



Dallas-Fort Worth (DFW) Exceptional Events Summary

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DFW Air Quality Technical Information Meeting
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Topics

- Exceptional Event References
- Policy Relevance
- Historical Comparisons
- Causal Fires
- Causal Relationship Summary



Image Sources

- The National Oceanic and Atmospheric Administration High Resolution Rapid Refresh Air Quality Smoke Model (NOAA-HRRR)
- The National Aeronautic and Space Administration (NASA) Moderate Resolution Imaging Spectroradiometer (MODIS) instrument aboard the Terra satellite



References

- The Texas Commission on Environmental Quality's Ozone Exceptional Events Page:
<https://www.tceq.texas.gov/airquality/airmod/docs/ozone-data-exceptional-event-flag-demonstrations>
- The US Environmental Protection Agency's Exceptional Events Rule:
<https://www.epa.gov/air-quality-analysis/treatment-air-quality-data-influenced-exceptional-events-homepage-exceptional>



Policy Relevance



Effect of Exclusions on Attainment

Date	2020 Rank	Preliminary MDA08	Expected 2018-2020 Design Value	Number of Days Excluded
8/17/2020	1	88		
5/19/2020	2	86		
8/16/2020	3	77		
8/21/2020	4	77	76	0 days excluded
6/12/2020	5	73	75	1 day excluded
6/1/2020	6	72	75	2 days excluded
6/13/2020	7	71	74	3 days excluded
8/22/2020	8	70	74	4 days excluded
4/30/2020	9	69	74	5 days excluded
5/1/2020	10	69	74	6 days excluded

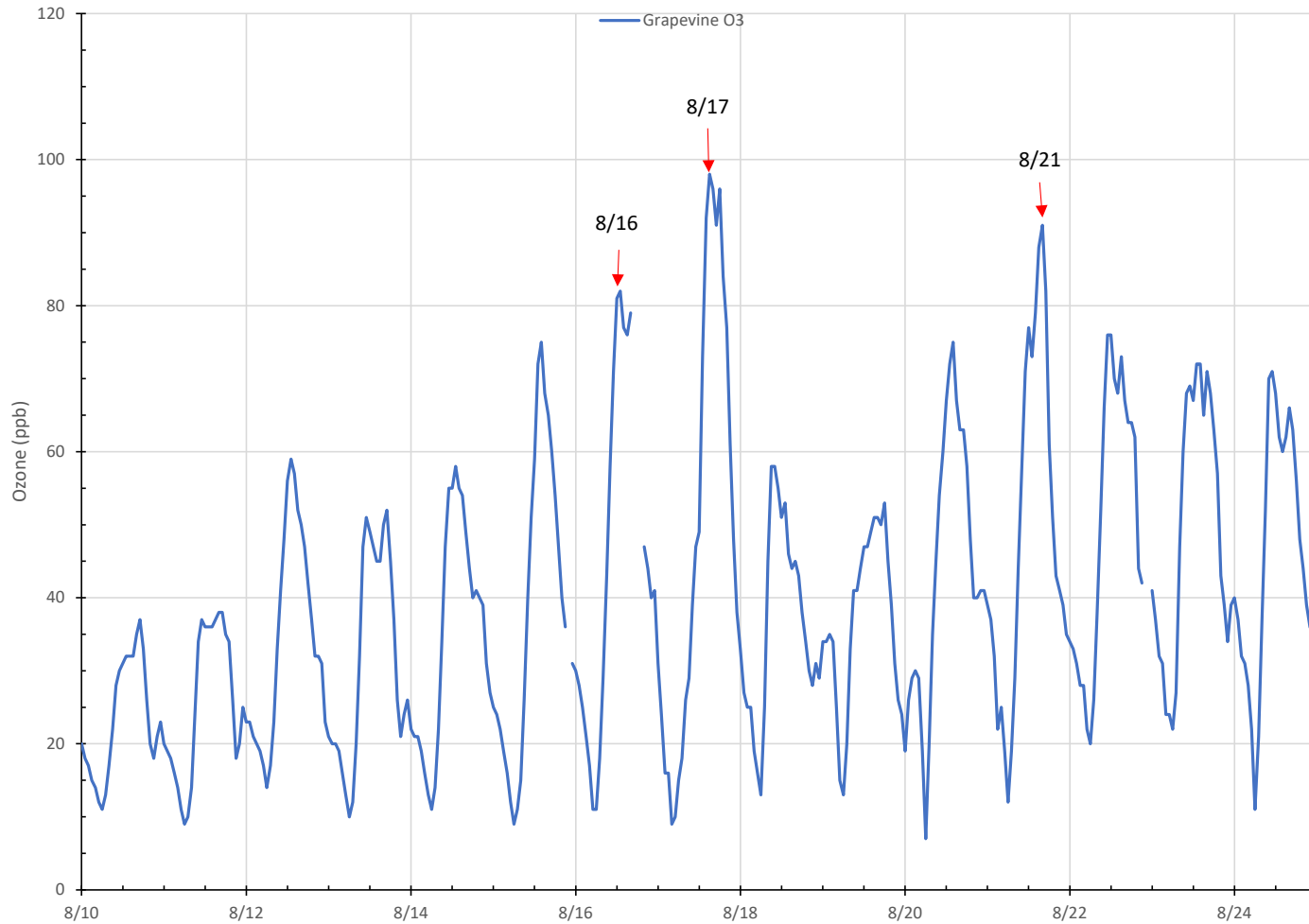


Historical Comparisons



Hourly Time Series

Grapevine-Fairway Ozone Time Series (8/10/2020 thru 8/24/2020)

