

Effects of the Elk Fire on Sheridan, WY

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Wyoming DEQ-Air Quality Division

Air Pollution Monitoring Program

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Overview

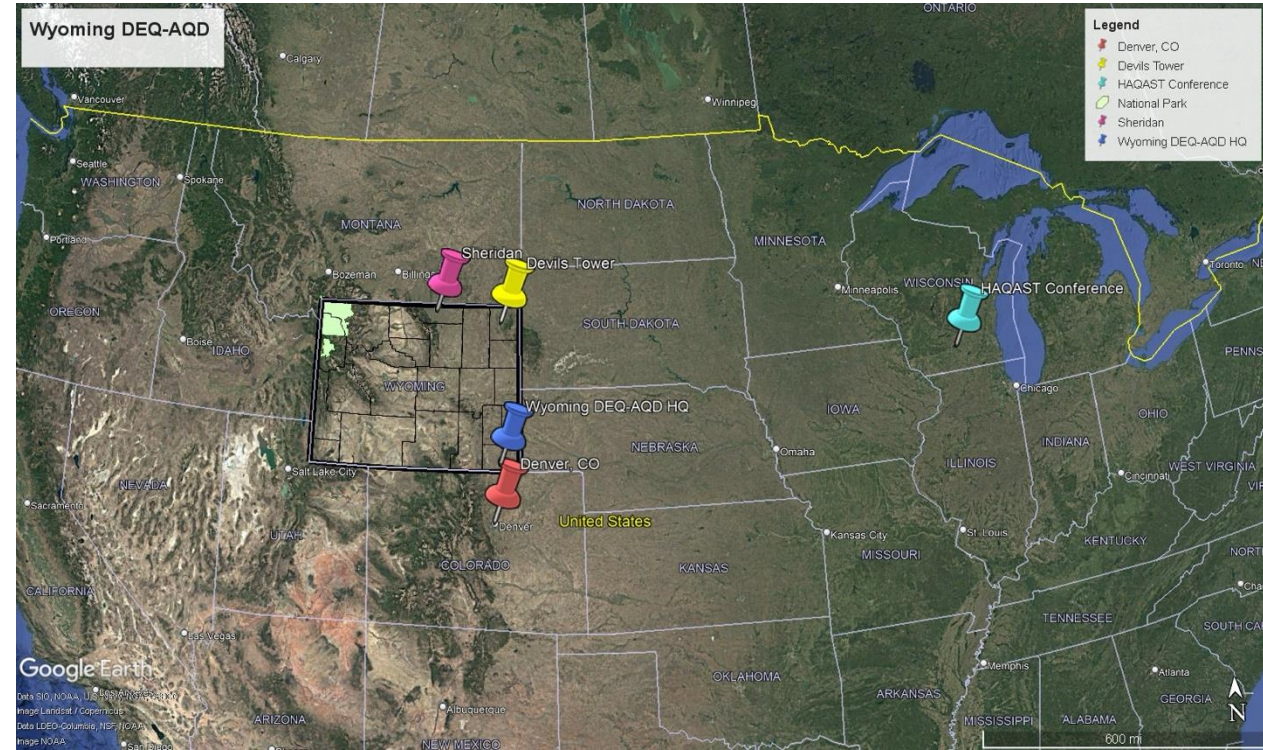
1. About the Wyoming DEQ-AQD
2. Sheridan's Monitoring History
3. The Elk Fire in 2024 and Influence on Sheridan
4. Satellite Data Use by the Wyoming DEQ-AQD
5. Key Takeaways



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About Wyoming DEQ-AQD

1. Air regulatory agency (monitoring, permitting of minor and major sources, compliance, and resource management)
2. About 25,000 operating facilities (mostly minor sources but over 100 Title V sources)
 1. Oil and gas, coal mines, power plants, refineries, trona mines, gas plants, gravel pits, etc.
3. Twenty-five (25) active air monitoring stations on WyVisNet (<https://www.wyvisnet.com>)
 1. Low-Cost Sensor network at select locations
4. Seven (7) monitoring objectives met by the whole network
5. Check out the 2023, 2024, and 2025 HAQAST presentations.



