



# Medford 2021 Smoke Season Forecasting

Wednesday, October 13

Ryan Sandler - NOAA's National Weather Service - Medford, OR





# Key Points

Wednesday, October 13

- **More than 2 million acres burned across southern Oregon and northern California this past summer.**
- **The Bootleg Fire in the Fremont-Winema National Forest made national headlines with extreme fire behavior and firenadoes.**
- **The HRRR Smoke Model was used extensively by the NWS Medford meteorologists, mainly in their AWIPS computer system. The model has improved since the extensive 2018 fires and smoke.**
- **There were many smoke impacts in southern Oregon and northern California.**

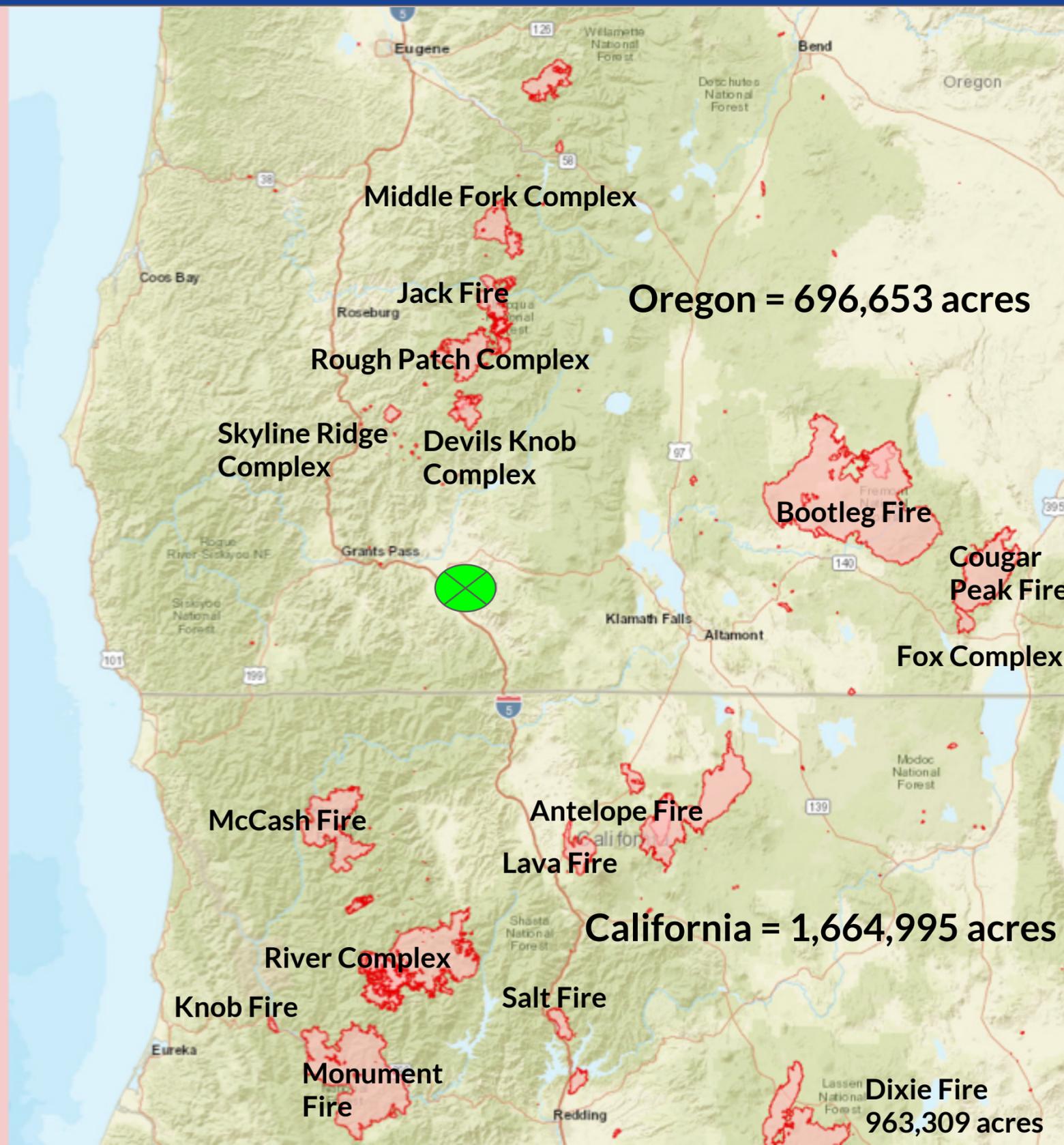


# Fire Map - Summer 2021

Wednesday, October 13

Total acres burned for S OR & N.  
CA: 2,361,648

The cause of these 16 large fires:  
10 lightning  
1 Human  
5 Undetermined



Oregon Dept. of Forestry  
Southwest District kept fires  
small around the Medford region:

