

# July 26-27, 2021 Wildfire Smoke Event

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Bureau of Air Management



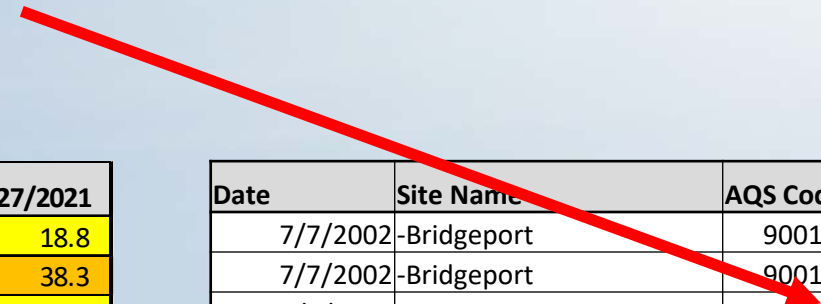
# July 26-27, 2021 Wildfire Smoke Event

Site	7/26/2021	7/27/2021
ChelmsfordNR	59	28.5
Londonderry - Moose Hill	54.1	31.4
Miller State Park	53	20.5
<b>Cornwall</b>	52.2	18.8
<b>Waterbury</b>	50.9	38.3
<b>East Hartford</b>	49.8	33.8
<b>Hartford-Huntley</b>	49.6	33.2
Portsmouth/	47.7	30.2
Burlington	47	17.3
Underhill	46.2	14.3
Keene	45.9	23.9
Worcester	45.2	18.8
LYNN	44.3	25.1
Boston-Von Hillern	44.1	25.6
E Providence	42.5	22.3
W Greenwich	42.3	25.2
Near Road	41.4	22.2
Bennington	41.2	18.8
Boston - Roxbury	41.1	18.6
RUTLAND	40.8	19.6
CCRI Providence	40.8	20.5
Haverhill	40.5	29.1
Rumford	40.2	21.2
<b>Groton Fort Griswold</b>	25.1	37.5
Lebanon	37.5	16.5
<b>New Haven - Criscuolo Park</b>	37	40
SPRINGFIELDSP	36.9	22
<b>Danbury</b>	36.4	33.6
<b>Bridgeport</b>	35.8	34.9
Albany	35.6	21.6

Connecticut was especially hard hit by this western smoke plume, but sites in Massachusetts and New Hampshire had higher 24-hour averages. Such widespread exceedances have probably not been experienced since the July 2002 wildfires from Quebec. PM2.5 levels in Connecticut were even much higher then.

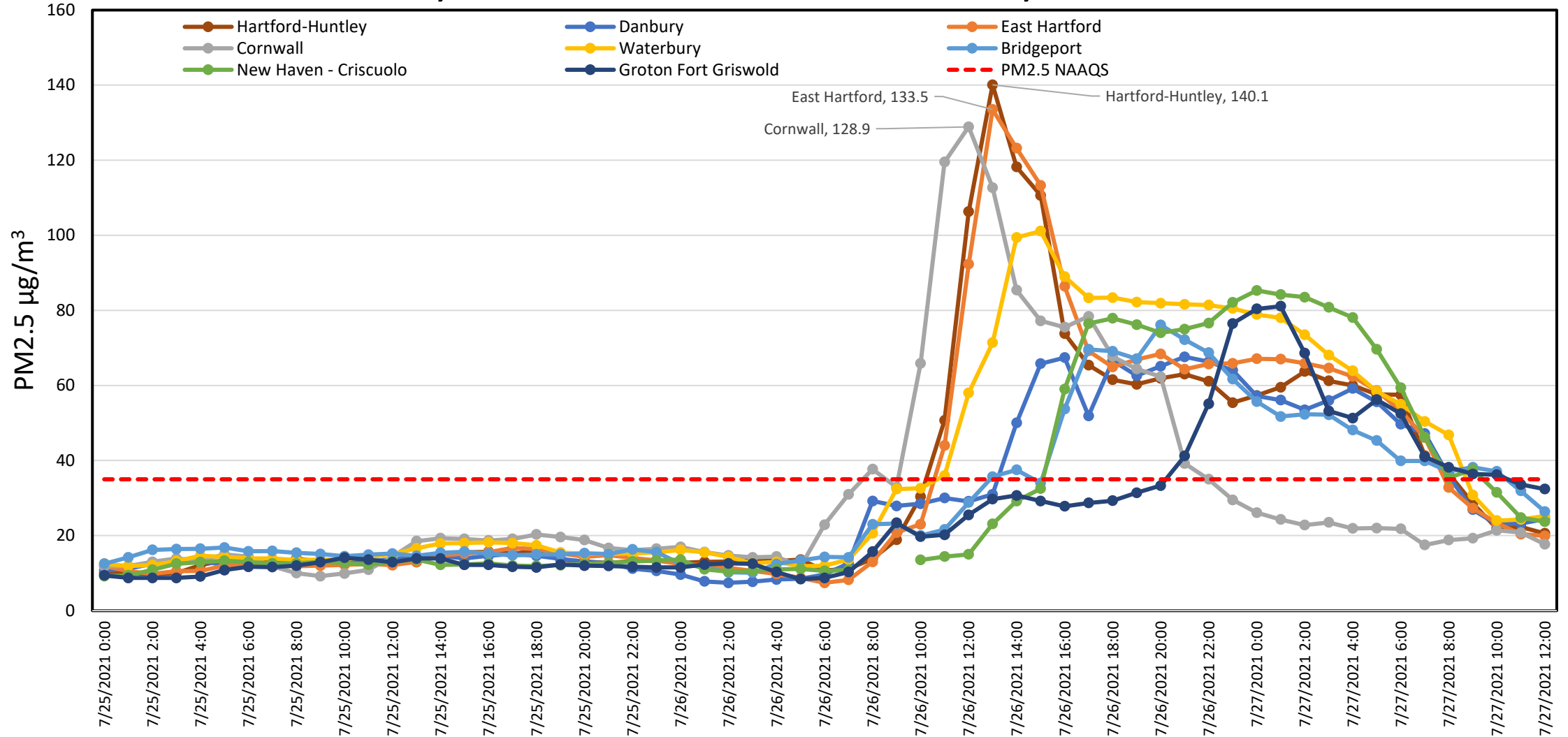
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Date	Site Name	AQS Code	24-hr PM2.5
7/7/2002	-Bridgeport	90010010	79.8
7/7/2002	-Bridgeport	90010010	80.9
7/7/2002	-Bridgeport	90010113	82.7
7/7/2002	Western Conn State Univ	90011123	74.8
7/7/2002	HILLANDALE AVE.	90012124	77.8
7/7/2002	Health Dept	90013005	79.3
7/7/2002	Sherwood Island	90019003	81.5
7/7/2002	McAuliffe Park	90031003	67.9
7/7/2002	Hartford	90031018	68.2
7/7/2002	New Haven	90090018	83.4
7/7/2002	New Haven	90090018	83.6
7/7/2002	State St-New Haven	90091123	80.7
7/7/2002	State St-New Haven	90091123	82.2
7/7/2002	Meadow and Bank Streets	90092123	73.9
7/7/2002	Meadow and Bank Streets	90092123	75.3
7/7/2002	Waterbury	90099005	76.7
7/7/2002	Court House-Norwich	90113002	73.4