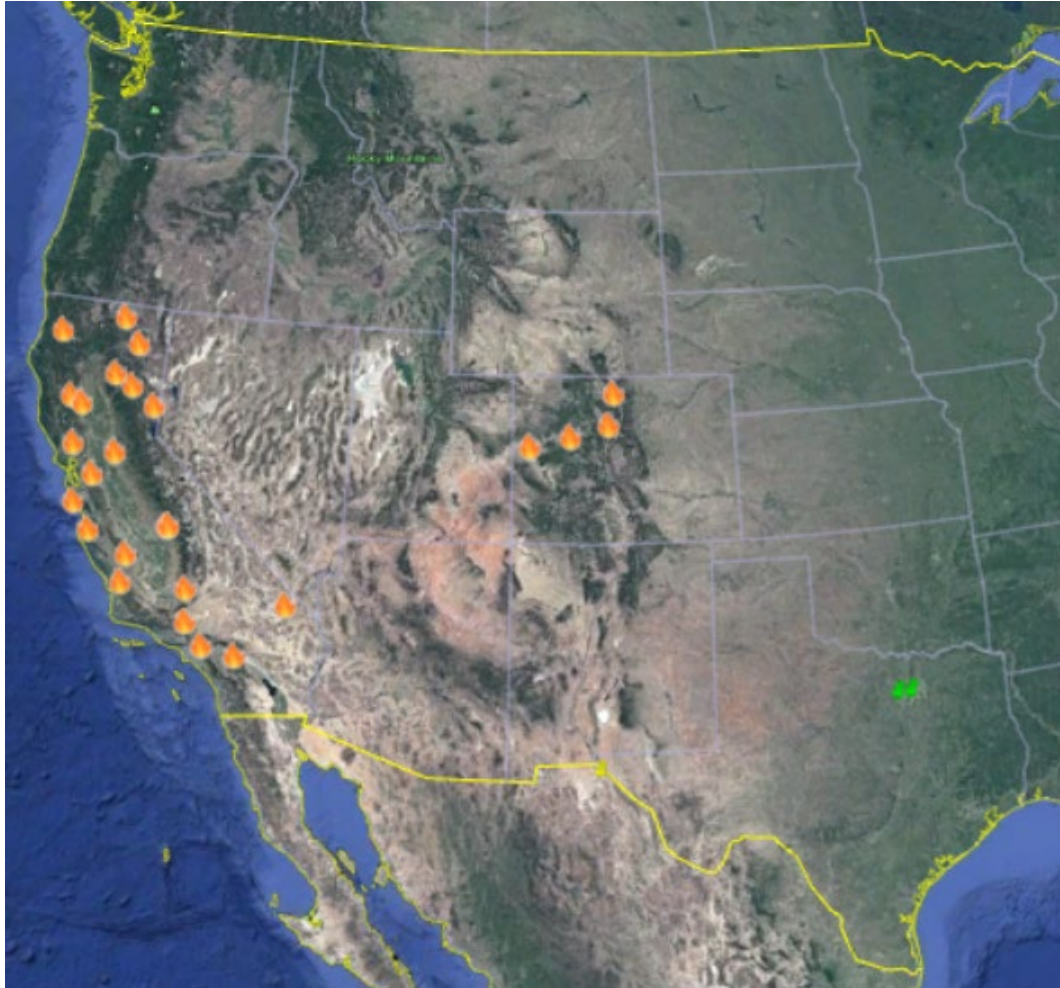




Causal Fires



Possible Fire Locations

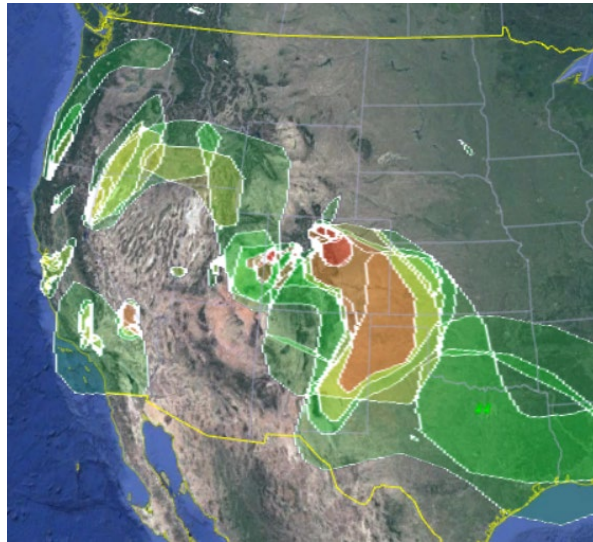




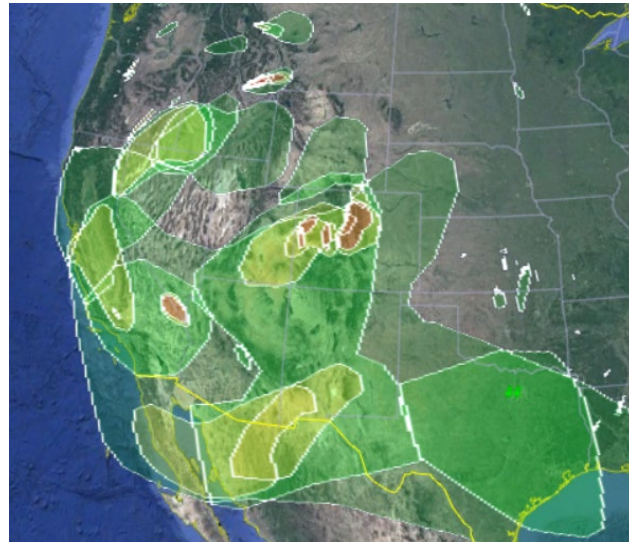
Causal Relationship Summary



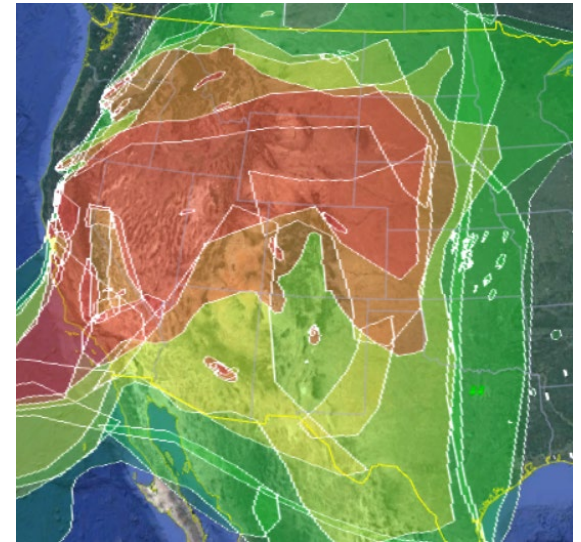
Hazard Management Systems Plumes



August 16, 2020



August 17, 2020

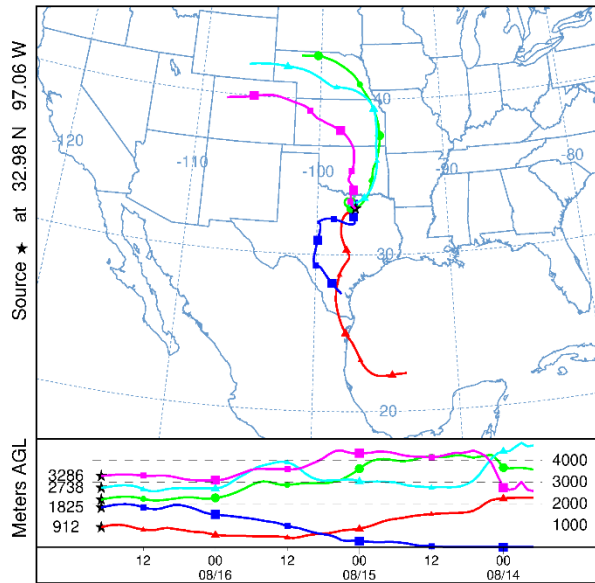


August 21, 2020



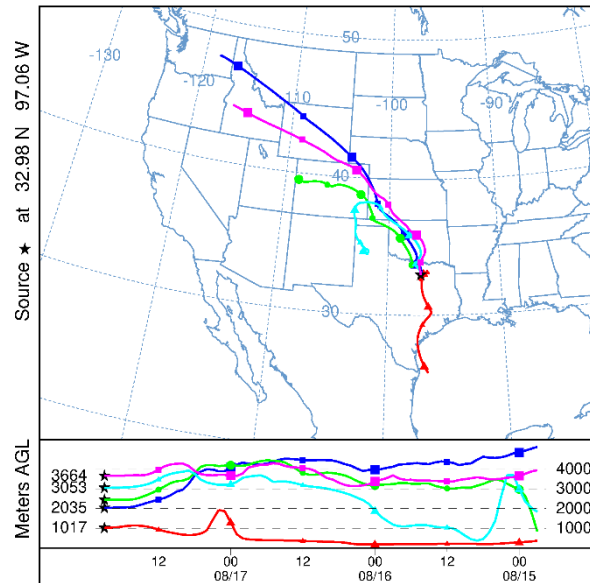
HYSPLIT Back Trajectories

NOAA HYSPLIT MODEL
Backward trajectories ending at 1900 UTC 16 Aug 20
NAM Meteorological Data



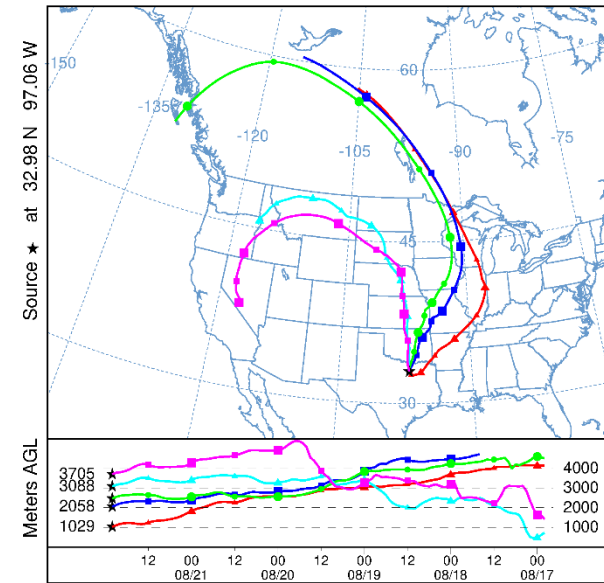
8/16/2020 1:00 PM CST

NOAA HYSPLIT MODEL
Backward trajectories ending at 2100 UTC 17 Aug 20
NAM Meteorological Data