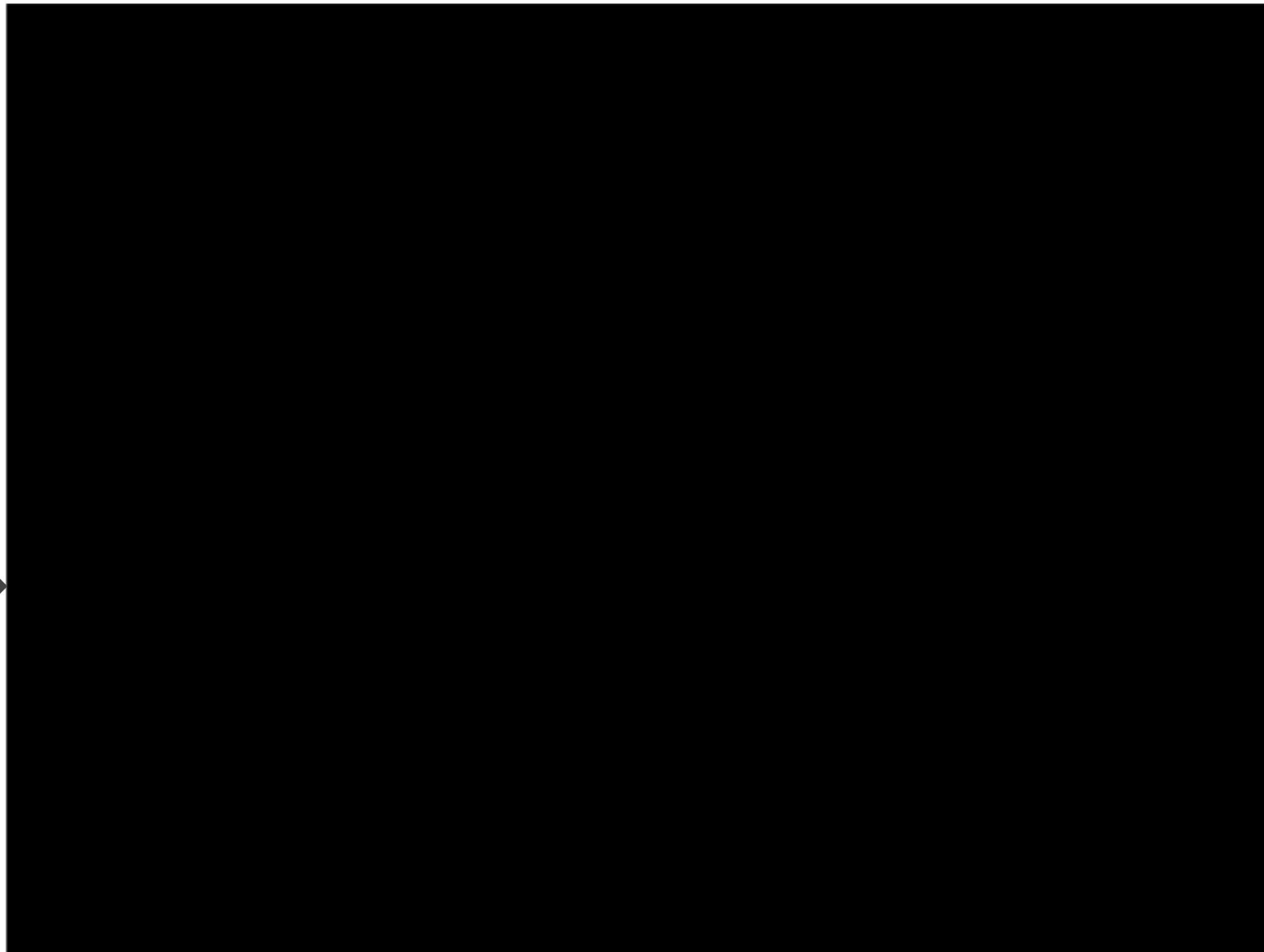
254 Human Caused = 324 acres  
63 Lightning Caused = 59 acres



# Satellite View of Bootleg Fire Smoke - July 19, 2021

Wednesday, October 13

Medford



Credit...  
NOAA,  
NASA Goddard Space Flight Center,  
CIRA



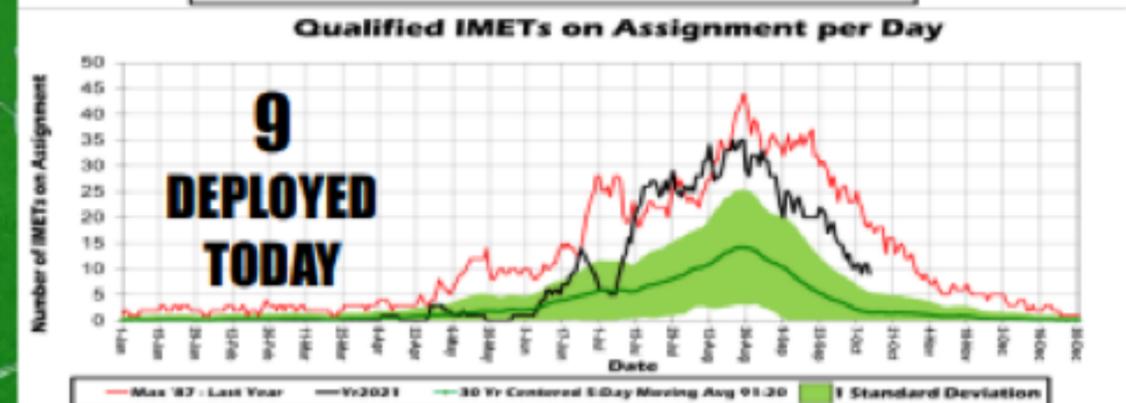
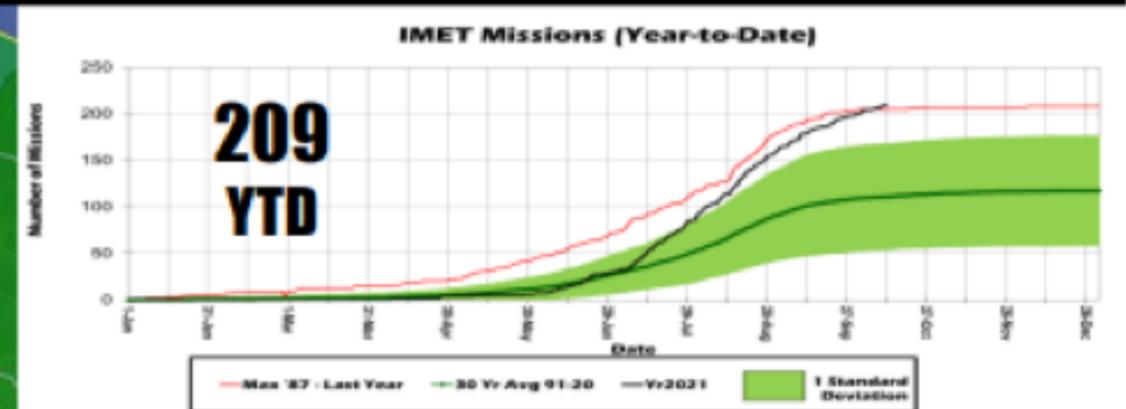
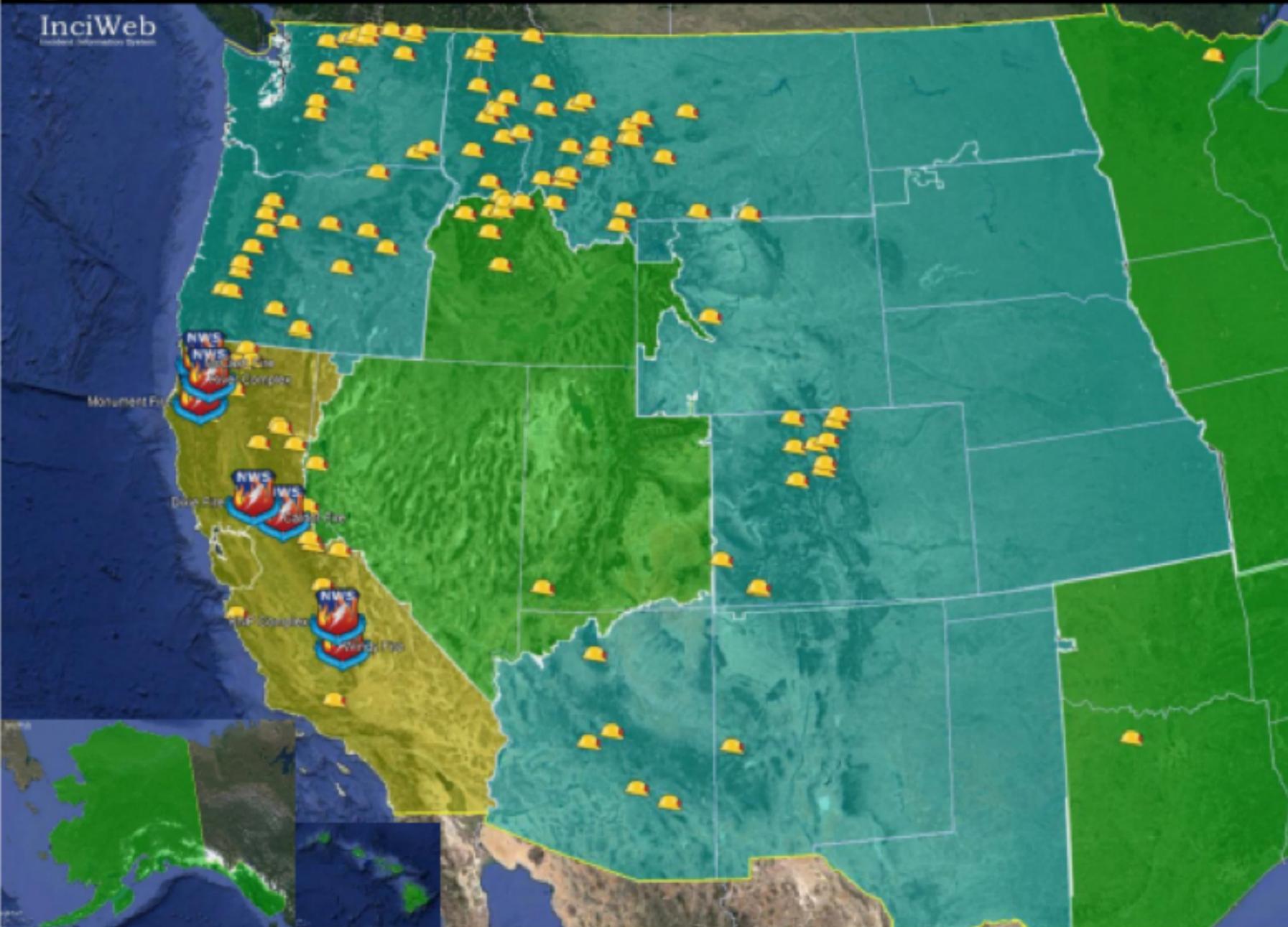
# NWS Incident Meteorologists - Busy!