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## July 26-27, 2021 Connecticut Hourly PM2.5



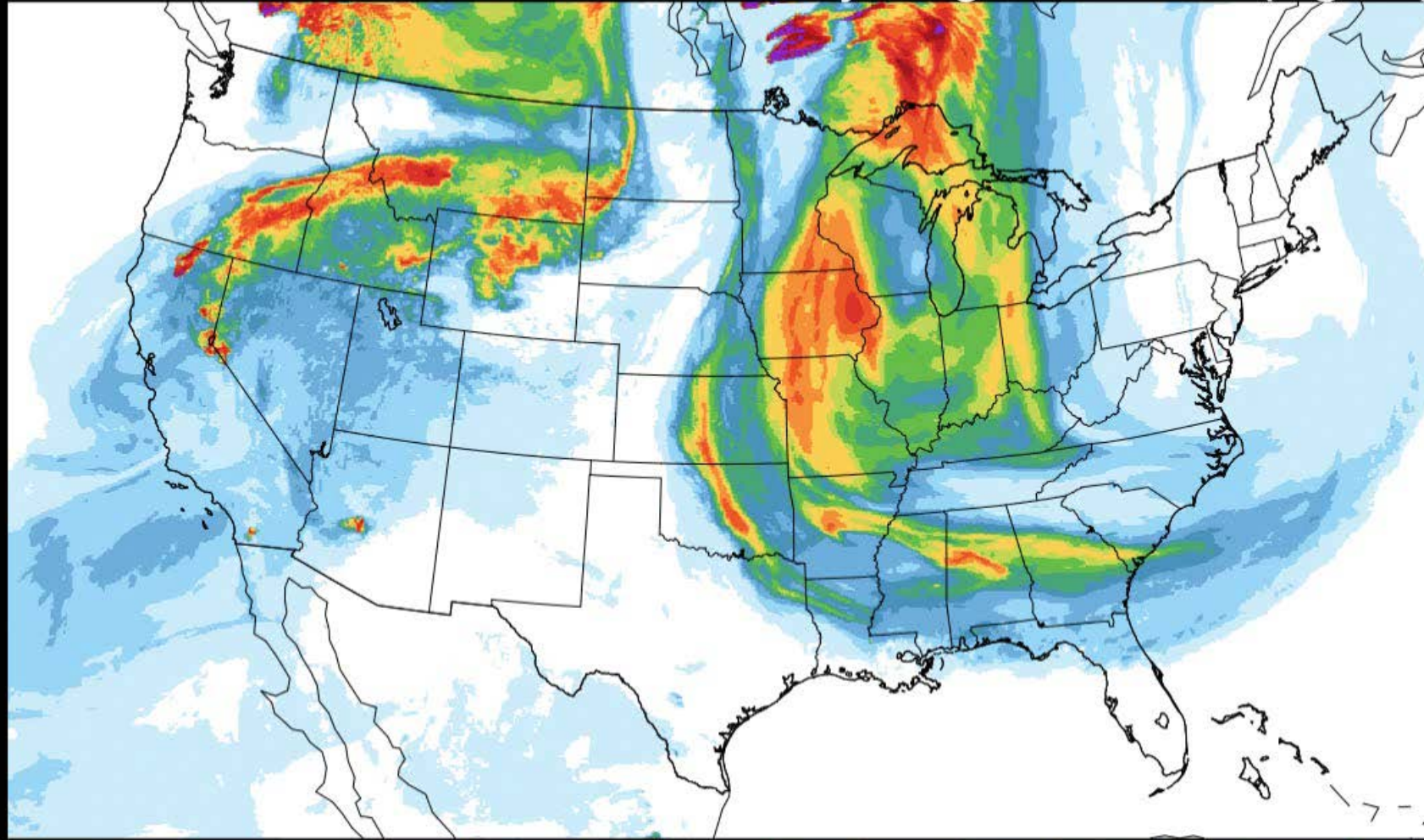
Note how quickly the PM2.5 levels spiked that day. First in Cornwall and then in the Hartford area.

# July 2021 HRRR Smoke Animation

HRRR-NCEP 07/04/2021 (00:00) 0h fcst

Valid 07/04/2021 00:00 UTC

Vertically Integrated Smoke ( $\text{mg}/\text{m}^2$ )