8/17/2020 3:00 PM CST

NOAA HYSPLIT MODEL
Backward trajectories ending at 2200 UTC 21 Aug 20
NAM Meteorological Data

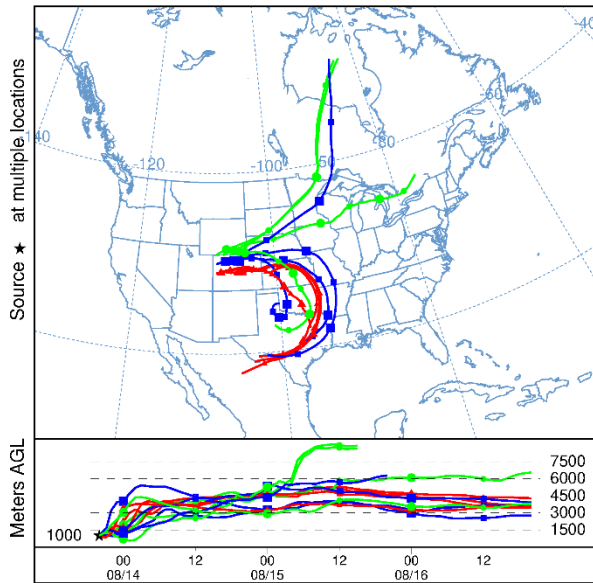


8/21/2020 4:00 PM CST



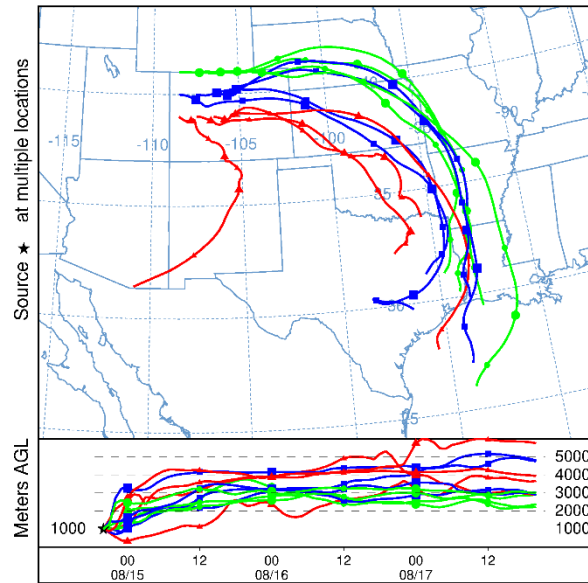
HYSPPLIT Forward Trajectories

NOAA HYSPLIT MODEL
Forward trajectories starting at 2000 UTC 13 Aug 20
NAM Meteorological Data



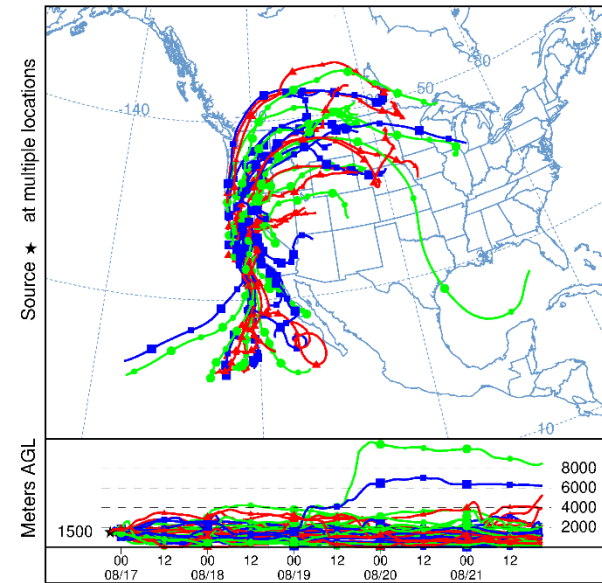
8/13/2020 1:00 PM MST

NOAA HYSPLIT MODEL
Forward trajectories starting at 2000 UTC 14 Aug 20
NAM Meteorological Data



8/14/2020 1:00 PM MST

NOAA HYSPLIT MODEL
Forward trajectories starting at 2100 UTC 16 Aug 20
NAM Meteorological Data

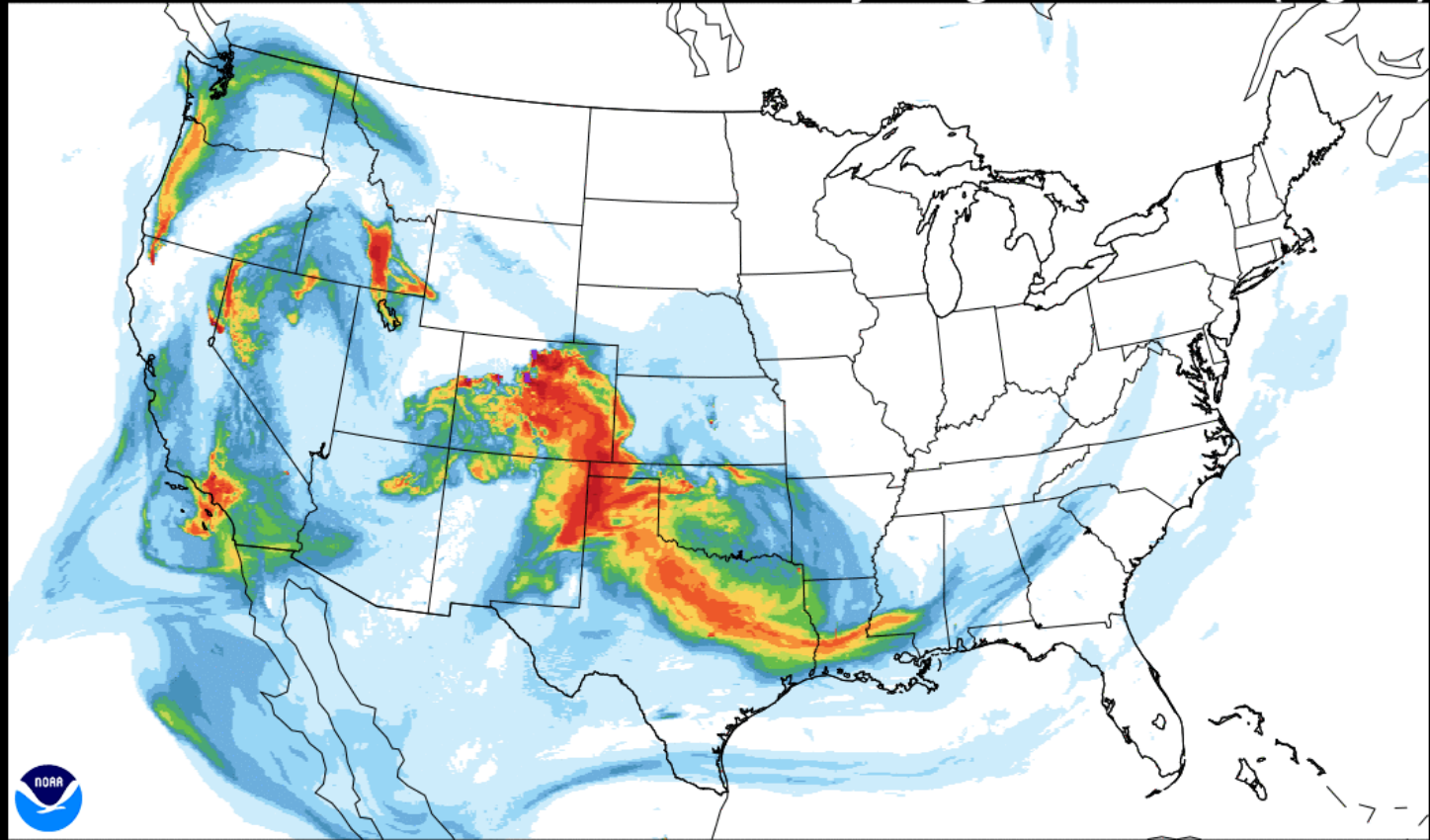


8/16/2020 1:00 PM PST



NOAA HRRR-smoke Model Vertically Integrated on 8/16

HRRR-SMOKE 2020-08-16 18 UTC 1h fcst - Experimental Valid 08/16/2020 19:00 UTC
Vertically Integrated Smoke (mg/m^2)