Wednesday, October 13



## IMET STATUS REPORT

### 12 OCTOBER 2021



| NATIONAL IMET AVAILABILITY |                         |                      |                 |
|----------------------------|-------------------------|----------------------|-----------------|
| IMETs DEPLOYED             | IMETs EN ROUTE          | TRAINEES DEPLOYED    | IMETs AVAILABLE |
| 9                          | 1                       | 1                    | 14              |
| OPERATIONAL STATUS         |                         |                      |                 |
| NORMAL DEPLOYMENTS         | SIGNIFICANT DEPLOYMENTS | HISTORIC DEPLOYMENTS |                 |
| 2 ●                        | 6 ●                     | 22 ●                 |                 |

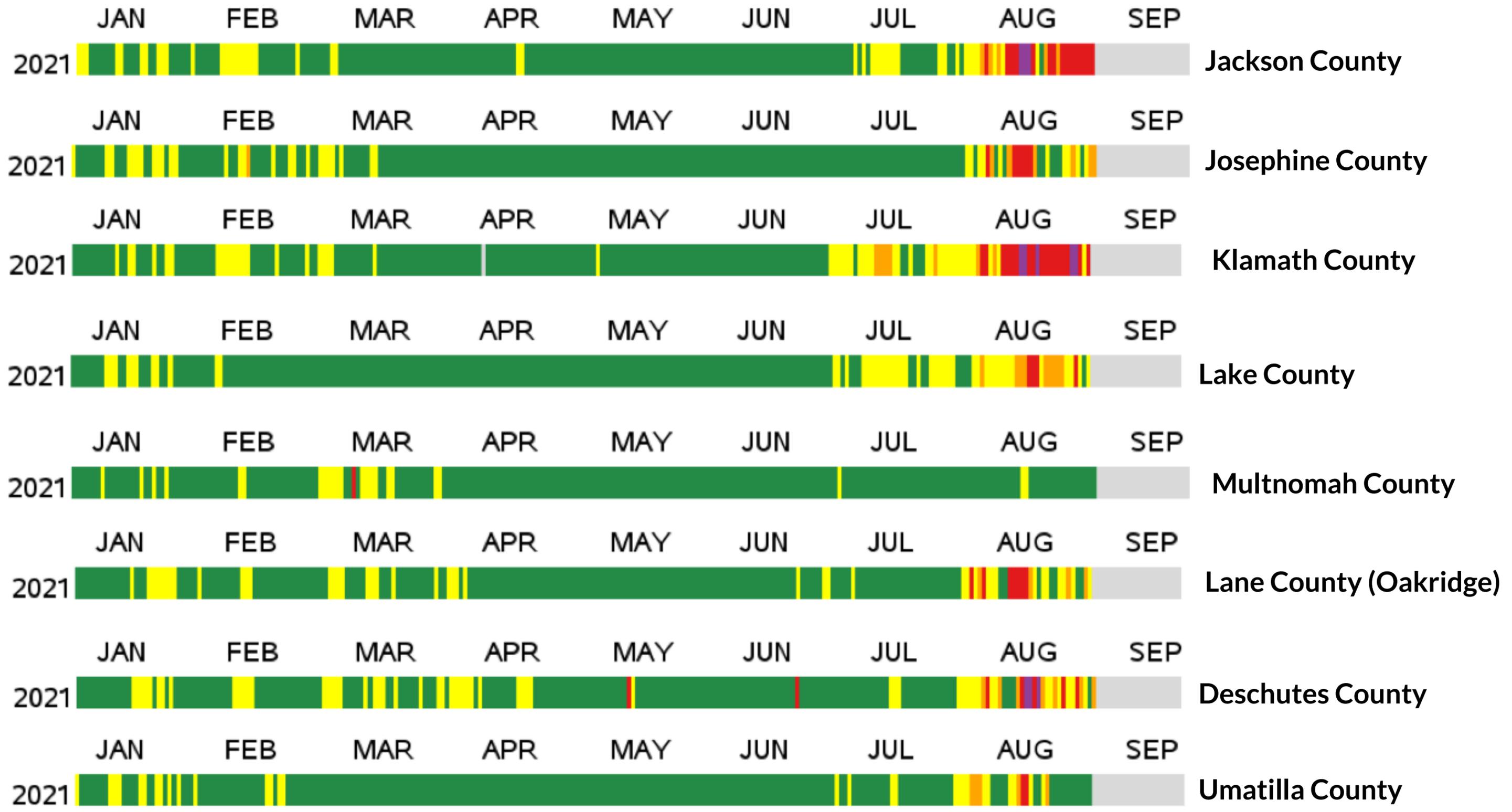




# EPA PM2.5 Daily AQI Values

(Through August 29th)