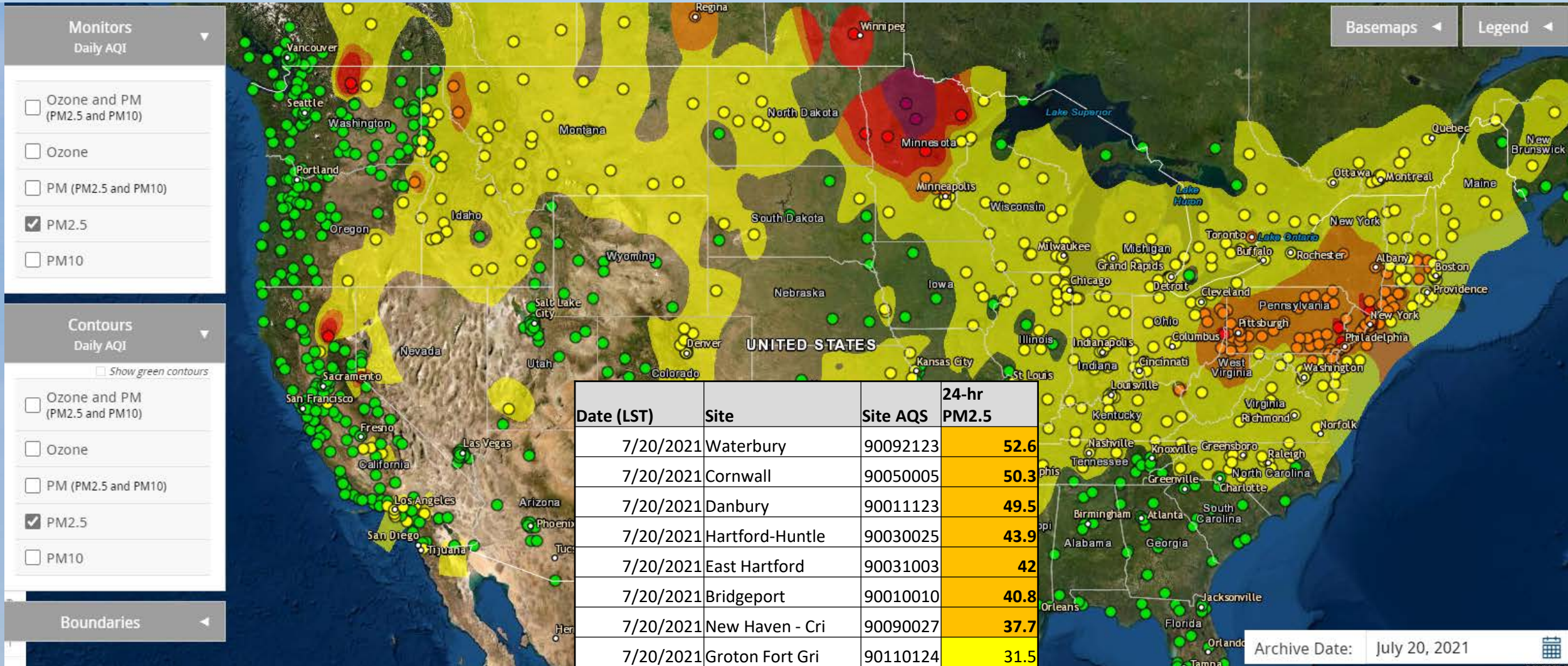


1 4 7 11 15 20 25 30 40 50 75 150 250 500

We use the HRRR Smoke model to track wild fire smoke plumes. This animation shows the daily smoke analysis during July 2021. much of the wildfire smoke plumes were produced from fires north of Lake Superior to Alberta Canada. Multiple plumes passed over New England, but most of the aerosols stayed aloft, except for July 20, 26 and 27.



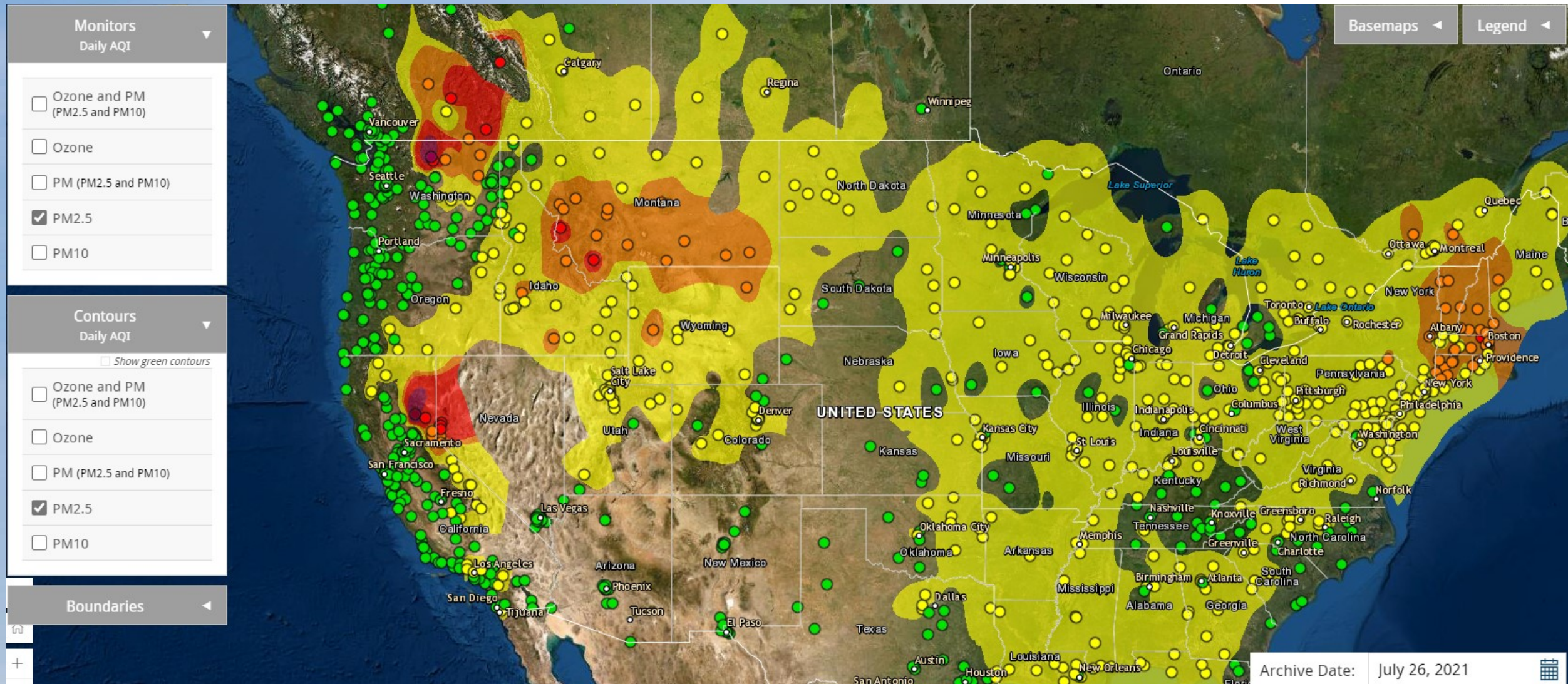
# July 20, 2021, Airnow PM2.5 Levels



The July 20<sup>th</sup> event was just as high as the July 26-27<sup>th</sup> event for Connecticut, but the highest values were recorded to our west and south.