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Brief History of Sheridan

- A city of slightly under 20,000
- Formerly a nonattainment area for PM_{10}
 - Redesignated as “Attainment/Unclassifiable” for PM_{10} in 2018
- History of Ambient Monitoring
 - Police Station SLAMS
 - Mobile Gaseous Station
 - Sheridan Field Office



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Sheridan Mobile Station

- What is a mobile station?
 - A self-contained trailer that is typically deployed for a period of 12-18 months.
 - Needs: ready power, 24/7/365 access, meeting siting criteria
 - Presently have 3 with 2 more being built
- What is monitored?
 - Met, PM₁₀, PM_{2.5}, Ozone, SO₂, NO₂, THC
 - Deployed from April 2024-April 2025
- Where do they go?
 - Cities and towns with no prior history of deep ambient monitoring
 - Special locations to investigate a concern brought forth by the Compliance Program



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Elk Fire

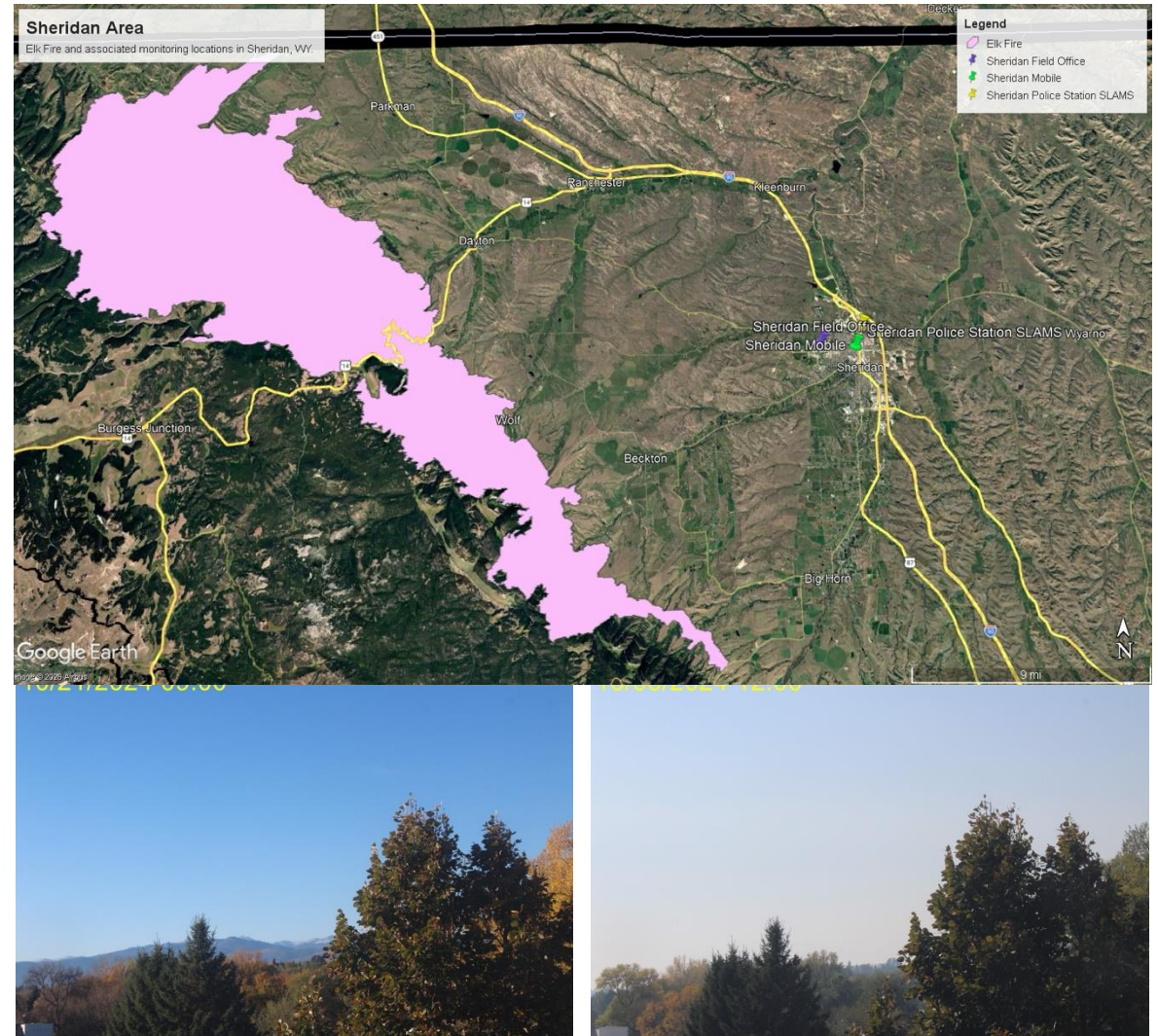
- Start Date: September 27, 2024
- Containment Date: November 14, 2024
- Area: 98,352 acres
- Cause: Lightning
- Land Ownership: USFS Bighorn National Forest
- 2024 was Wyoming's second worst year on record for area burned by wildfires!