Wednesday, October 13





# Oregon Forest Fire and HRRR Model Breakpoints Differ

Wednesday, October 13



State of Oregon Department of Environmental Quality

## Forest Fire Smoke Categories and Breakpoints

| Air Quality Rating                   | AQI     | PM <sub>2.5</sub> 24-hour Average Concentration (µg/m <sup>3</sup> )* | PM <sub>2.5</sub> 8-hour Average Concentration (µg/m <sup>3</sup> )* | PM <sub>2.5</sub> 1-hour Average Concentration (µg/m <sup>3</sup> )* | 5-3-1 Visibility Index (miles) |
|--------------------------------------|---------|---|--|--|--------------------------------|
| GOOD                                 | 0-50    | 0-12  | 0 – 22   | 0-38   | 15+                            |
| MODERATE                             | 51-100  | 12-35   | 23-50  | 39-88  | 5-15                           |
| UNHEALTHY for Sensitive Groups (USG) | 101-150 | 35-55   | 51-79  | 89-138   | 3-5                            |
| UNHEALTHY                            | 151-200 | 55-150  | 80-200   | 139-351  | 2-3                            |
| VERY UNHEALTHY                       | 201-300 | 150-250   | 201-300  | 352-526  | 1-2                            |
| HAZARDOUS                            | >300    | >250  | >300   | >526   | <1                             |

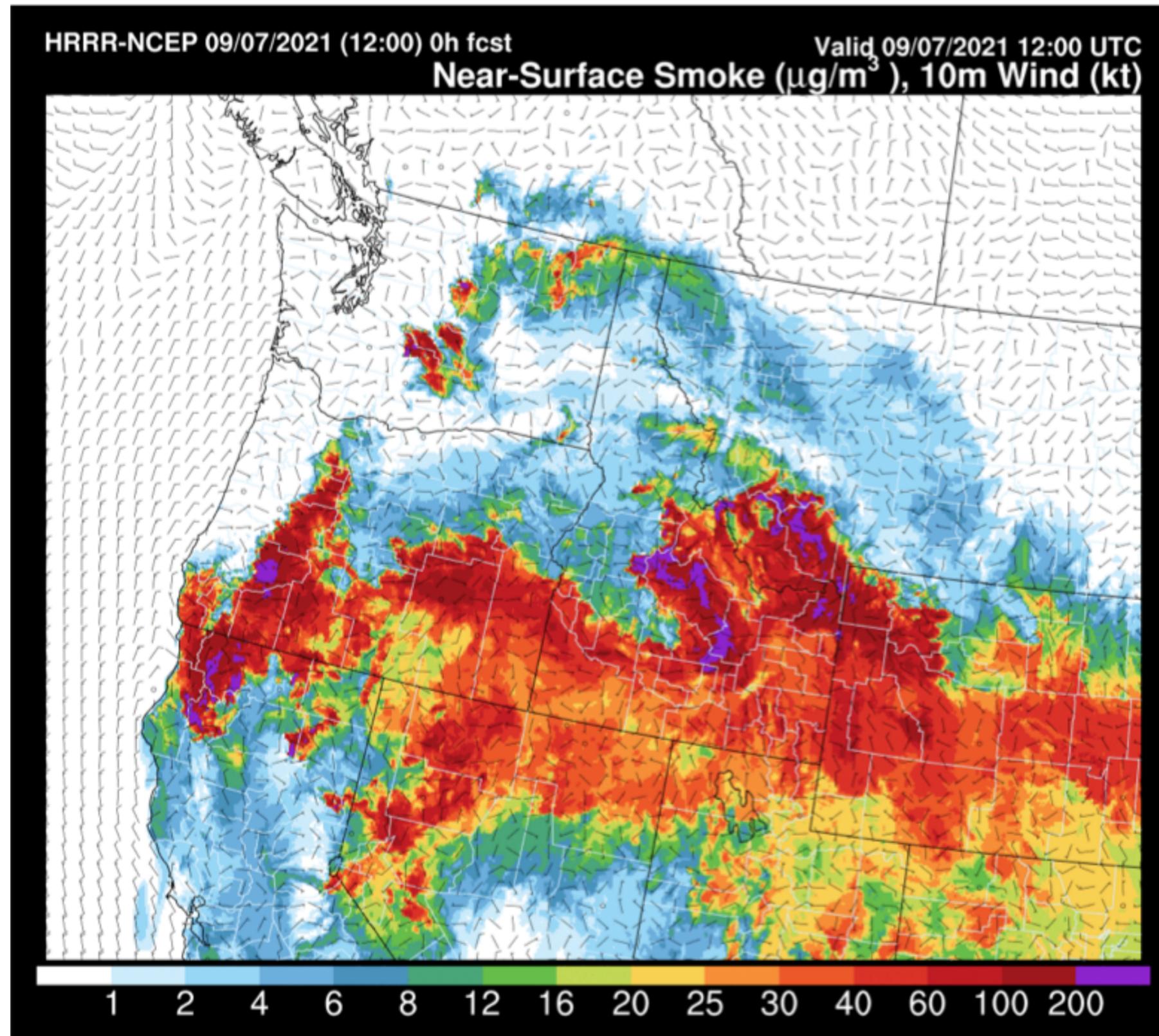
\* (µg/m<sup>3</sup>) = micrograms per cubic meter