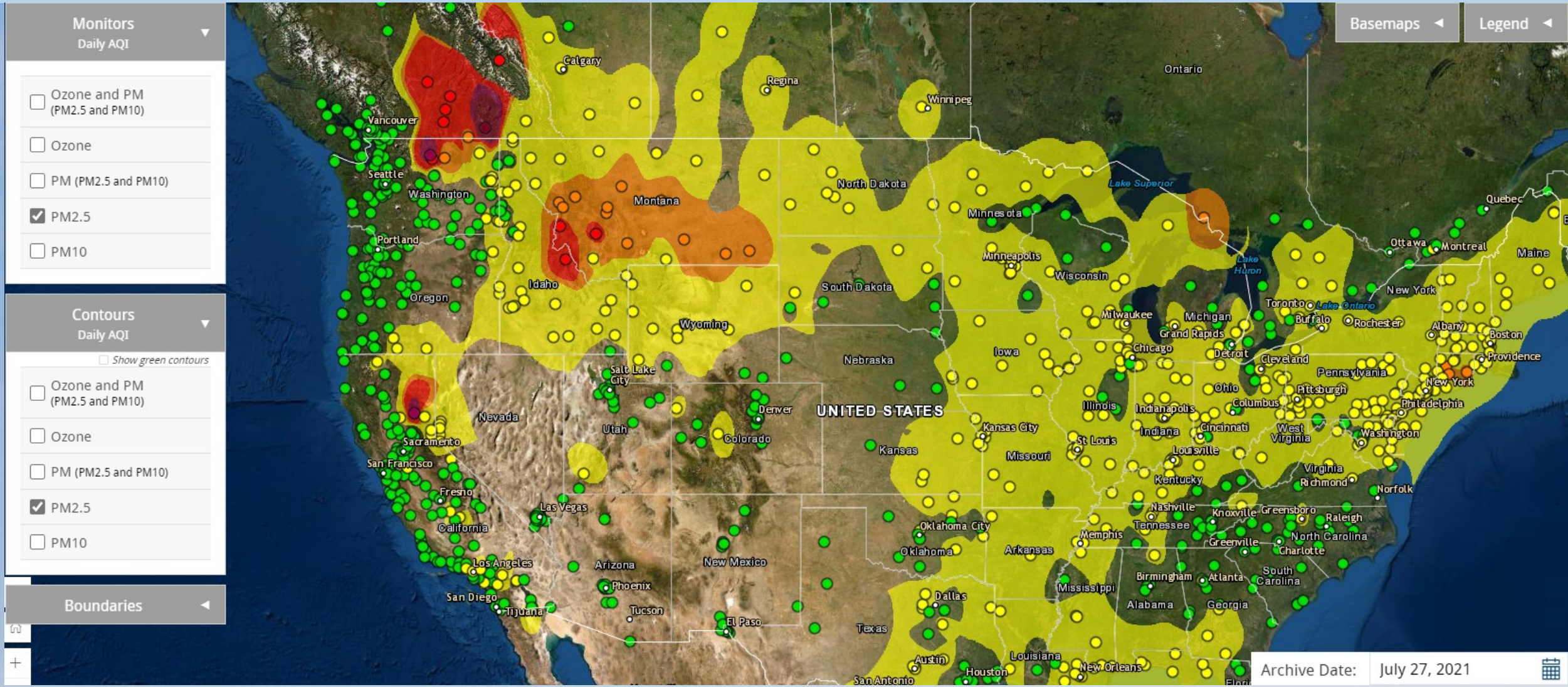
# July 26, 2021, Airnow PM2.5 Levels



The worst of the July 26<sup>th</sup> event was mostly confined to the New England States, but a large portion of the eastern U.S. monitored moderate levels of PM2.5.



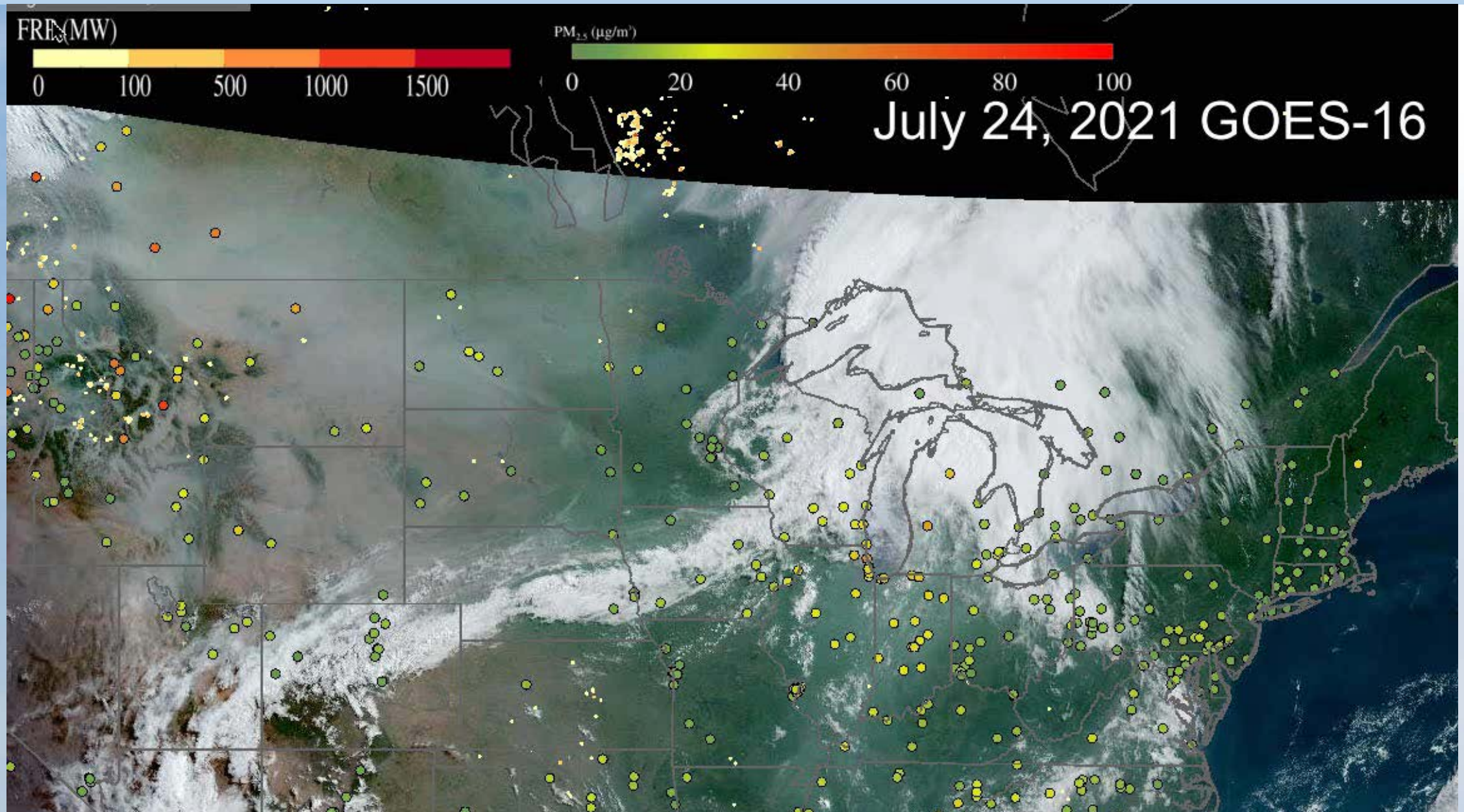
# July 27, 2021, Airnow PM2.5 Levels



Moderate levels of PM2.5 persisted in the Northeast States, but Connecticut still had a few monitors over the NAAQS.