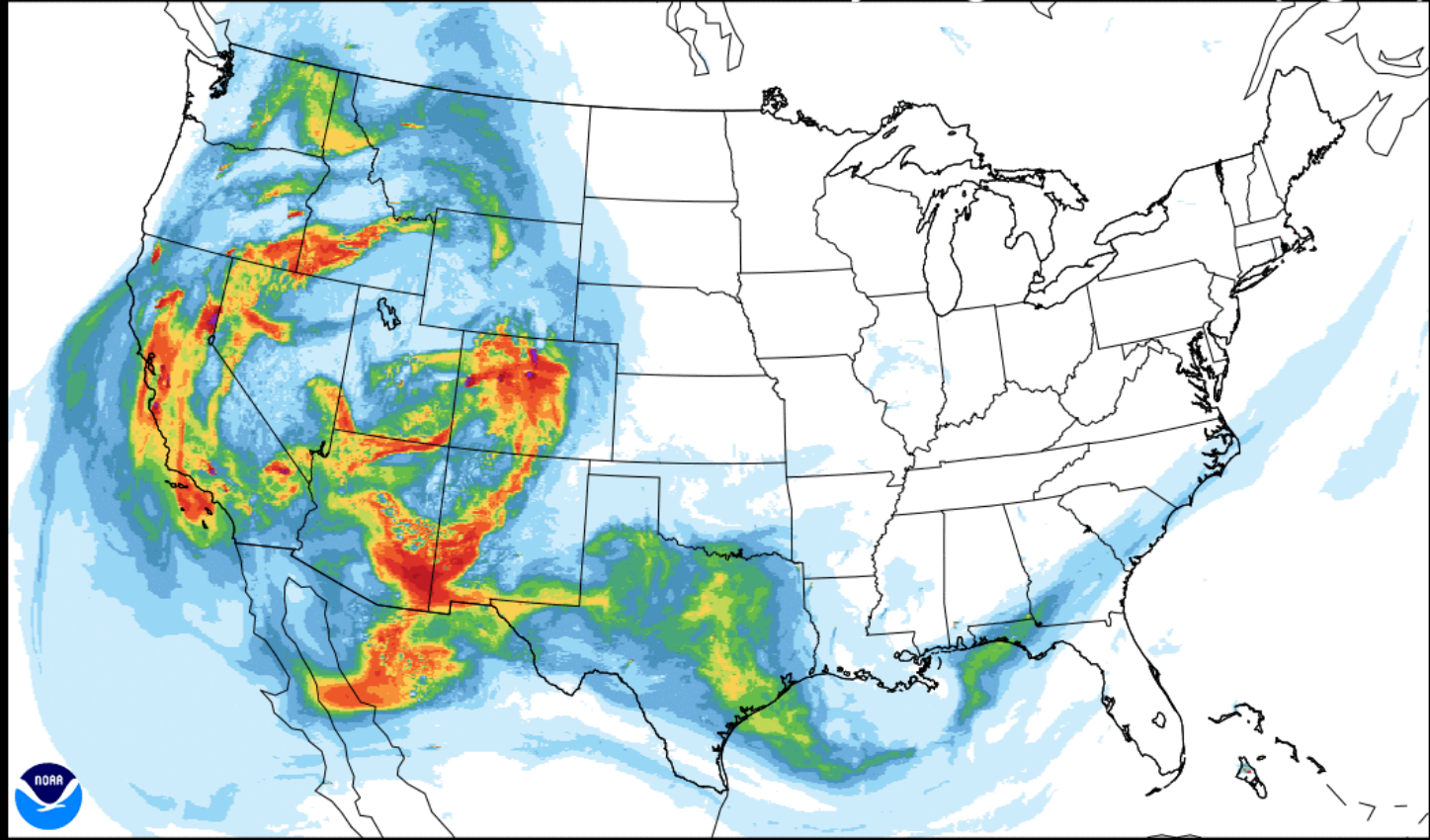
1 4 7 11 15 20 25 30 40 50 75 150 250 500

August 16, 2020



NOAA HRRR-smoke Model Vertically Integrated on 8/17

HRRR-SMOKE 2020-08-17 18 UTC 3h fcst - Experimental Valid 08/17/2020 21:00 UTC
Vertically Integrated Smoke (mg/m²)



1 4 7 11 15 20 25 30 40 50 75 150 250 500

August 17, 2020

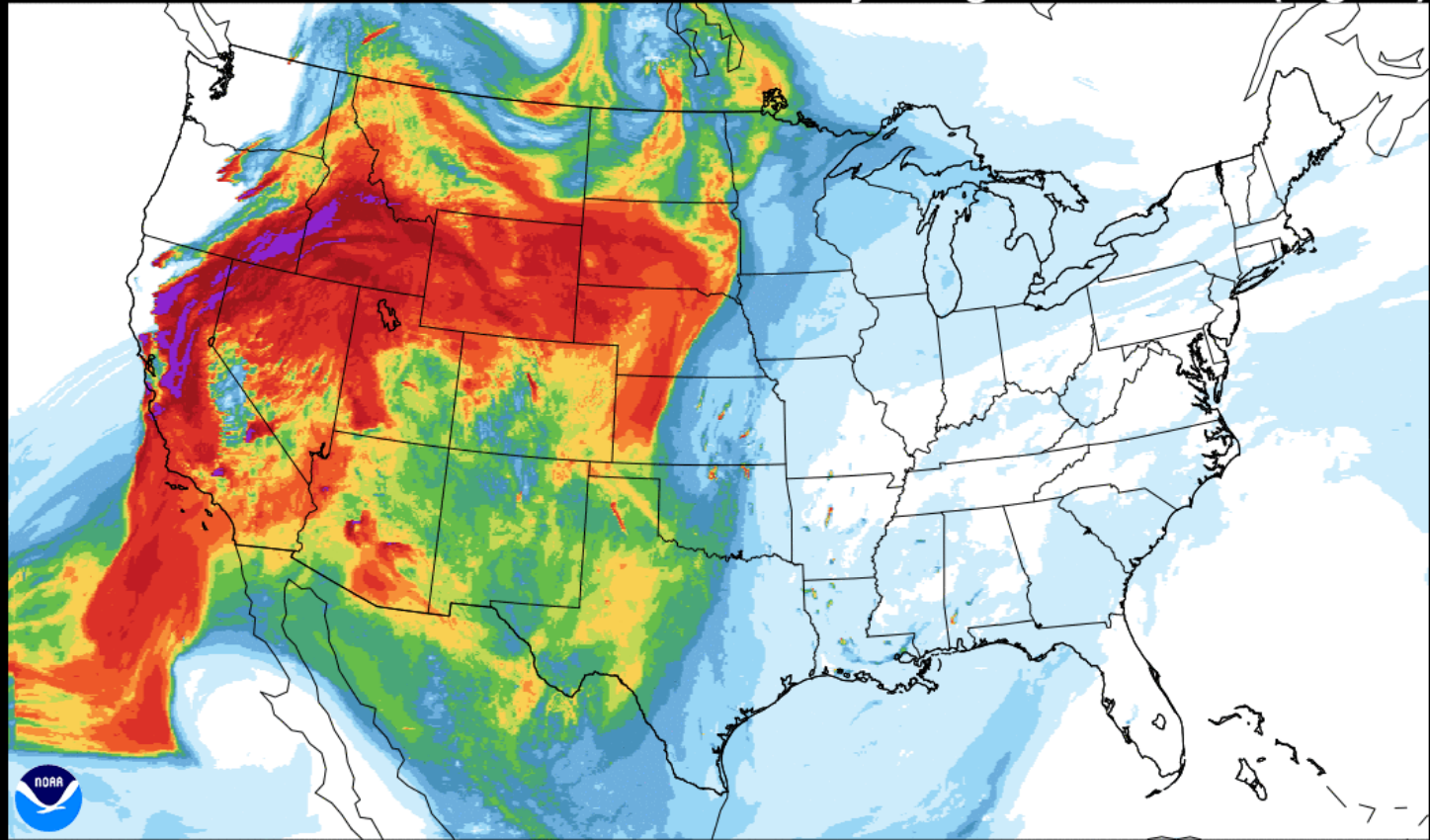


NOAA HRRR-smoke Model Vertically Integrated on 8/21

HRRR-SMOKE 2020-08-21 18 UTC 4h fcst - Experimental

Valid 08/21/2020 22:00 UTC

Vertically Integrated Smoke (mg/m^2)