High-Resolution Rapid Refresh (HRRR) Smoke Model Legend

## HRRR Smoke Model:

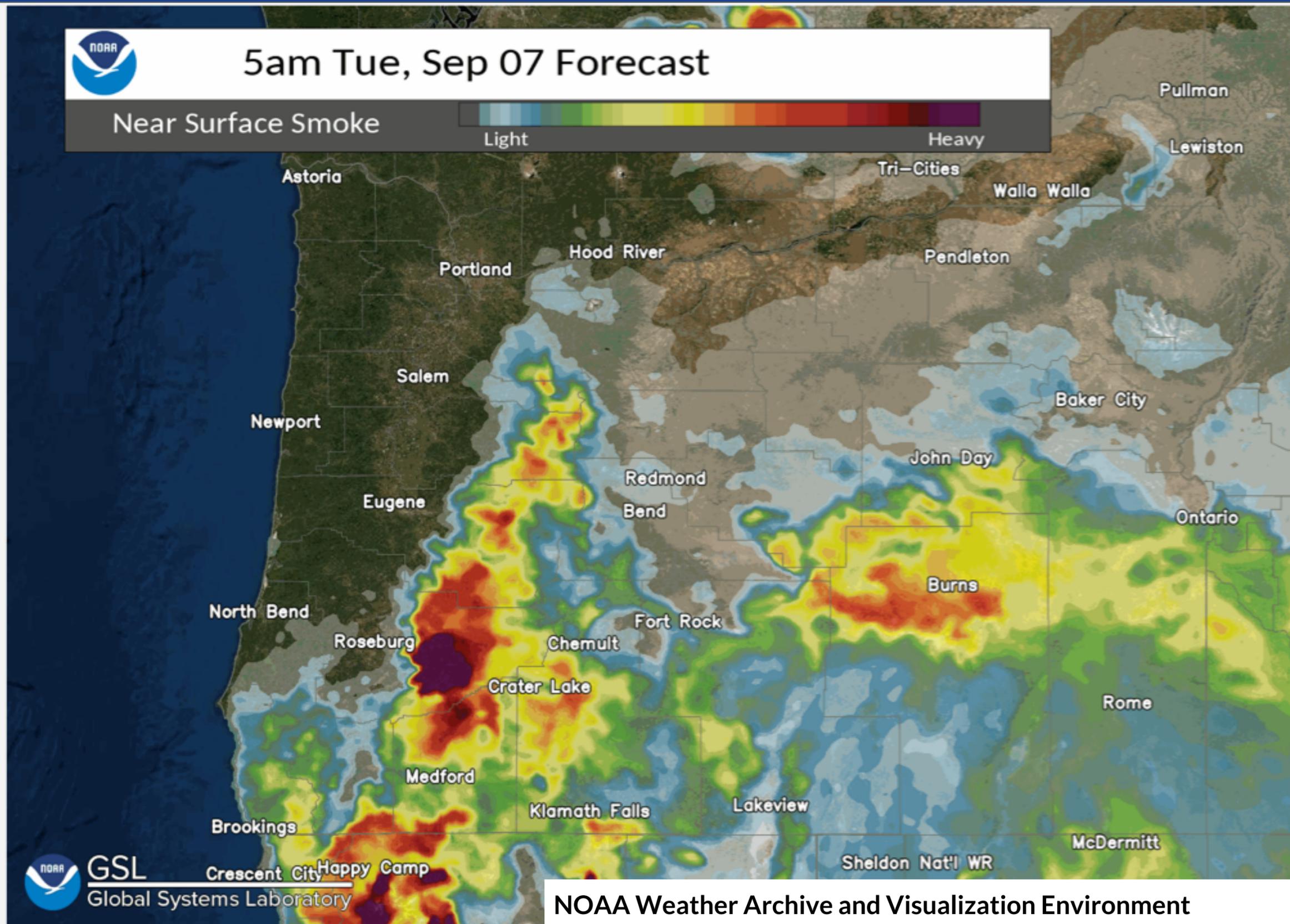
- Operational since 2020 so <1% downtime
- Need cities and zoom features rather than just a NW sector
- Can't save as a GIF
- Would prefer PDT over UTC time
- Smoke scale is mostly hourly good to moderate air quality levels
- Available on NWS AWIPS computers with map overlay features. We can use a tool to create smoke boundaries into the forecast (i.e. patchy, areas, widespread smoke)
- The HRRR model does better in the boundary layer than other models because it shows the smoke inhibiting heating and mixing during the day.
- The HRRR near surface smoke tries to clear the smoke out too soon. The Vertically Integrated smoke back edge clearing works better.





# HRRR Smoke Model - Near Surface Smoke

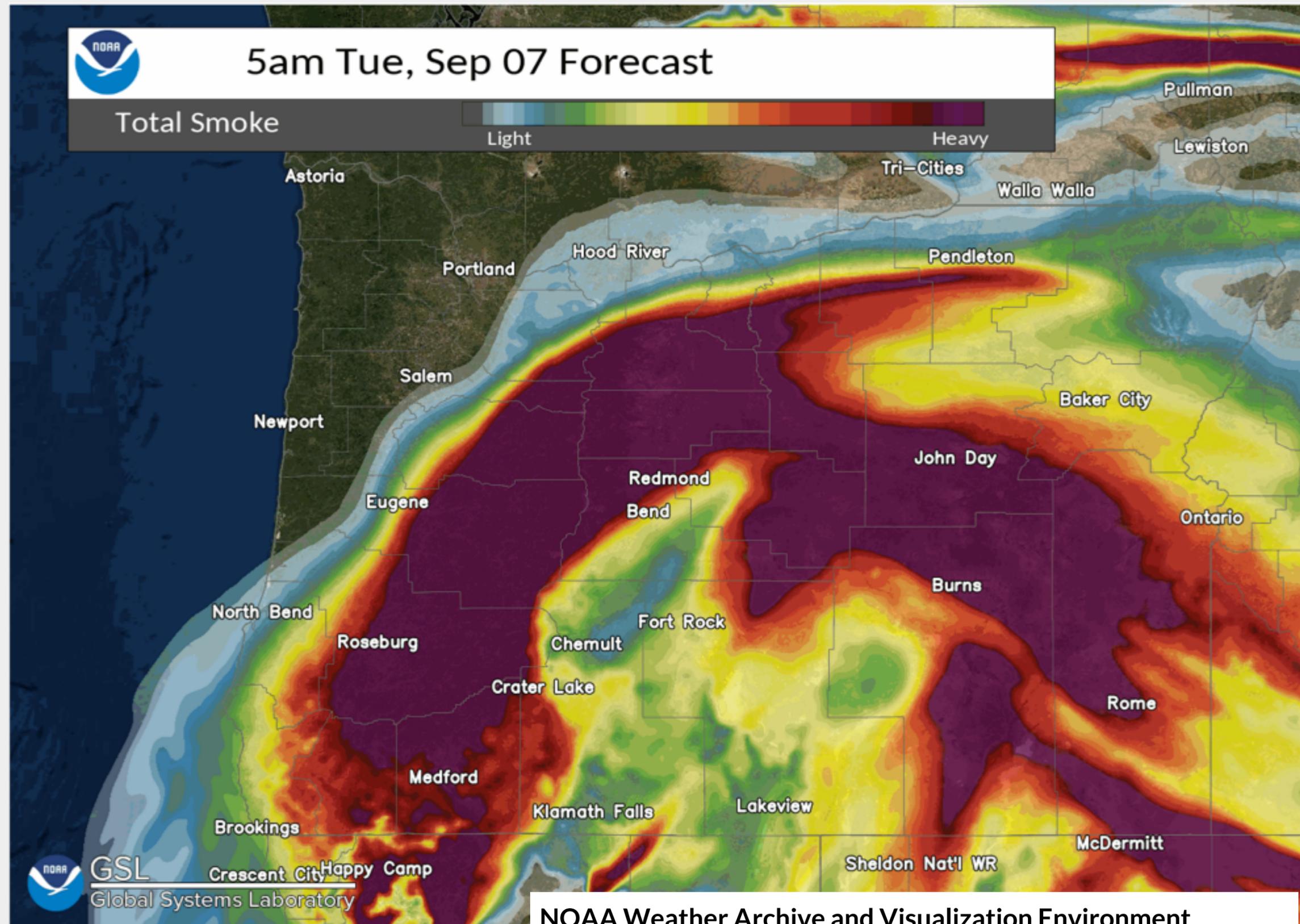
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# Vertically Integrated Smoke (Total Smoke)