<https://inciweb.wildfire.gov/incident-information/wybhf-elk-fire-2024>



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<https://cowboystatedaily.com/2024/10/05/as-elk-fire-rages-dayton-watches-while-mountain-above-just-glowing-orange/>



Elk Fire's Attention

Elk Fire, Wyoming

This image of the Elk Fire in Wyoming was captured on Oct 16, 2024, by the VIIRS instrument aboard the joint NASA/NOAA NOAA-21 platform.

1 MIN READ

OCT 17, 2024

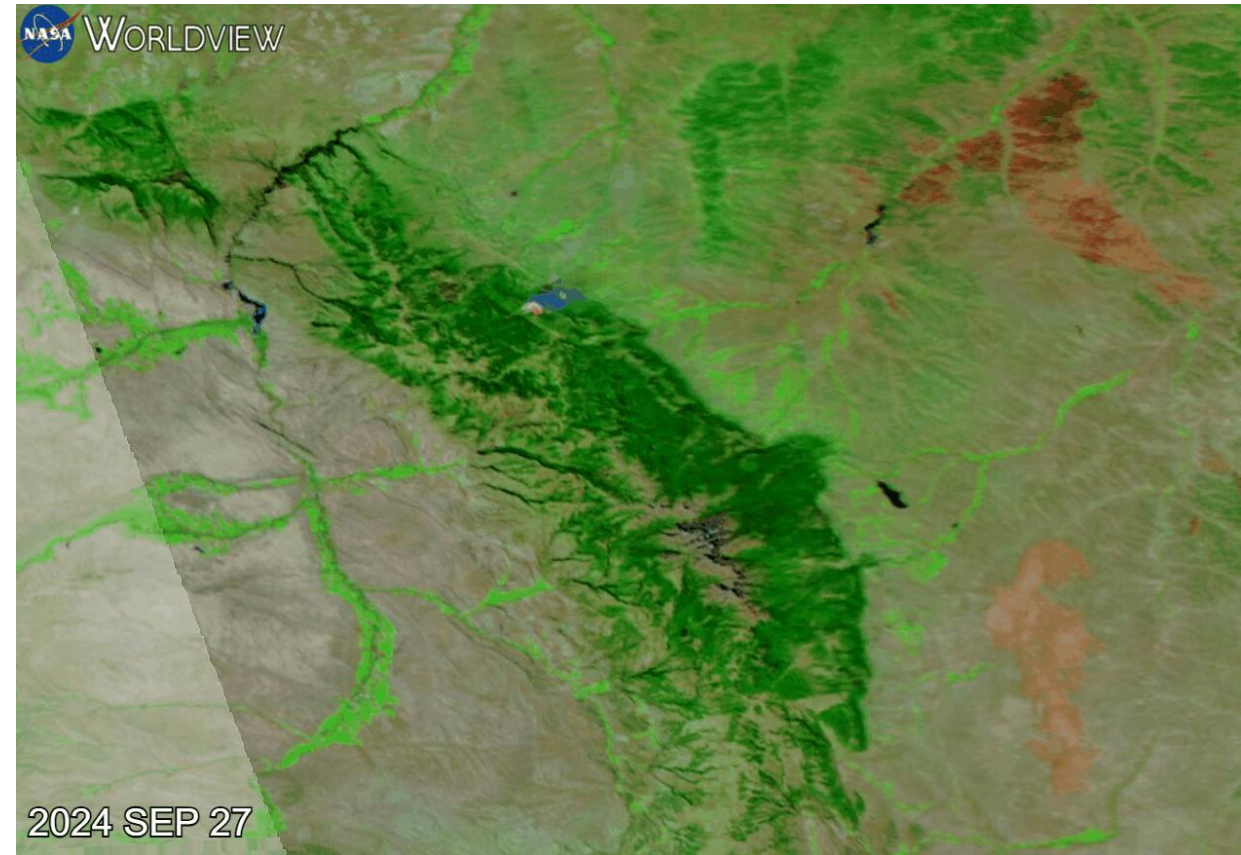
WORLDVIEW IMAGE OF THE WEEK

2024 OCT 16

This false-color (bands M11-I2-I1) corrected reflectance image of the Elk Fire in Wyoming was captured by the Visible Infrared Imaging Radiometer Suite (VIIRS) instrument aboard the joint NASA/NOAA NOAA-21 platform. Press the blue "Play" button in the lower left corner of the image to view an animation of the spread of the Elk Fire between September 27 and October 16.