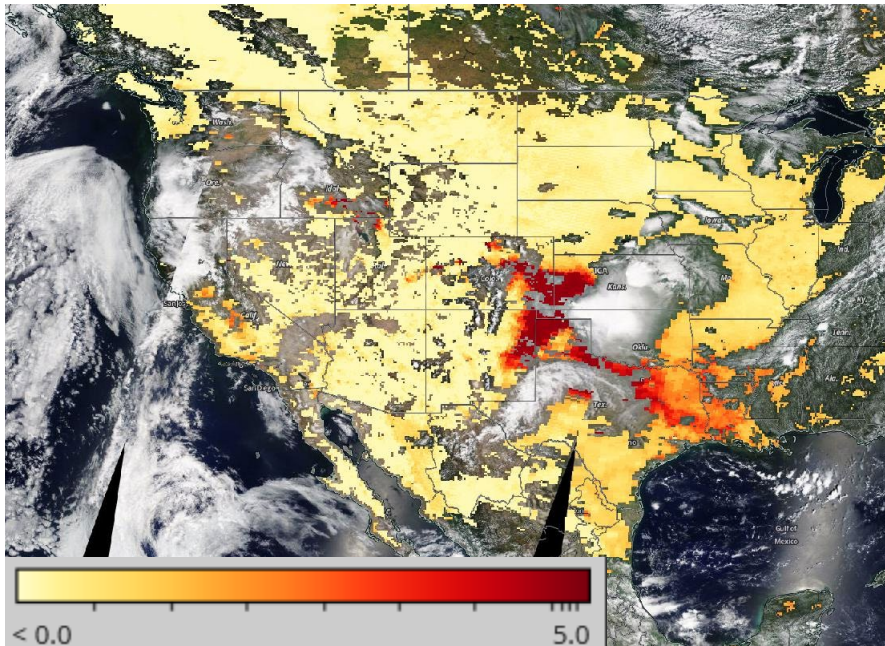


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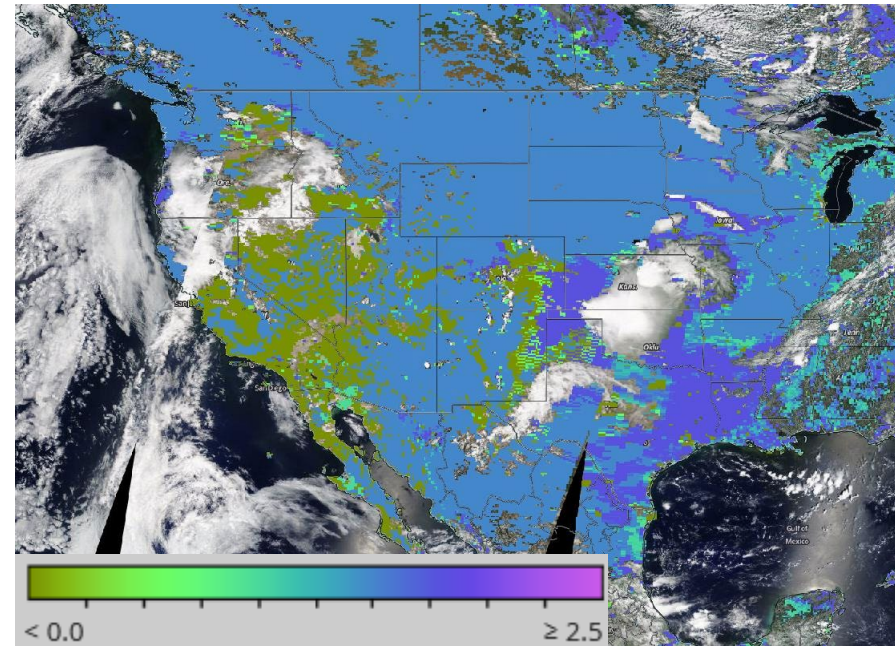
August 21, 2020



Terra/MODIS Imagery 8/16



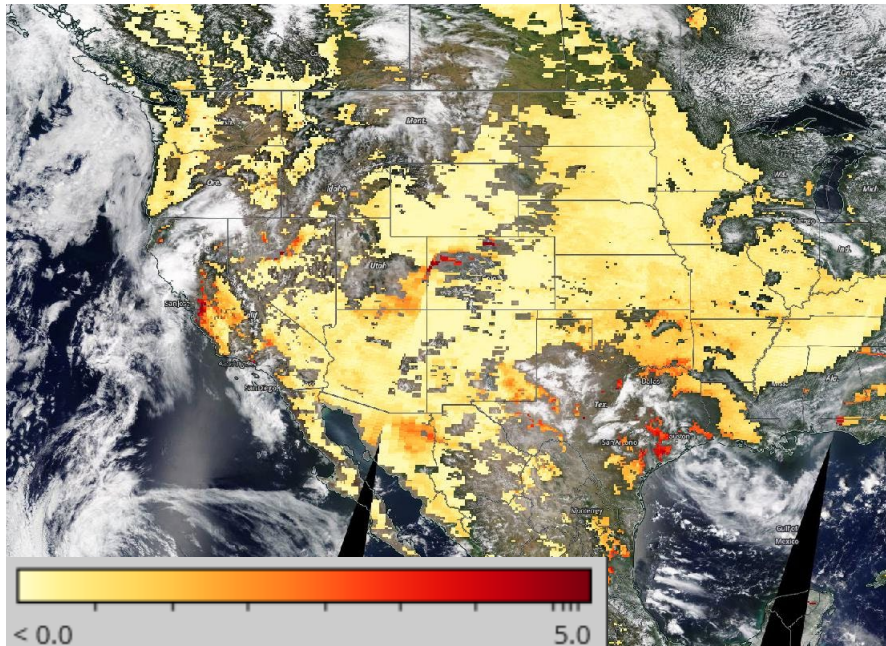
Aerosol Optical Depth (AOD)



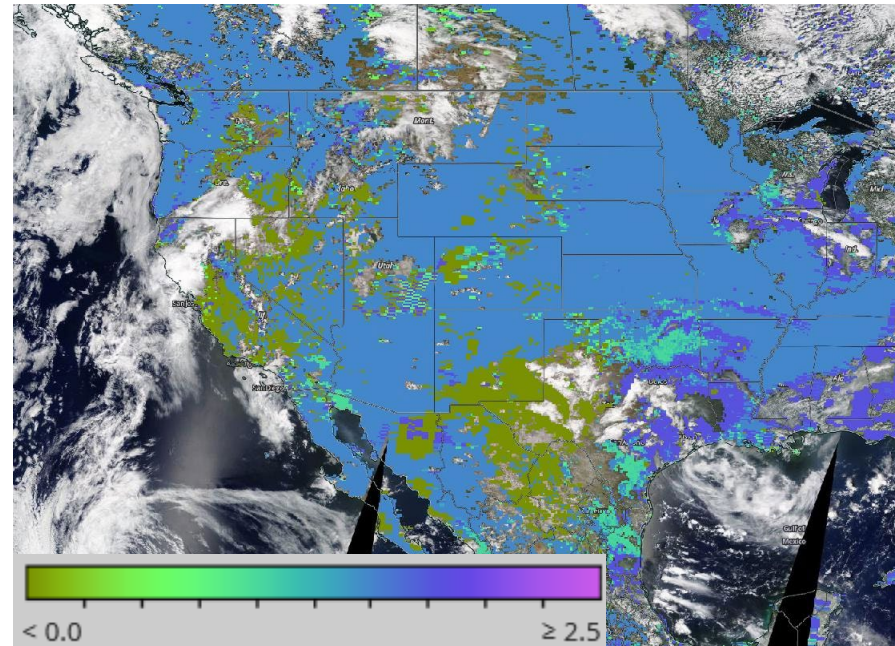
Aerosol Angstrom Exponent (AAE)