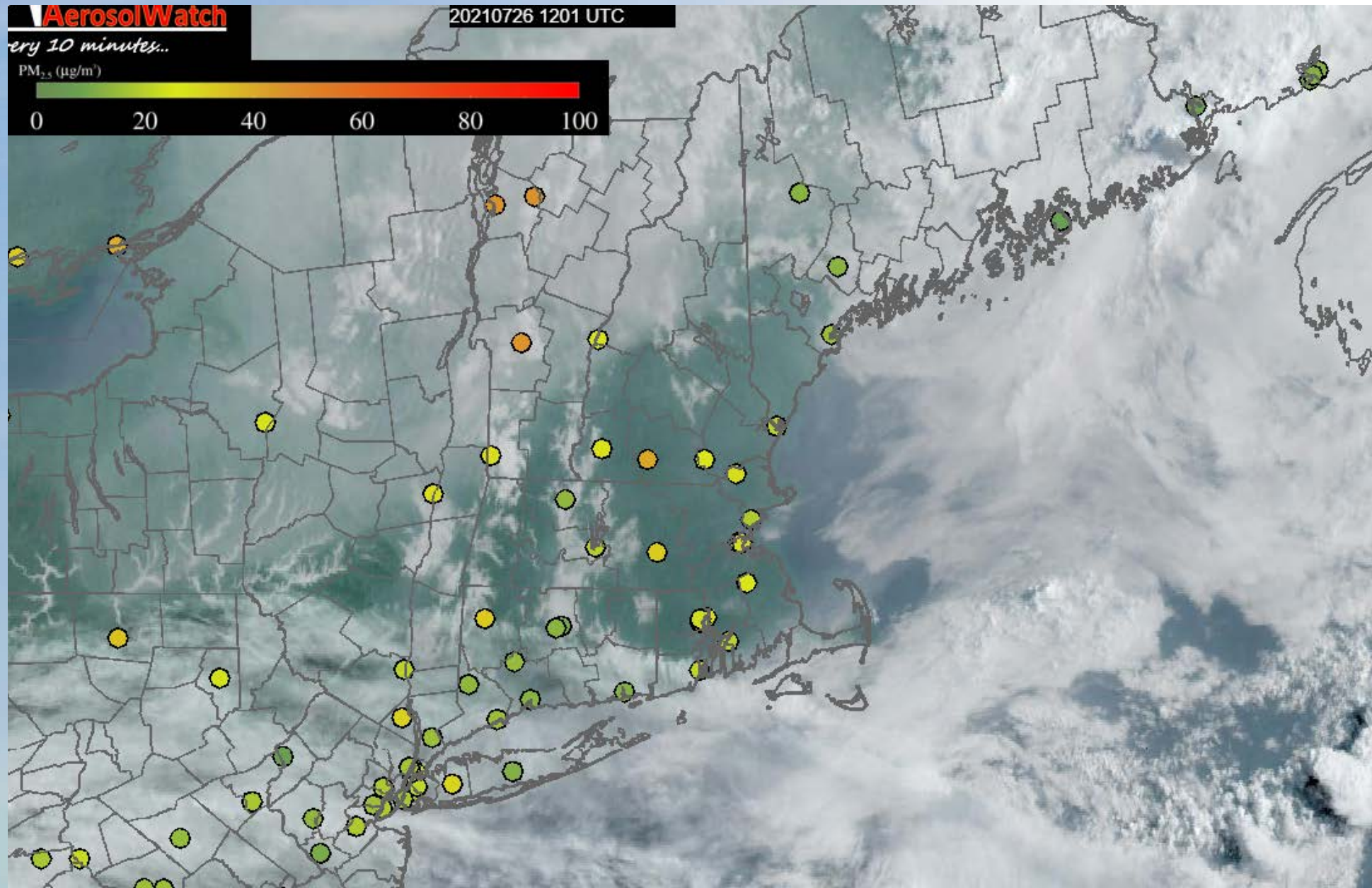


# July 24-27, 2021 Satellite Animation





# July 26, 2021 Satellite Animation





# Mohawk Mountain HazeCam Images

32.9  $\mu\text{g}/\text{m}^3$



The Hazecam at Mohawk Mountain in Cornwall, is at an elevation around 1,700 feet. It was the first CT site to be impacted by the smoke plume. From 10:00am to 1:00pm, the PM2.5 levels rose nearly  $100 \mu\text{g}/\text{m}^3$  !

119.5  $\mu\text{g}/\text{m}^3$



65.9  $\mu\text{g}/\text{m}^3$



More typical visibility



128.9  $\mu\text{g}/\text{m}^3$





# Hartford HazeCam Images

18.9  $\mu\text{g}/\text{m}^3$

July 26, 2021 10:00 AM

The Hazecam at Talcott Mountain overlooks Hartford. From 10:00am to 1:00pm, the PM2.5 levels in Hartford rose nearly 90  $\mu\text{g}/\text{m}^3$  !