The Elk Fire is burning in the Bighorn National Forest in an area of rough terrain that features a large amount of dead and down timber. It was detected at 7:00 p.m., ET, on Friday, September 27, 2024. As of the morning of October 17, the fire covered 92,487 acres and was 28% contained. View the Elk Fire using the NASA Fire Information for Resource Management System (FIRMS) [US/Canada Fire Map](#).

Visit [Worldview](#) to visualize near real-time imagery from NASA's EOSDIS; find more imagery in our [Worldview weekly image archive](#).



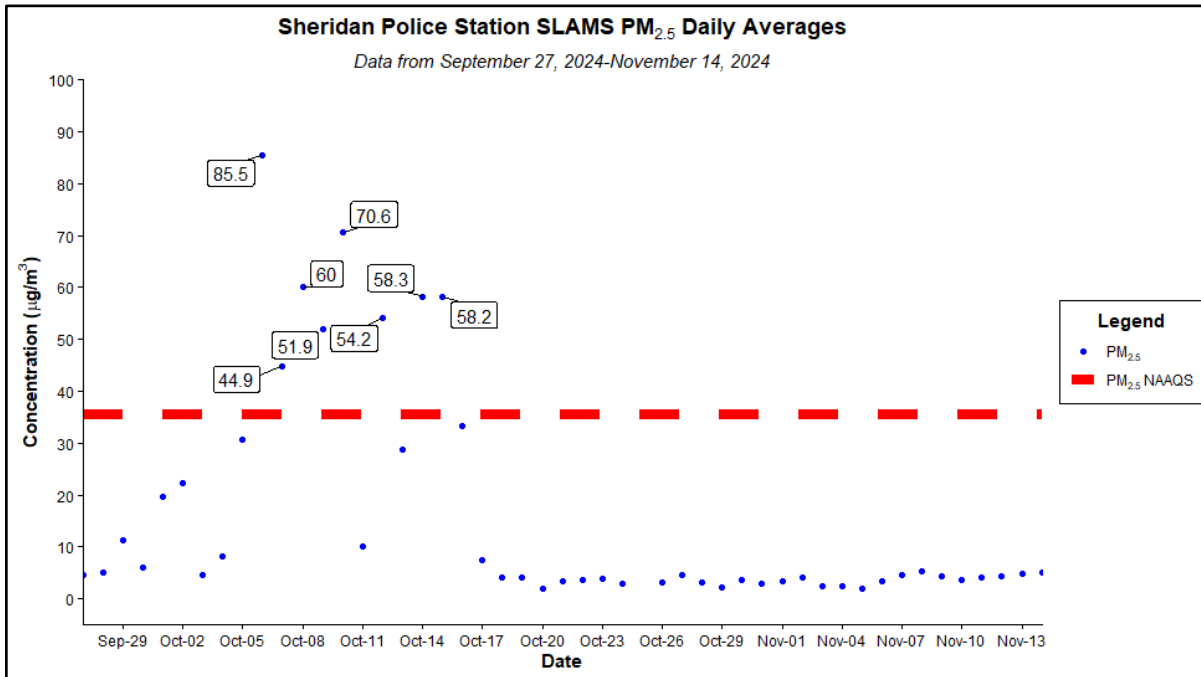
<https://www.earthdata.nasa.gov/news/worldview-image-archive/elk-fire-wyoming>