Terra/MODIS Imagery 8/17



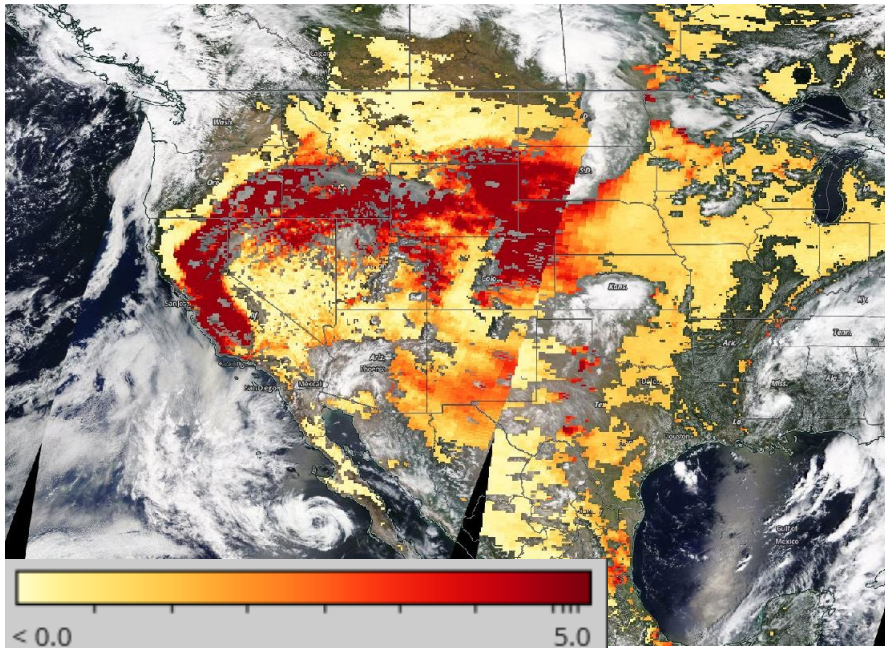
Aerosol Optical Depth (AOD)



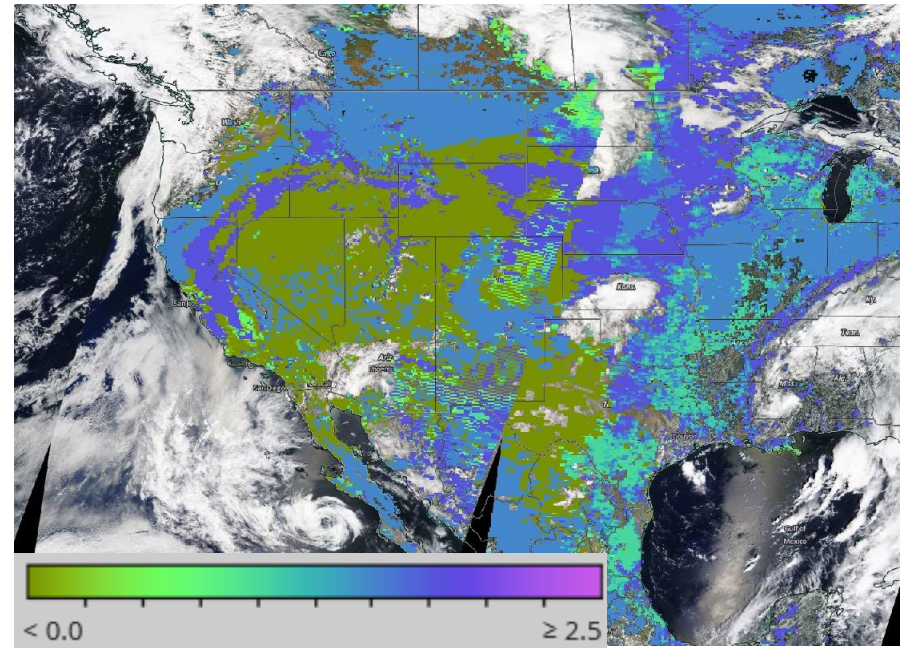
Aerosol Angstrom Exponent (AAE)



Terra-MODIS Imagery 8/21



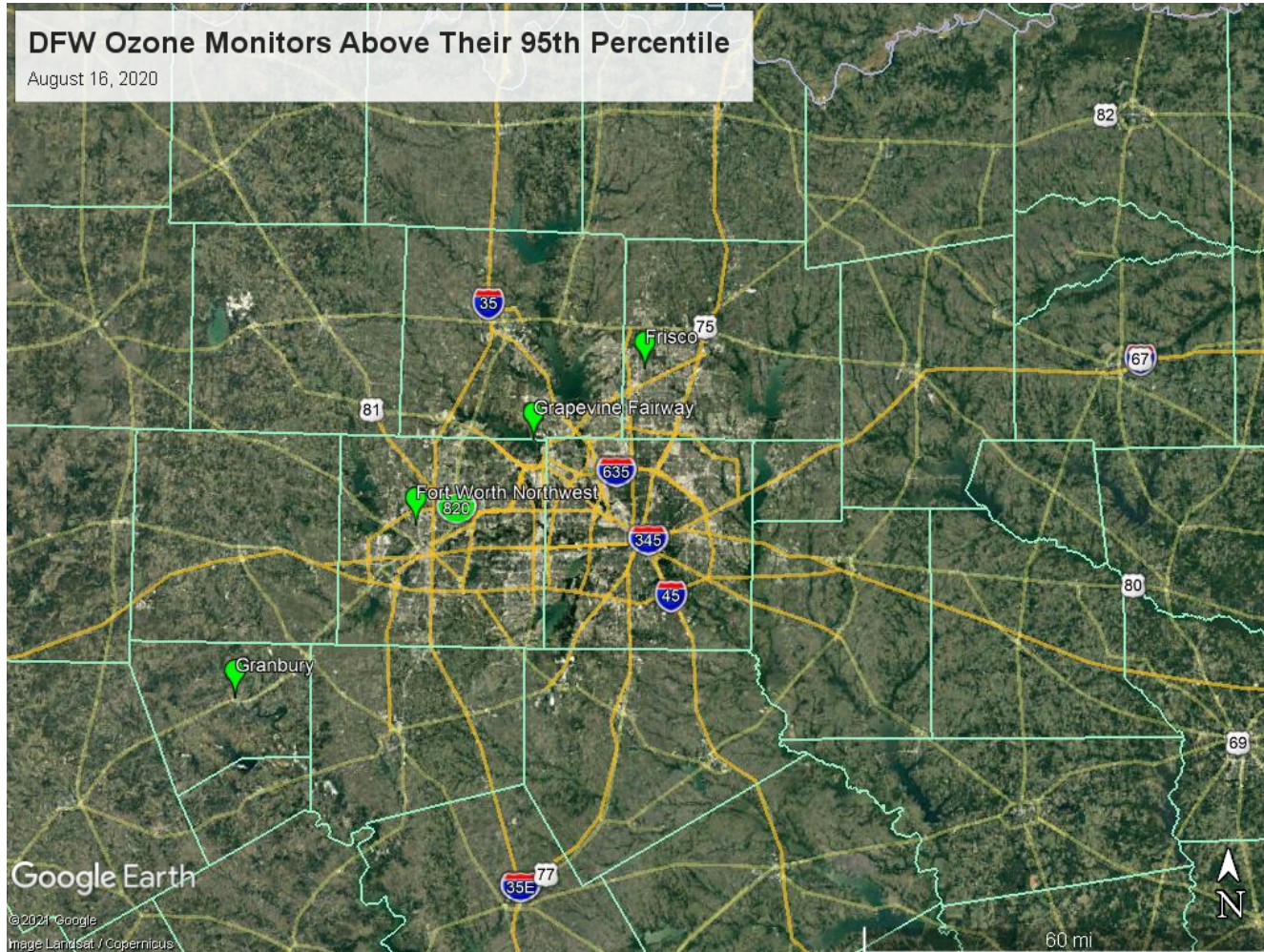
Aerosol Optical Depth (AOD)