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# On Our Webpage for the Public

Wednesday, October 13

Southern Oregon and Northern California Smoke Forecast from the HRRR model  
(Updates hourly)

**weather.gov/mfr/wildfire**

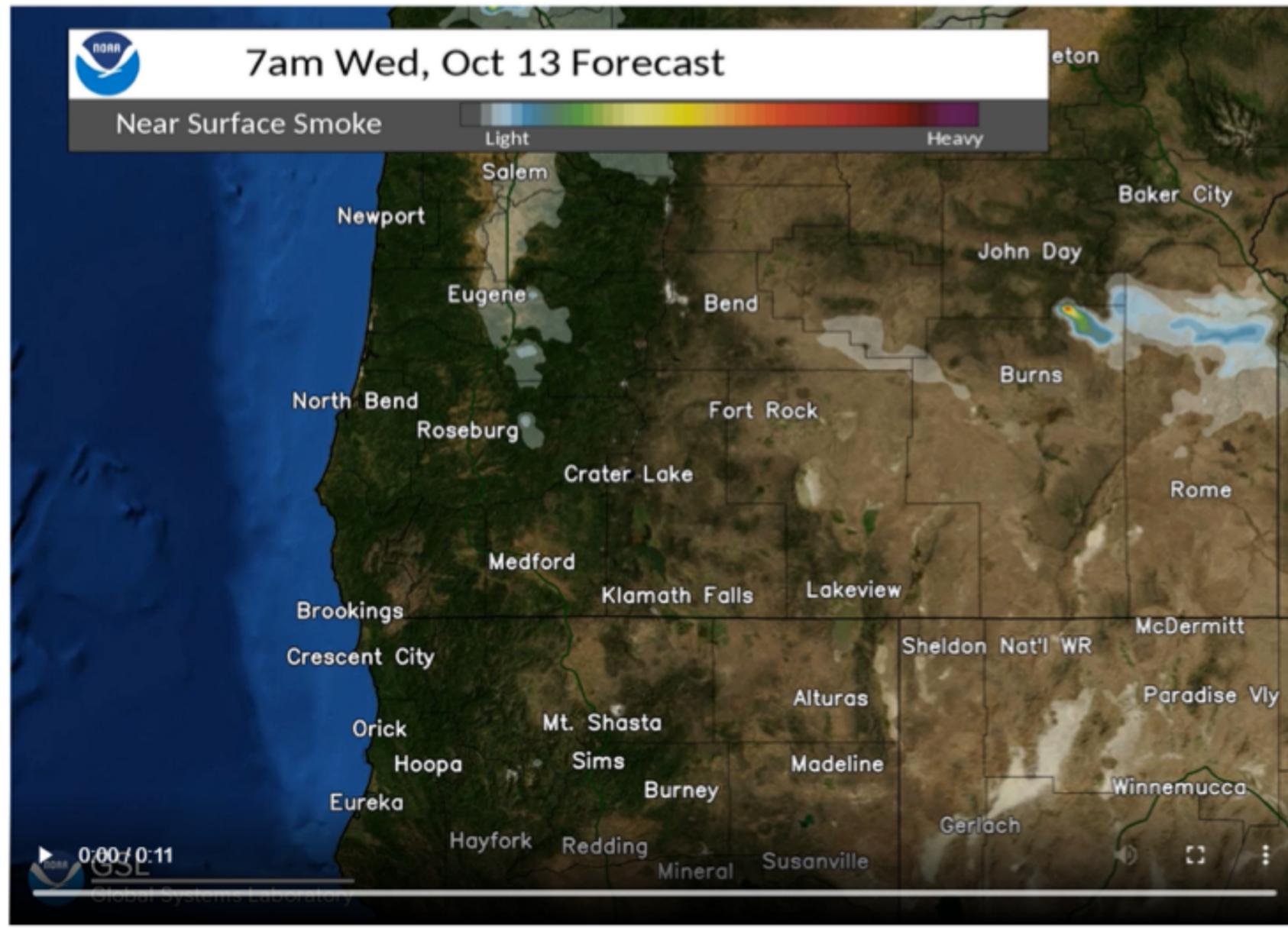
Surface Smoke   Surface Smoke Extended   Total Smoke (plus smoke aloft)   Western US (plus smoke aloft)