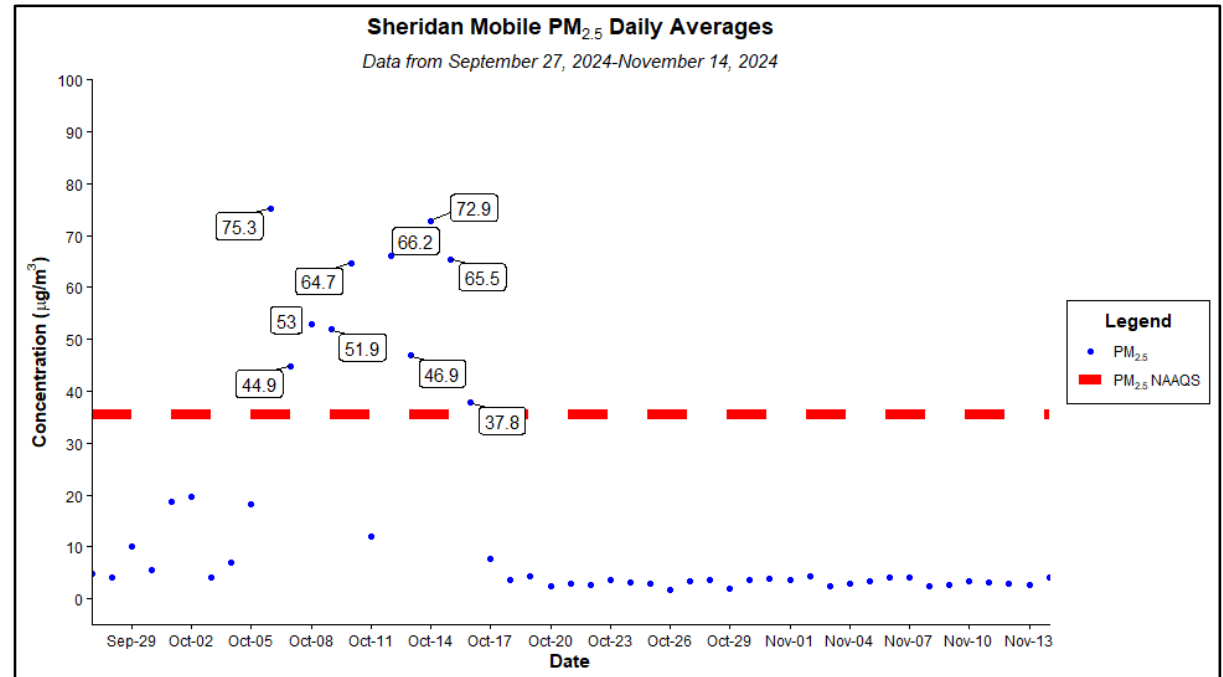
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PM_{2.5} Conditions at Sheridan