50.7  $\mu\text{g}/\text{m}^3$

July 26, 2021 12:00 PM

30.4  $\mu\text{g}/\text{m}^3$

July 26, 2021 11:00 AM

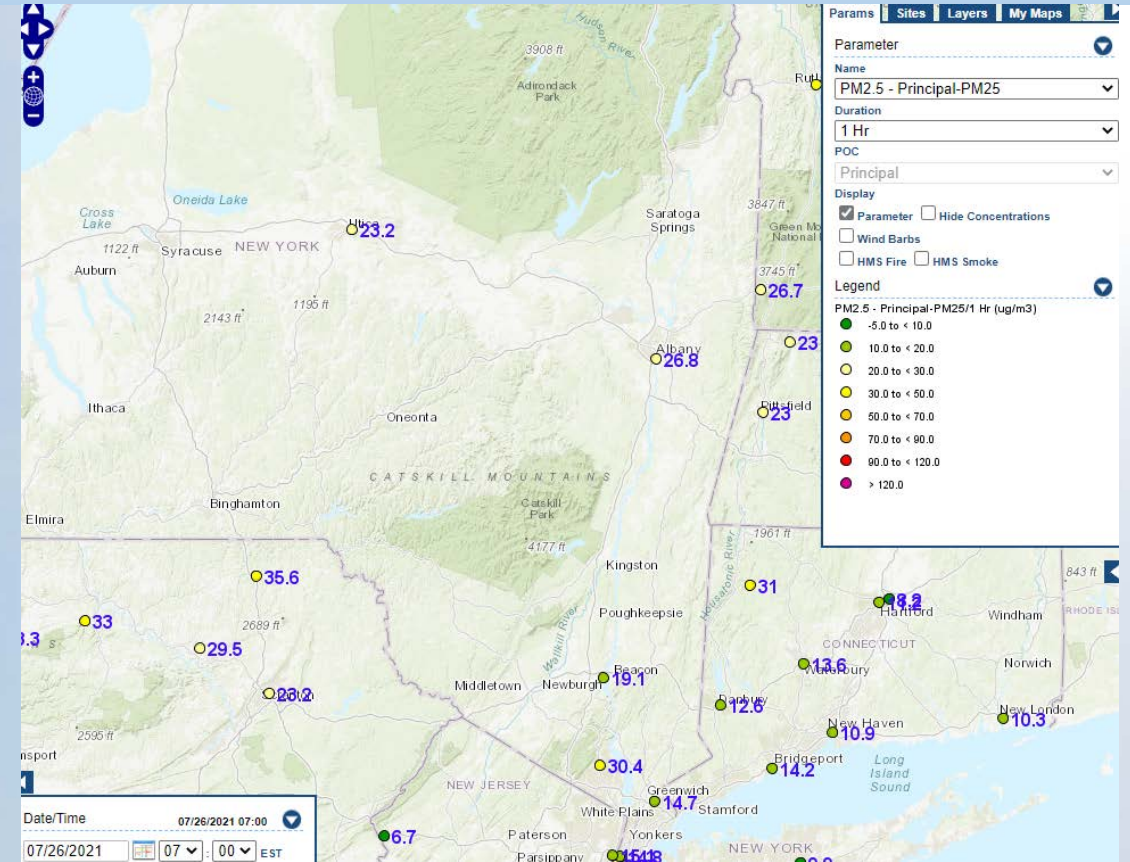
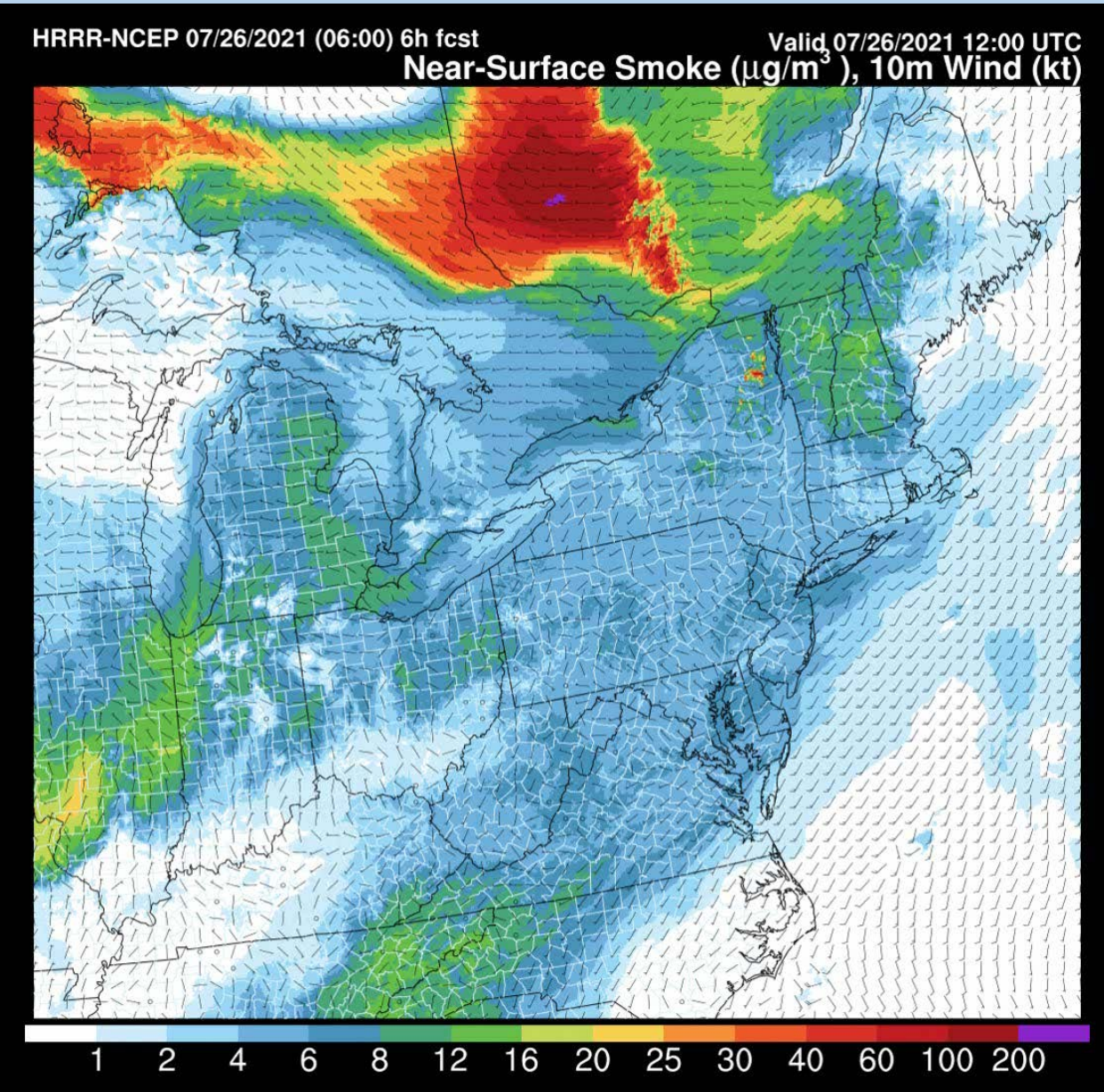