Aerosol Angstrom Exponent (AAE)



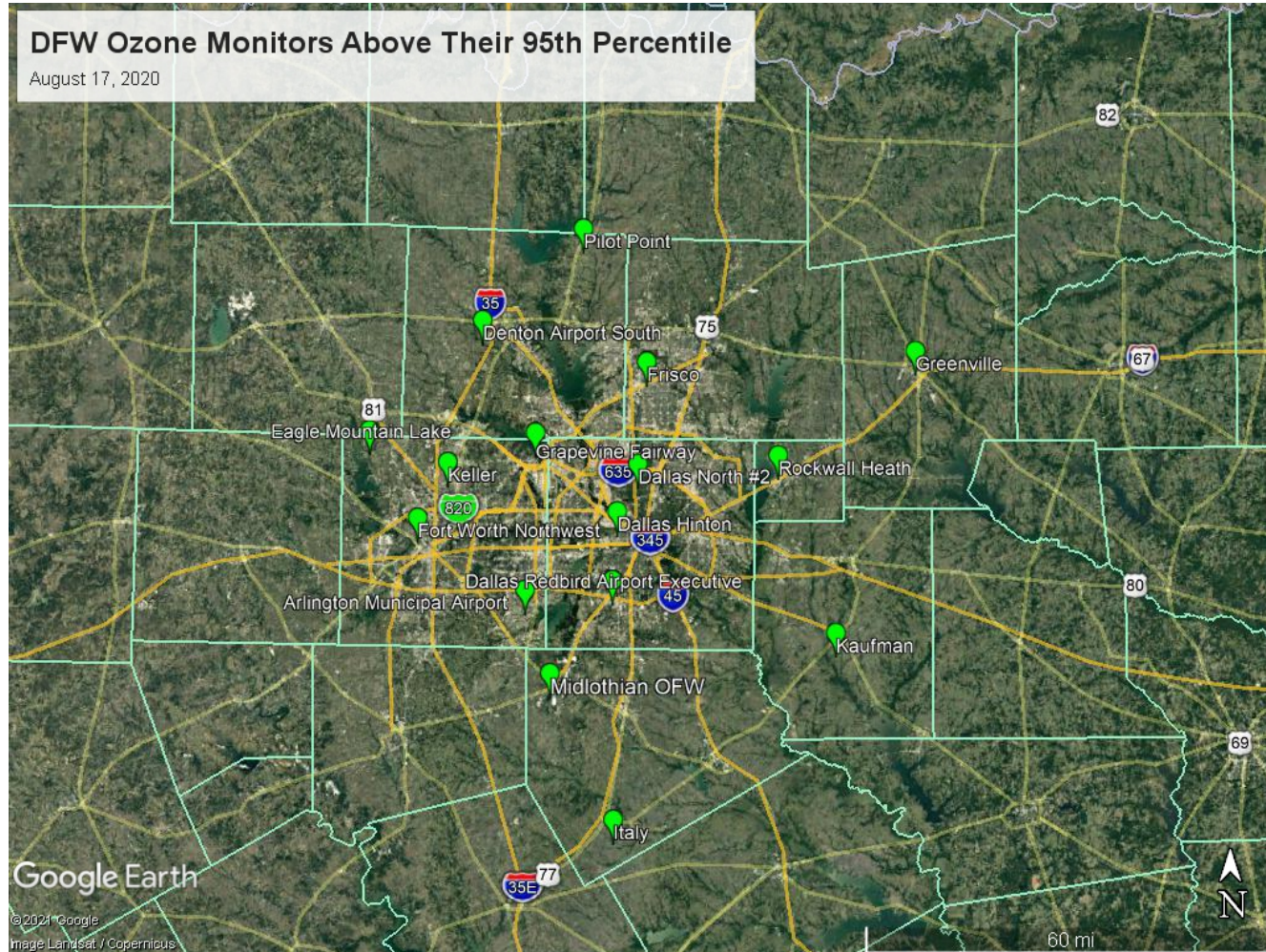
Monitors Above Their 95th Percentile on August 16, 2020



August 16, 2020



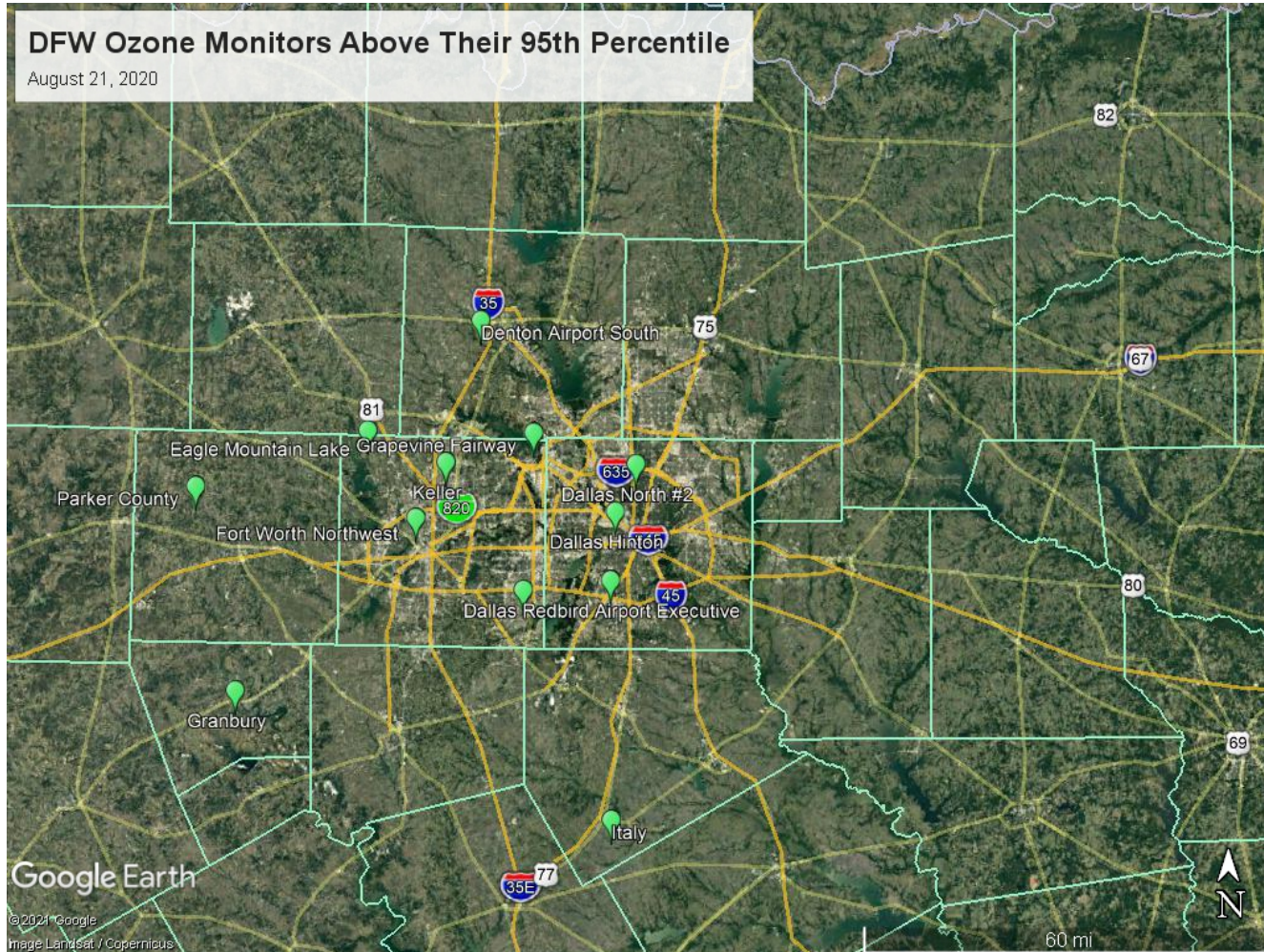
Monitors Above Their 95th Percentile on August 17, 2020