Sheridan Police Station SLAMS

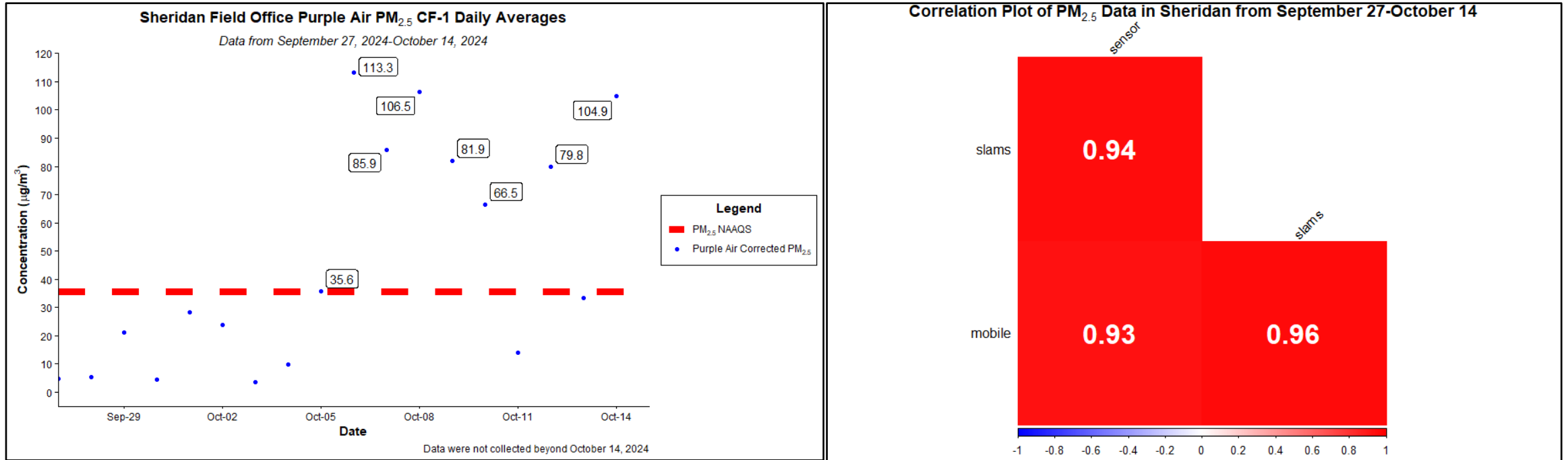


Sheridan Mobile



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Purple Air Observations

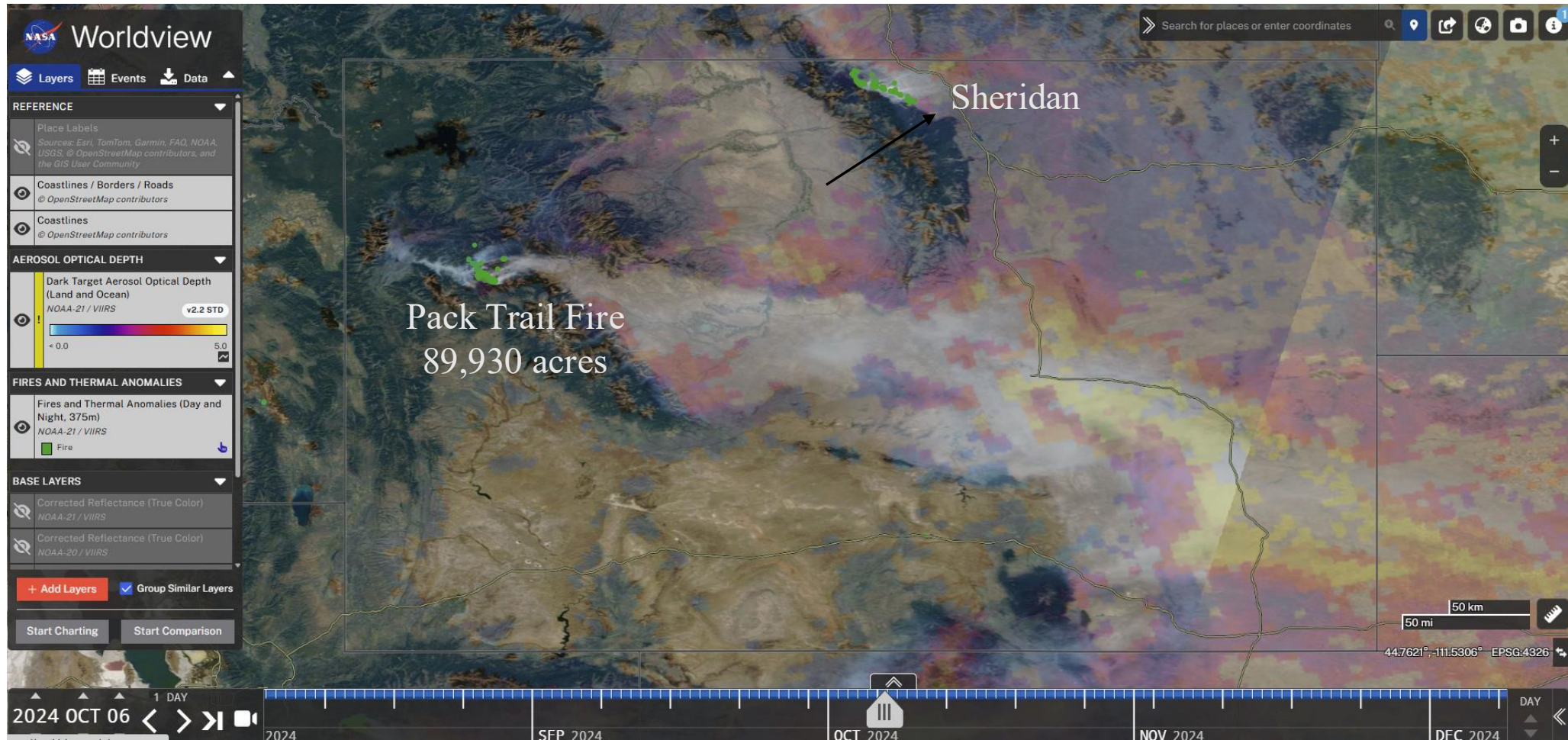


1. Barkjohn, K. K., Holder, A. L., Frederick, S. G., & Clements, A. L. (2022). Correction and Accuracy of PurpleAir PM_{2.5} Measurements for Extreme Wildfire Smoke. *Sensors*, 22(24), 9669. <https://doi.org/10.3390/s22249669>