106.3  $\mu\text{g}/\text{m}^3$

July 26, 2021 1:00 PM

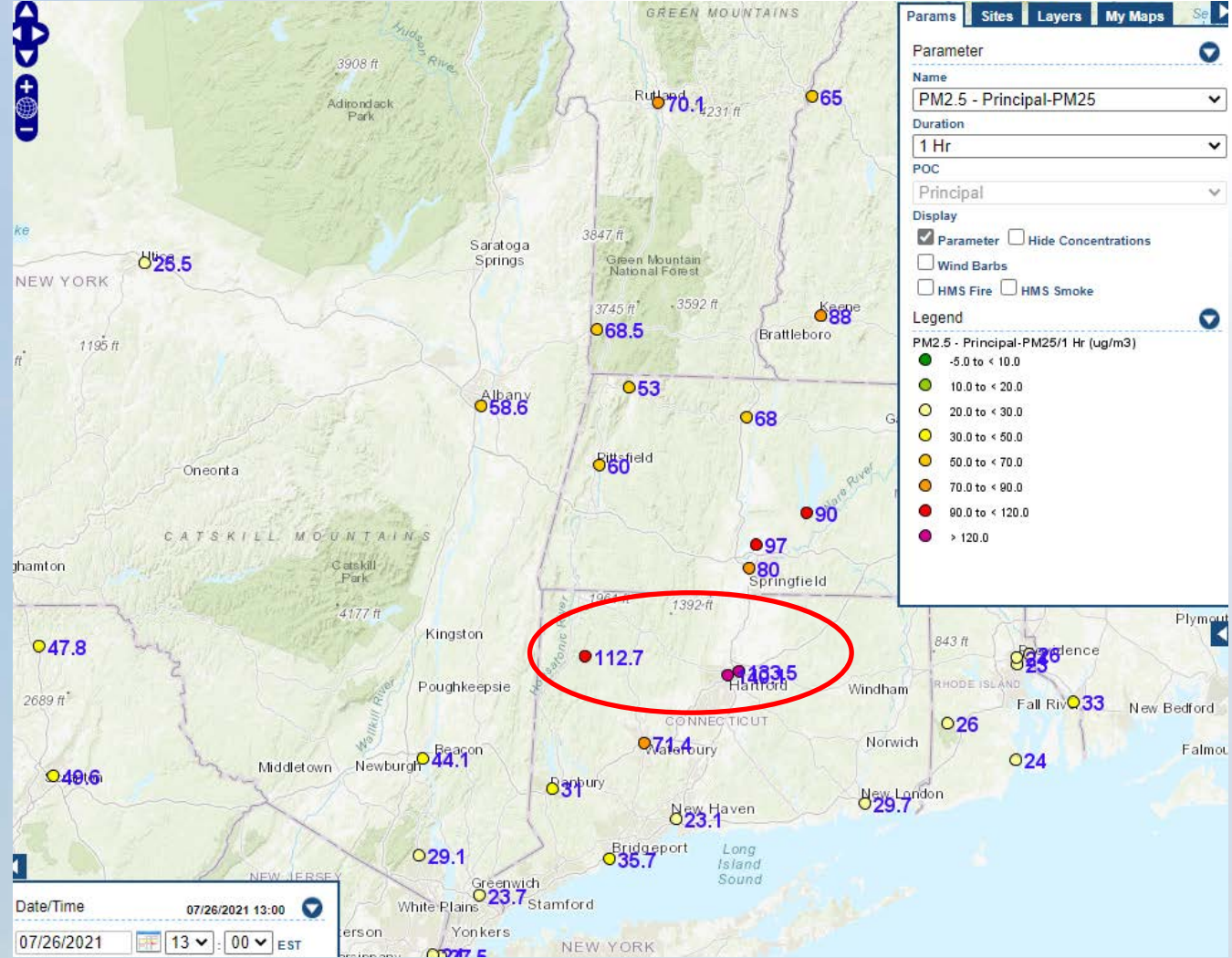
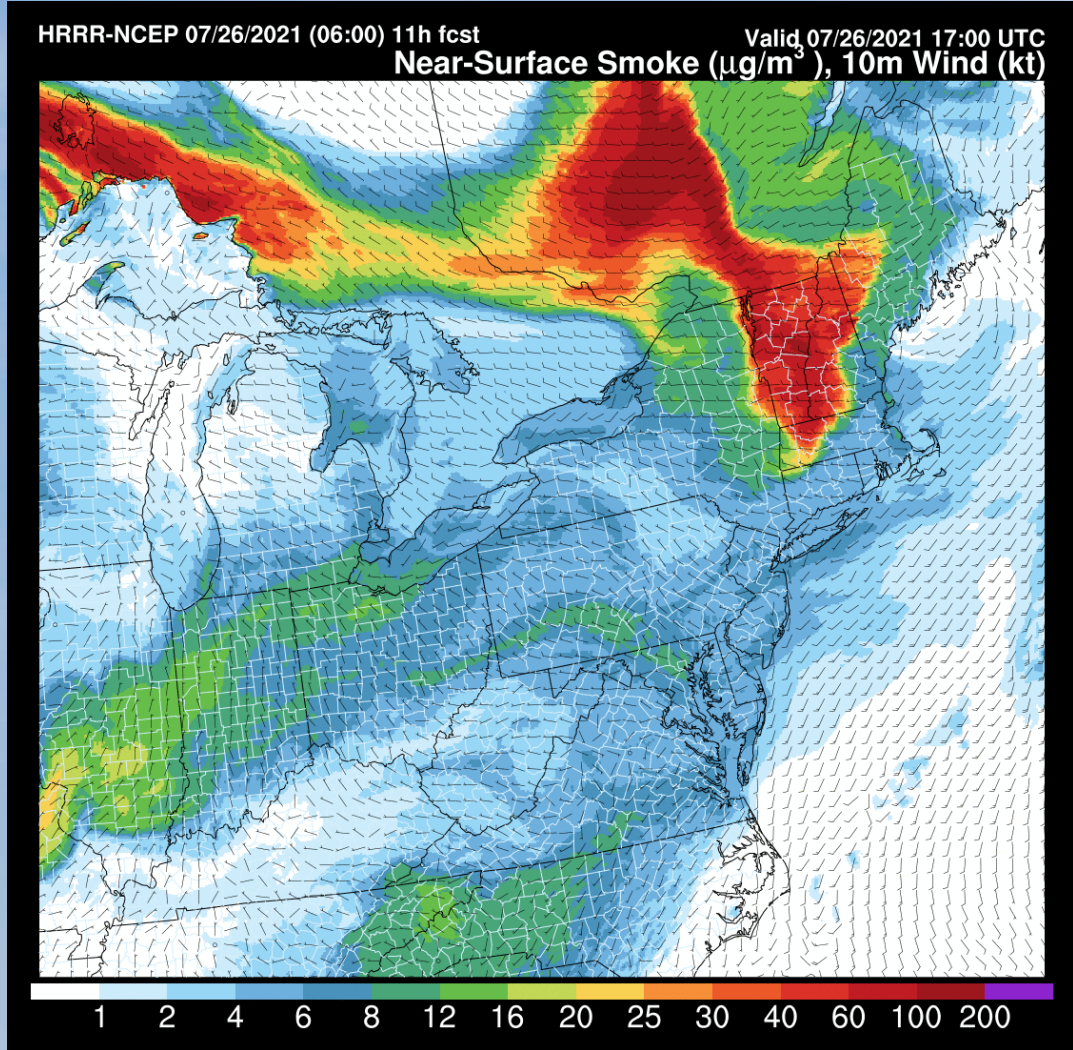


# July 26, 2021 HRRR Smoke Forecast



Surface PM2.5 levels at 8:00am were only moderate to our west. This seemed to verify with the model, which consistently forecast the bulk of the smoke staying to our north. AQ forecasters throughout the region were expecting a fast moving event, with only several hours of elevated PM2.5.