August 17, 2020



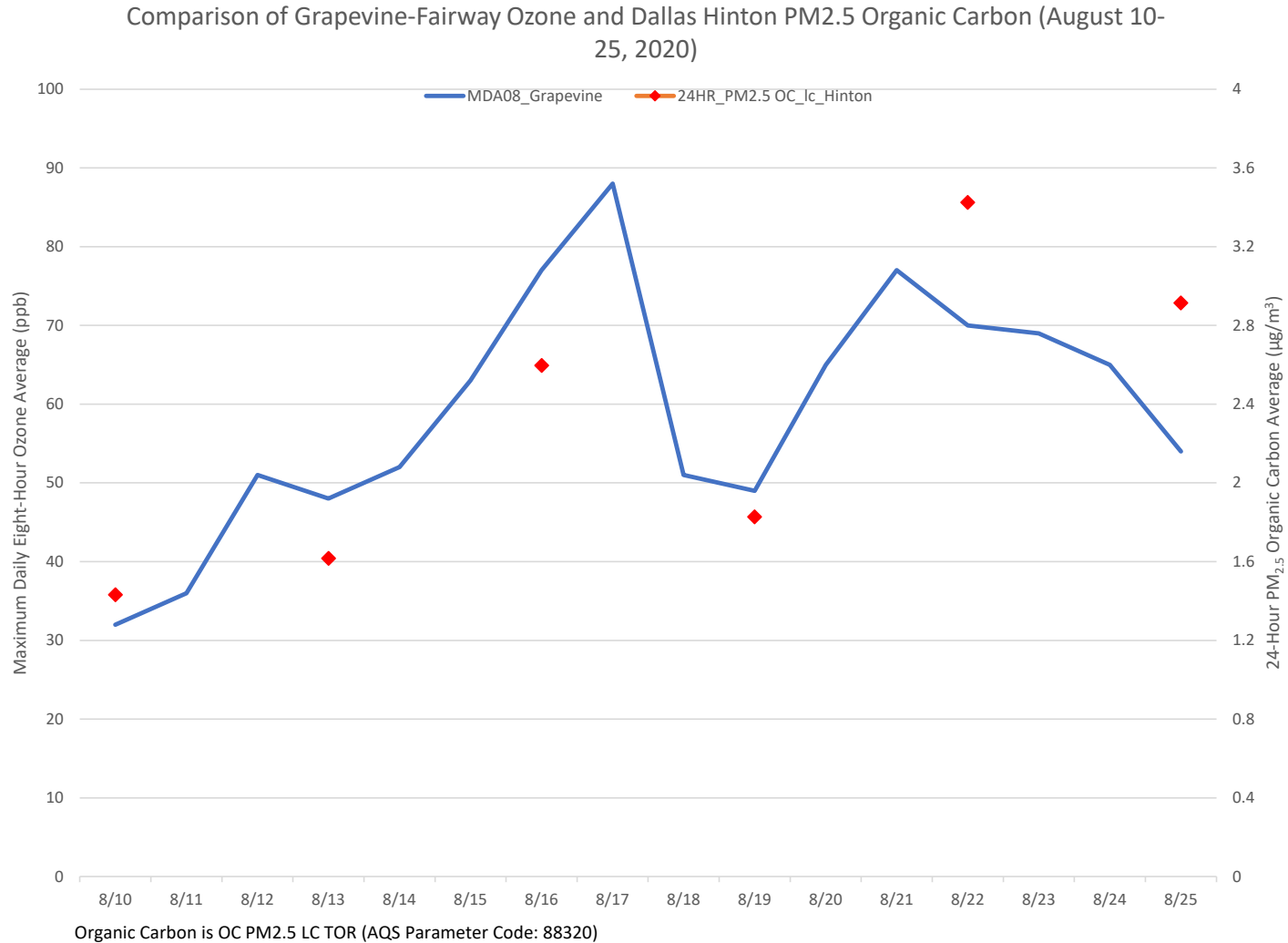
Monitors Above Their 95th Percentile on August 21, 2020



August 21, 2020



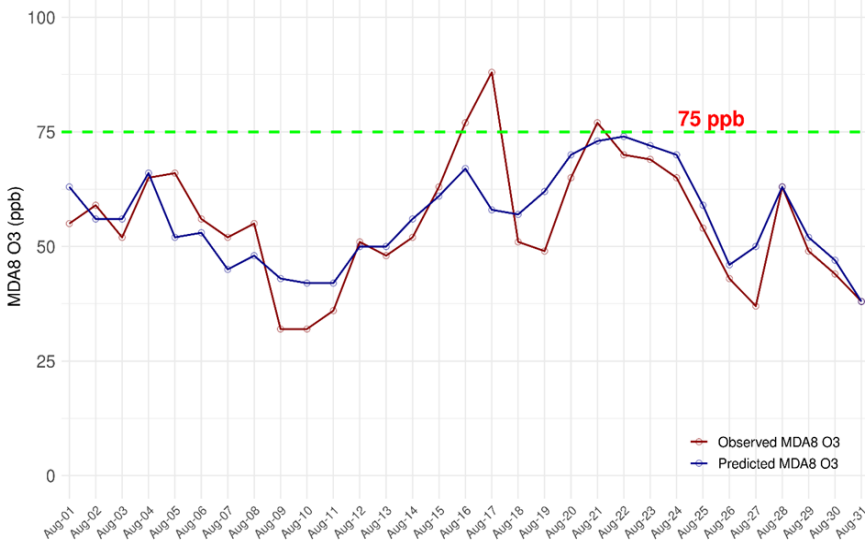
Organic Carbon and Daily Ozone



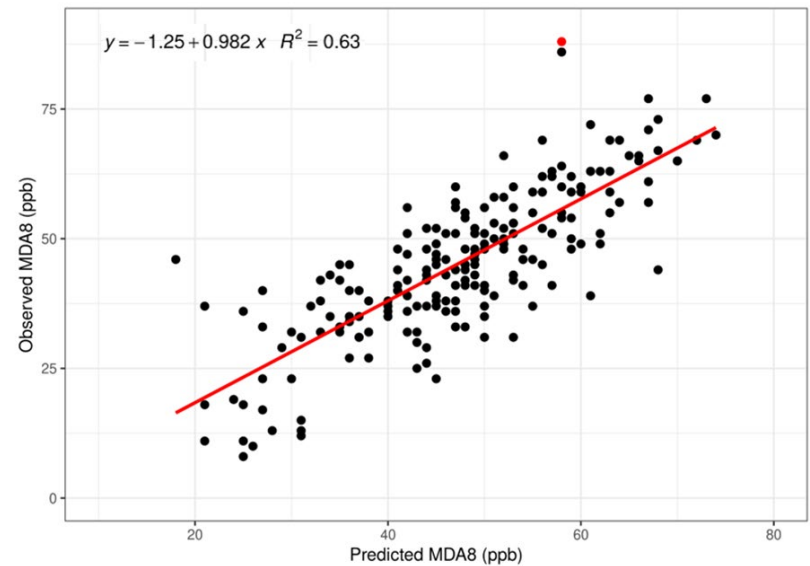


Generalized Additive Model

Comparison of GAM Predicted vs Observed MDA8 O3 for August 2020
Grapevine Fairway



August 2020 Time Series for Observed and Predicted Ozone at Grapevine-Fairway



2020 Model Predictions Compared to Observed Ozone



Questions?



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