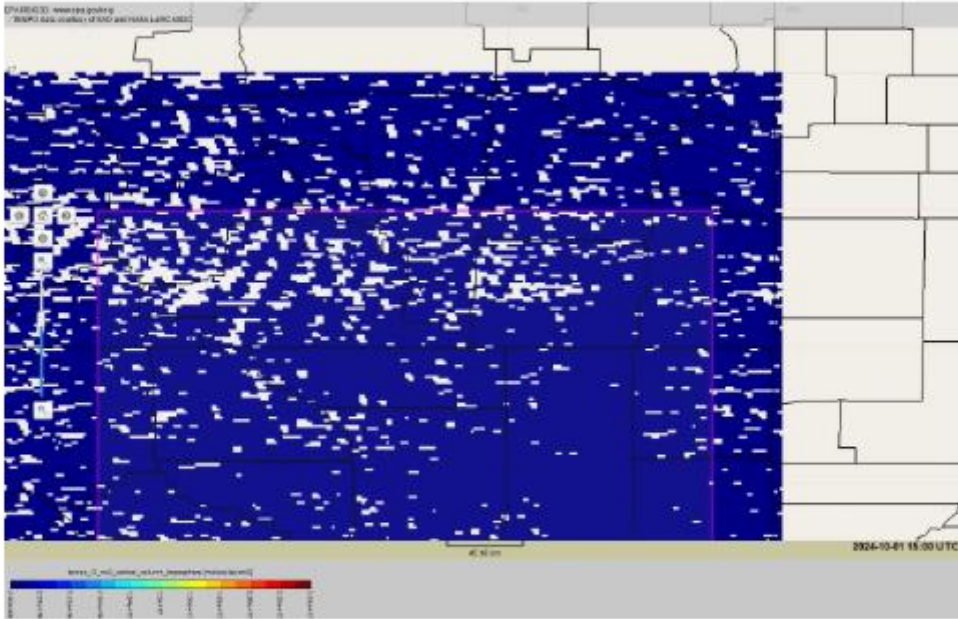
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Satellite Imagery from the Elk Fire



