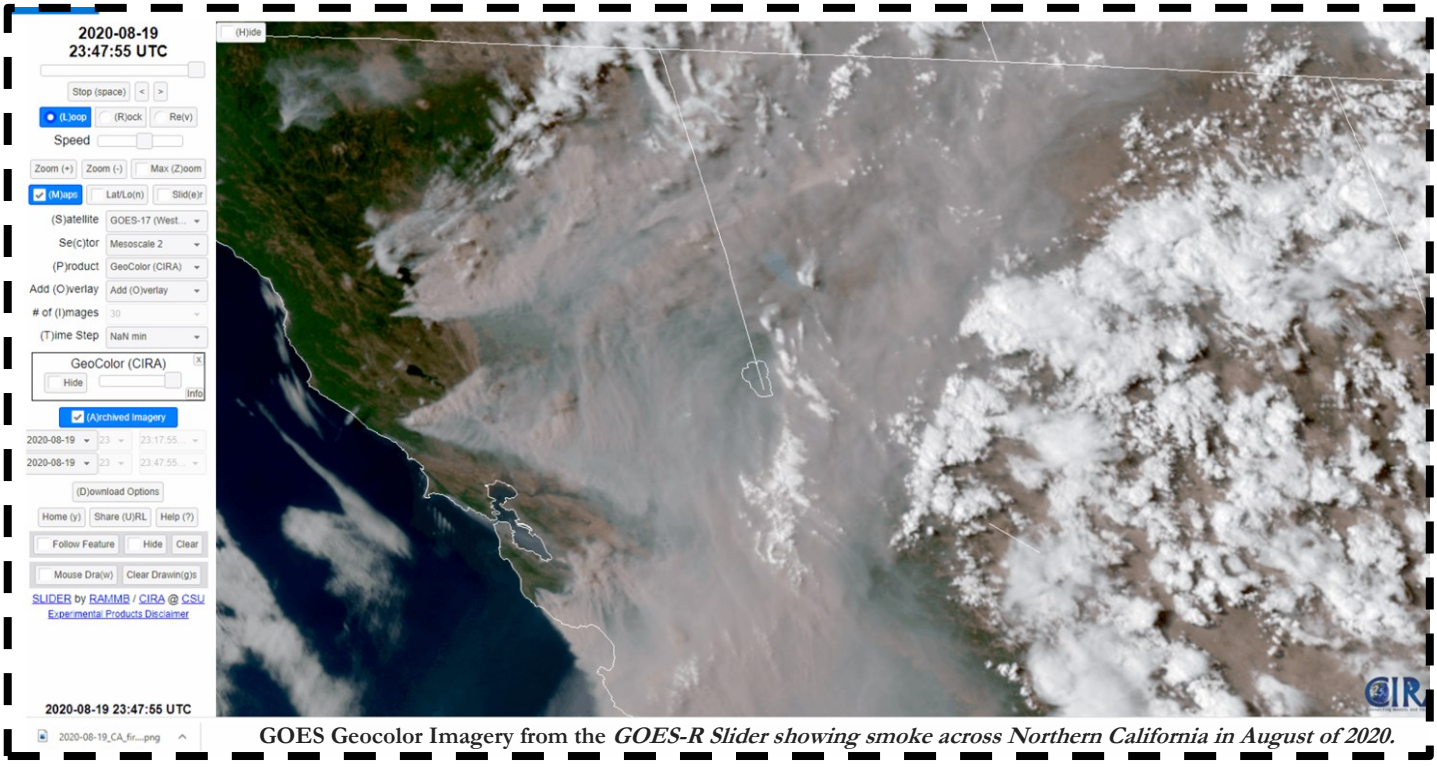


Example of HRRR Smoke which utilizes VIIRS for fire points and smoke production.

The Geostationary satellites (GOES-R series East and West) uses 16 channels of imagery from the Advanced Baseline Imager (ABI) to produce a variety of imagery and products. The 3.9 channel is especially useful as it is very sensitive to high heat near the earth's surface. Also, imagery from individual channels is transformed into multispectral "RGB" imagery to tease out a variety of details otherwise difficult to see. Unlike the higher resolution of the polar satellites, the Geostationary satellite offers pixel resolutions only as small as 500m, but mostly between 1000m and 2000m.

With the GOES-R series comes a "fire hotspot" suite provided to forecasters which provides 3 characteristics of fire detection including size, intensity, and power. In addition, special RGBs, such as the Fire Temperature RGB, provide forecasters with eye-friendly pictures of fires and use intelligence to apply colors that offer an intuitive feel for actual fire. The latency of the images received from the GOES satellites is fast, as high as 1-minute per image, and this allows for smooth animations which allow the observer to get a very good understanding of trends in development and intensity of features. RGBs are available for the polar satellites as well.

Smoke is observed very well on both satellite types using primarily the 0.64 visible channel, but RGBs such as the "GeoColor" RGB, make observing smoke easier, since smoke color is enhanced and contrasts with surrounding land features and other surface characteristics are provided.



GOES Geocolor Imagery from the *GOES-R Slider showing smoke across Northern California in August of 2020.*

National Weather Service - Medford, Oregon

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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.