## HRRR Smoke Model Tutorial

Medford, OR  
Weather Forecast Office

[Weather.gov](#) > [Medford\\_OR](#) > HRRR Smoke Model Tutorial

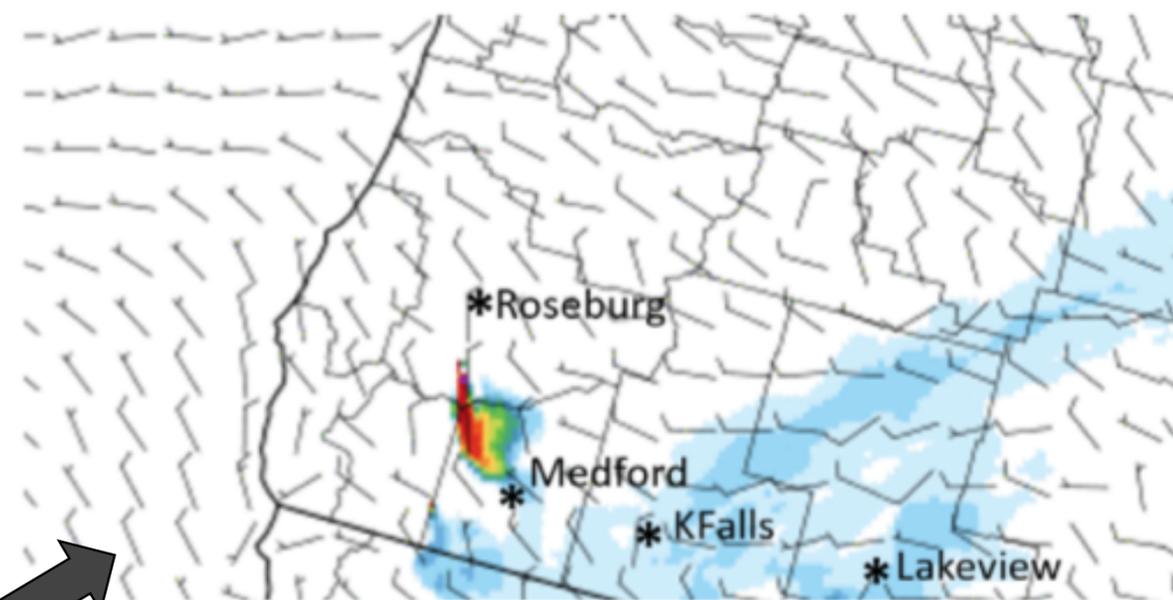
[Current Hazards](#)   [Current Conditions](#)   [Radar](#)   [Forecasts](#)   [Rivers and Lakes](#)   [Climate and Past Weather](#)   [Local Programs](#)



The animated movie on the [weather.gov/medford/wildfire](#) web page is based on the HRRR. Typically those movies only go out 18 hours. If you want to view imagery that goes out 48 hours, this tutorial will help you get there. The HRRR smoke model has really improved over the past several years and can provide a good idea on where the greatest/least concentration of smoke will be, out to 48 hours. Please understand when viewing this imagery that no model is perfect, and it's usually best to use to view trends where smoke is getting worse or better. Take a look at the AQI in your area, and then you can use the model to see if it looks like your area will improve or worsen through the day/night.

Here's the link to the smoke model page: <https://rapidrefresh.noaa.gov/hrrr/HRRRsmoke/>

Note that this imagery only shows county boundaries. Below is an image with some approximate city locations as a reference in case you're not familiar with all county boundaries.



[HRRR Smoke Model Link with tutorial and access to full, 48 hour runs](#)



# Air Resource Advisor - USFS

Wednesday, October 13

## Air Resource Advisor



### Smoke Outlook for 10/07 - 10/08

#### California North Coast - McCash Fire

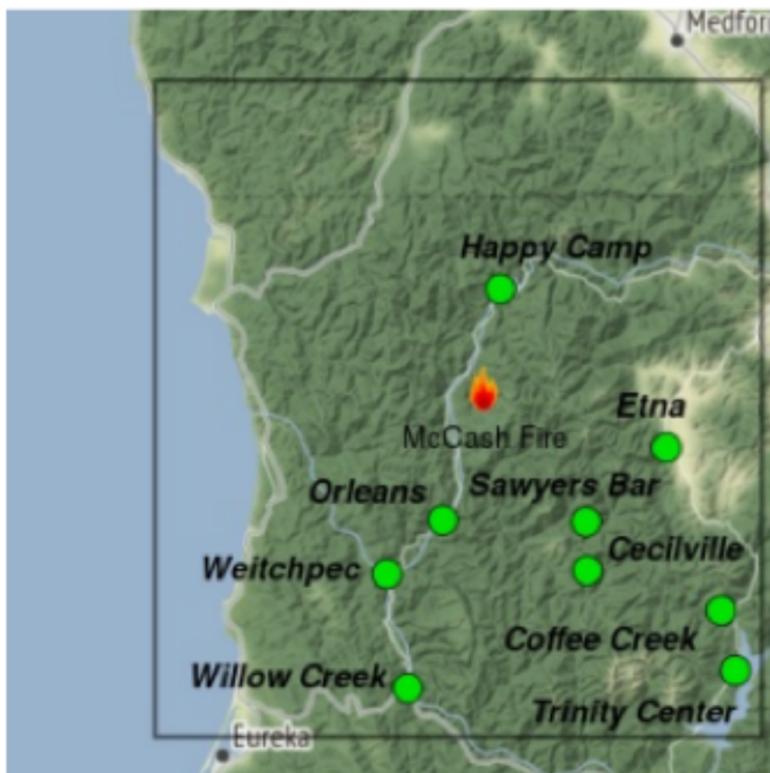
Issued at: 2021-10-07 06:38 PDT

#### Fire

The McCash Fire has burned 94962 acres with 61% containment. Surface fuels remain wet/damp from the residual effect of the previous day's precipitation. Cooler temperatures, and moderate relative humidity will slow the drying of surface fuels limiting the fire spread potential. Crews will continue to monitor the entire perimeter and mop-up on the north and west flanks of the fire. Detailed information on the McCash Fire can be found here: <https://inciweb.nwcg.gov/incident/7757/>.

#### Smoke

Early morning winds will shift from the northeast to the northwest after noon today. Expect lifting today around 11 AM. Smoldering and creeping with limited fire spread are expected across the fire producing minimal smoke production. Communities to the southeast and southwest of both the McCash and River Complex fires (i.e., Trinity Center and Coffee Creek) may see air quality in the moderate for some periods later in the afternoon. There will be a small (< 20 acres) prescribed burning operation unrelated to the incident today east and north of Happy Camp that could move smoke into this community near midday.