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TEMPO Level 3 NO₂ Data



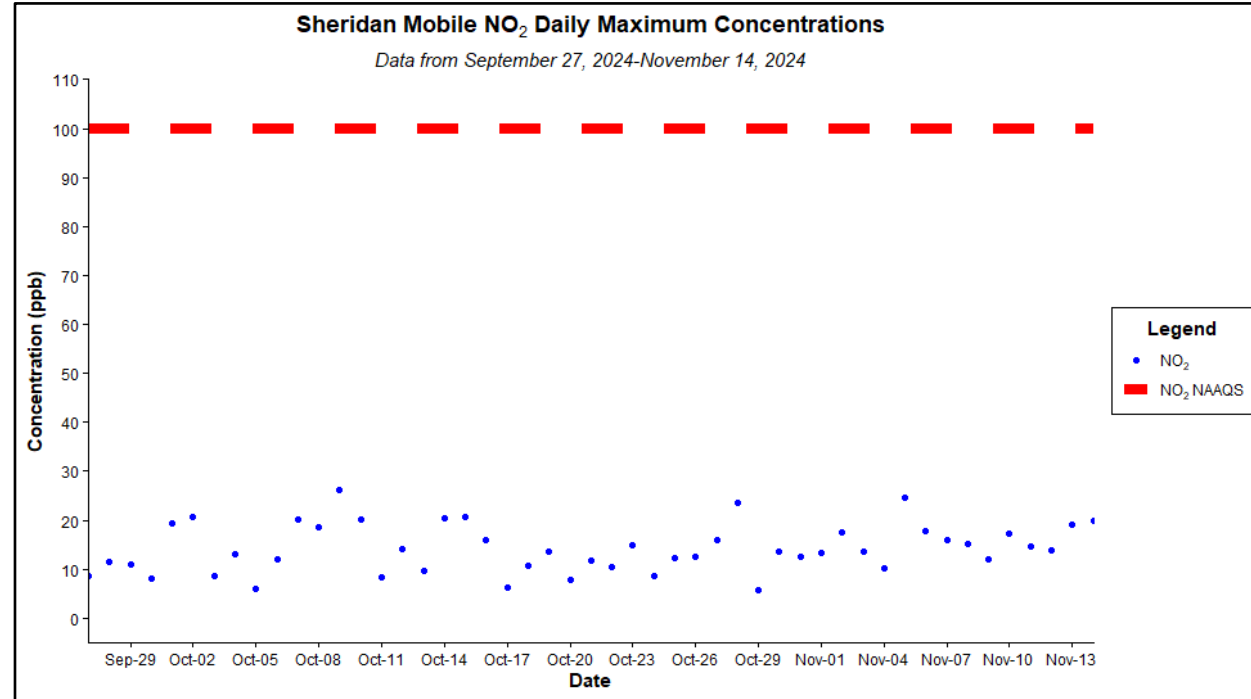
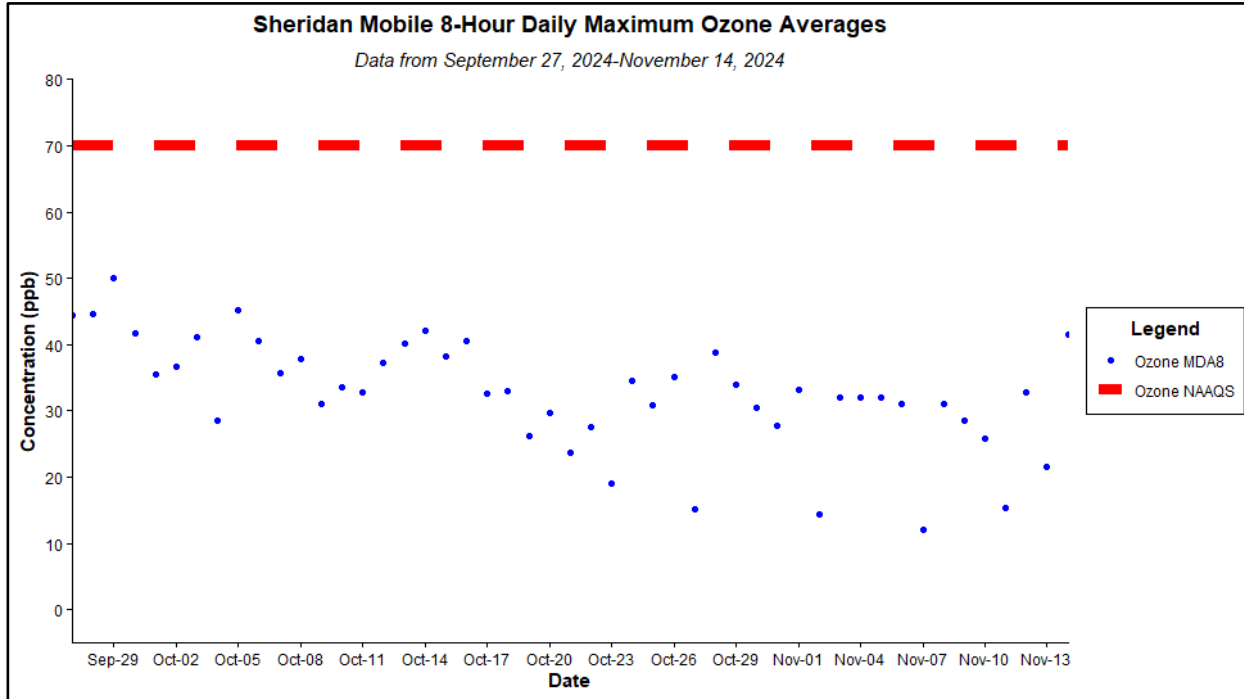
- Image Times
 - 10/1/2024 15:00-22:00 UTC
 - 10/2/2024 14:00-23:00 UTC
 - 10/11/2024 13:00-23:00 UTC
- RSIG Settings
 - Maximum Solar Zenith Angle = 90°
 - Maximum Cloud Fraction = 1
 - Data Quality = “bad”
 - Units are in molecules/cm²



Gaseous Conditions at Sheridan Mobile

Ozone

Nitrogen Dioxide



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Takeaways and the Future

- Smoke from the Elk Fire influenced the city of Sheridan and the two (2) monitors resulting in several PM_{2.5} exceedances.
- Many accessible resources are available to assist state and local air regulatory agencies
- Importance of gathering information
- 2024 PM_{2.5} Exceptional Events Demonstration Submitted to EPA Region 8 in September 2025 to comply with the 2024 PM_{2.5} NAAQS
- Continue performing analyses on low-cost sensors
- Excited for the addition of Aerosol Products to TEMPO's arsenal

PM_{2.5} 2024 Wildfire Exceptional Event Demonstration

Final



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Thank You!



Jackson Hole, WY



Cheyenne, WY



Thermopolis, WY



Our Team



Pinedale, WY

- Access Wyoming DEQ-AQD's near real-time air monitoring data at WyVisNet (<https://www.wyvisnet.com>).
- Access Wyoming DEQ-AQD's historical air monitoring data and reports at OpenAir (<https://openair.wyo.gov>).
- Learn more about Wyoming DEQ-AQD (<https://deq.wyoming.gov/aqd>).



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