Daily AQI Forecast\* for Oct 07, 2021

Issued 2021-10-07 06:38 PDT by John Iames, Air Resource Advisor john.iames@gmail.com

| Station        | Yesterday      |      |    | Wed<br>10/06 | Forecast*<br>Comment for Today -- Thu, Oct 07    | Thu<br>10/07 | Fri<br>10/08 |
|----------------|----------------|------|----|--------------|--|--------------|--------------|
|                | hourly         |      |    |              |  |              |              |
|                | 6a             | noon | 6p |              |  |              |              |
| Happy Camp     |                |      |    | ●            | Good air quality today, possible moderate midday | ●            | ●            |
| Sawyers Bar    |                |      |    | ●            | Good air quality today.                          | ●            | ●            |
| Cecilville     | No hourly data |      |    | ●            | Good air quality today.                          | ●            | ●            |
| Orleans        |                |      |    | ●            | Good air quality today.                          | ●            | ●            |
| Weitchpec      |                |      |    | ●            | Good air quality today.                          | ●            | ●            |
| Willow Creek   |                |      |    | ●            | Good air quality today.                          | ●            | ●            |
| Etna           |                |      |    | ●            | Moderate early AM, good through the day          | ●            | ●            |
| Trinity Center |                |      |    | ●            | Good air quality today                           | ●            | ●            |
| Coffee Creek   | No hourly data |      |    | ●            | Good air quality with periods of moderate        | ●            | ●            |

| Air Quality Index (AQI) | Actions to Protect Yourself   |
|-------------------------|---|
| ● Good                  | None  |
| ● Moderate              | Unusually sensitive individuals should consider limiting prolonged or heavy exertion.     |
| ● USG                   | People within Sensitive Groups* should <b>reduce</b> prolonged or heavy outdoor exertion. |
| ● Unhealthy             | People within Sensitive Groups* should <b>avoid all</b> physical outdoor activity.        |
| ● Very Unhealthy        | Everyone should avoid prolonged or heavy exertion.  |
| ● Hazardous             | Everyone should avoid any outdoor activity.   |

**\*Disclaimer:** This forecast is based on fine particulates only; ozone is not included. Forecasts may be wrong; use at own risk. Use caution as conditions can change quickly. See your health professional as needed. Smoke sensitive groups should take appropriate precautions.

- Additional Links**
- California Smoke Blog -- <http://californiasmokeinfo.blogspot.com/>
  - Oregon Smoke Blog -- <https://oregonsmoke.blogspot.com/>
  - McCash Fire Information - Inciweb -- <https://inciweb.nwcg.gov/incident/7757/>
  - North Coast Unified Air Quality Management District -- <https://www.ncuaqmd.org/>
  - Covid & Smoke -- [https://drive.google.com/file/d/1Lfc11\\_PMZFAWZack2cqtU8m8XLpve0Q/view](https://drive.google.com/file/d/1Lfc11_PMZFAWZack2cqtU8m8XLpve0Q/view)
  - Smoke Outlooks -- <https://fires.airfire.org/outlooks>

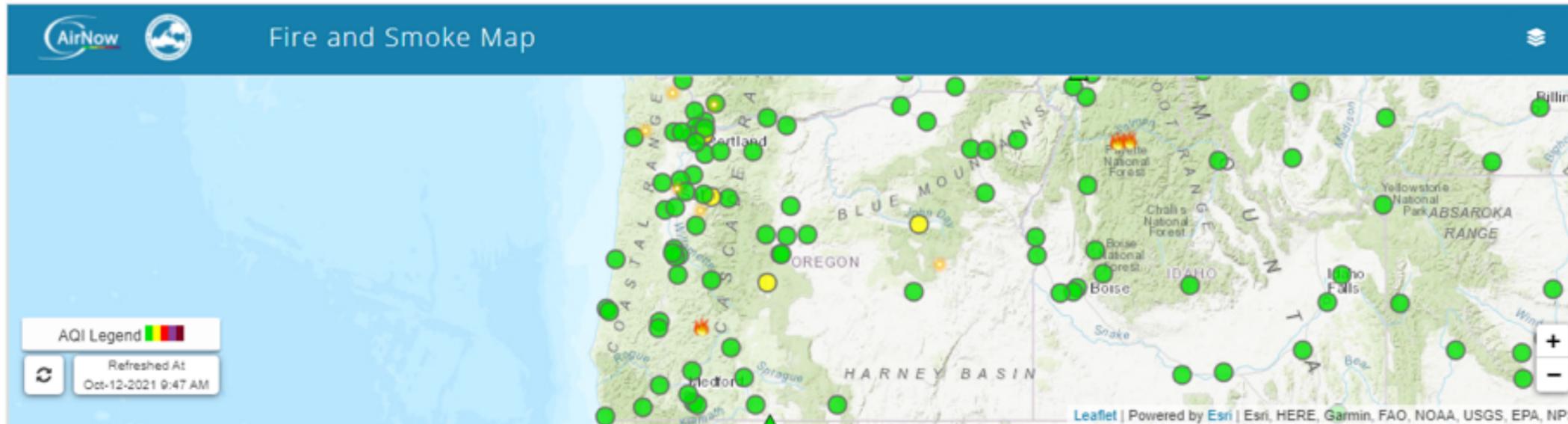
Issued by USFS Wildland Fire Air Quality Response Program -- [www.wildlandfiresmoke.net](http://www.wildlandfiresmoke.net)  
 California North Coast Current Outlook -- [tools.airfire.org/outlooks/CaliforniaNorthCoast](https://tools.airfire.org/outlooks/CaliforniaNorthCoast)  
 \*Smoke and Health Info -- [www.airnow.gov/index.cfm?action=smoke.index](http://www.airnow.gov/index.cfm?action=smoke.index)

## OREGON SMOKE INFORMATION

SEARCH

[Español](#)

Site managed by Oregon DEQ with contributions from ODF, OHA, USFS & NWS



### Smoke watch in southern Oregon this weekend

By [Oregon DEQ](#) · [September 24, 2021](#)

Keep an eye out for smoke over the weekend of September 25th and 26th. Wind this weekend could bring occasional wildfire smoke into parts of Klamath, Lake and Harney Counties. Smoke from the Fawn Fire in California could impact these areas over the weekend. Air quality condition...

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### [Air quality advisory for Jackson, Klamath and Lake counties](#)



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Air Quality Advisory Signup



Understanding the Air Quality Index



Smoke and Health



Wildfire Info



Multi-agency smoke response protocol



Free OregonAIR app for Android



Free OregonAir app for iPhone





# Smoke Impacts

Wednesday, October 13

- **Increase in urgent medical care for asthma and cardiovascular chronic conditions**
- **Wildfire smoke in Ashland canceled all but two August performances of the only play running this summer at the Oregon Shakespeare Festival**
- **School sports were cancelled or moved due to smoke in August and early September (OSAA criteria to move or cancel games is “Unhealthy for Sensitive Groups.”)**
- **People stayed indoors more often with less exercise.**
- **Travel and tourism was probably down due to smoke.**



# Summary

Wednesday, October 13

- More than 2 million acres burned across southern Oregon and northern California this past summer.
- The Bootleg Fire in the Fremont-Winema National Forest made national headlines with extreme fire behavior and firenadoes.
- The HRRR Smoke Model was used extensively by the NWS Medford meteorologists, mainly in their AWIPS computer system. The model has improved since the extensive 2018 fires and smoke.
- There were many smoke impacts in southern Oregon and northern California.