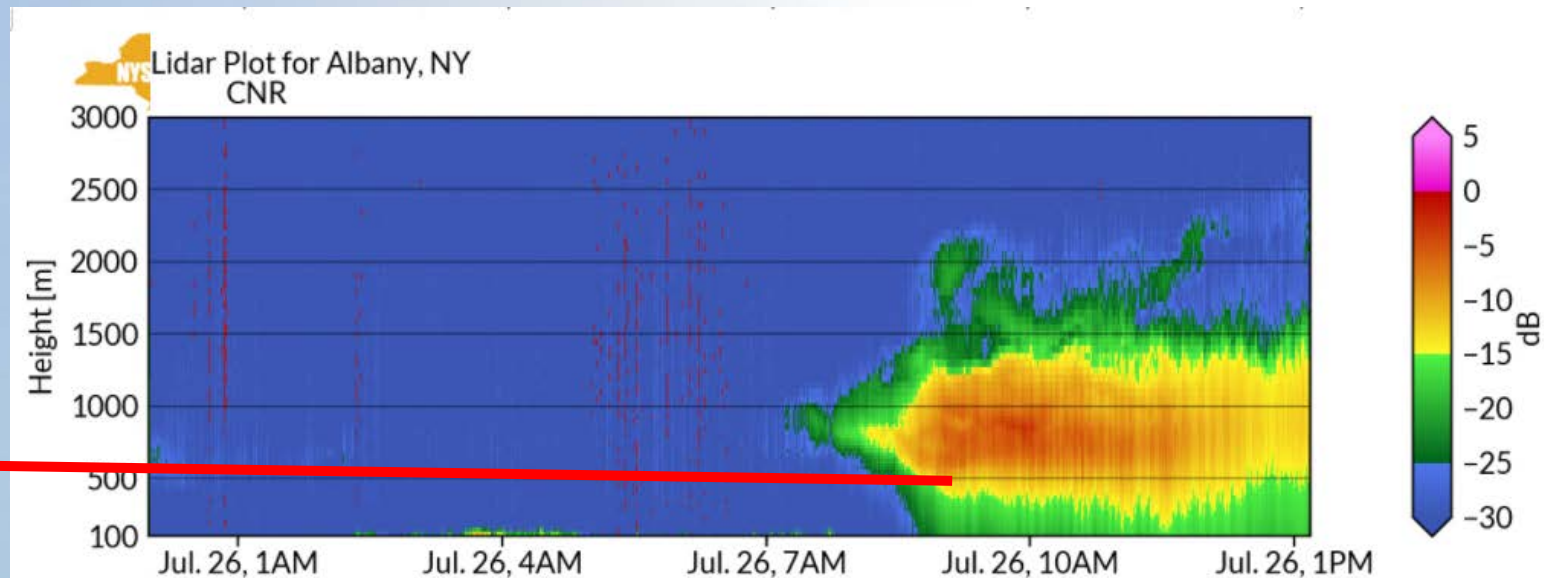
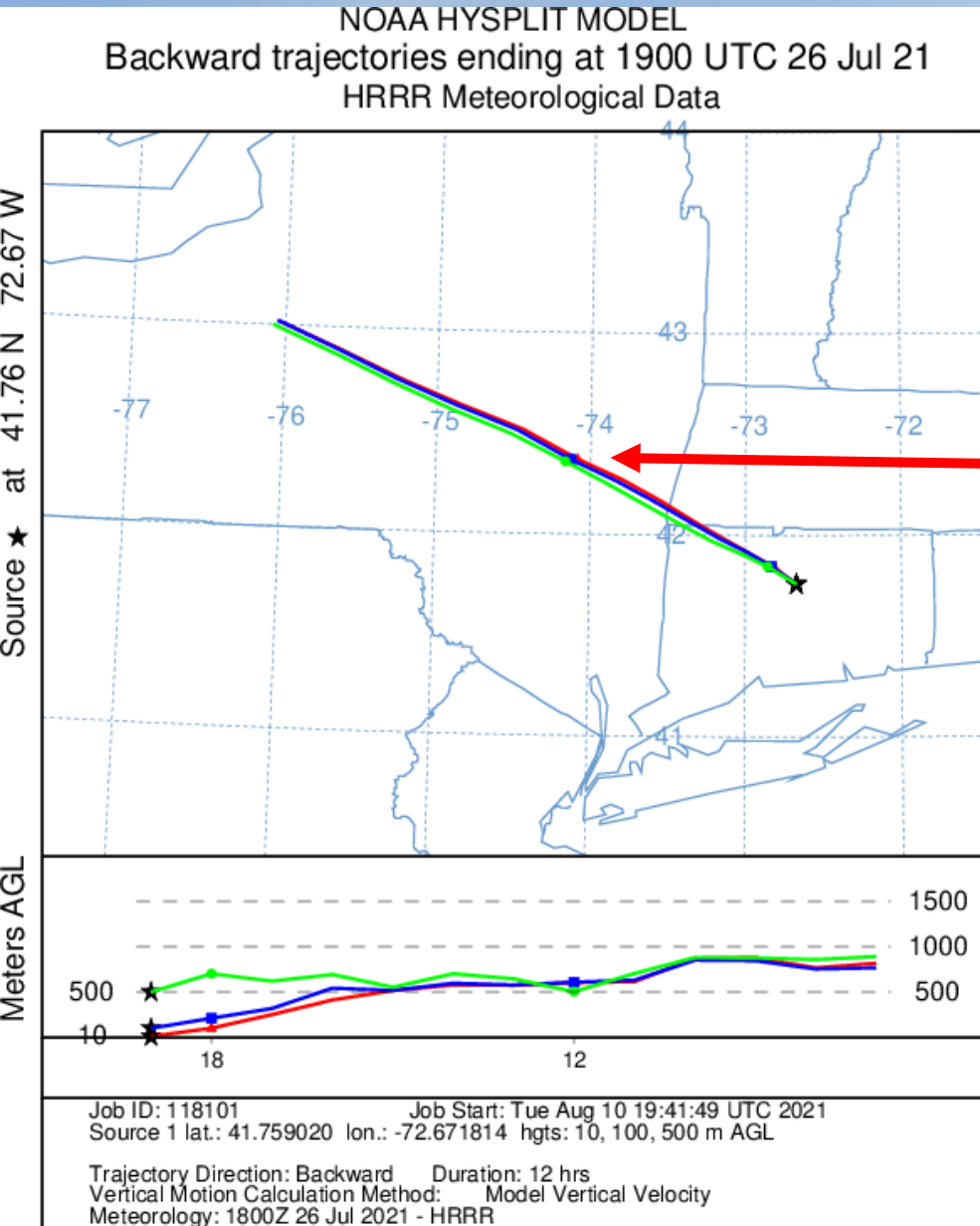




By 2:00pm, the highest PM2.5 values were in Connecticut and not to our north, as the smoke model predicted.



# Back Trajectories and LIDAR at Albany, NYY



There is an aerosol LIDAR at Albany that shows the height of the plume, starting at about 8:00am. The LIDAR window was covered by dew before that, obscuring the overnight sensor readings. This shows a large portion of the plume descending to the ground for several hours. The back trajectories at 8:00am EDT shows a height of 500 meters for all three levels over Albany. The 0-10 meter high trajectories descended from 500 meters over Albany and brought the smoke plume to the ground over Hartford.



# Conclusions

- The usually reliable HRRR smoke model did not capture the correct location of the southern tip of smoke plume as it approached Connecticut.
- Aerosol levels remained only moderate until late morning, when the plume reached the ground from Albany to Cornwall and western Massachusetts.
- A well mixed atmosphere and down-sloping northwest winds off the Appalachians carried the bulk of the plume into the Connecticut River Valley.
- Air Quality forecaster were caught off guard by this event and had to issue air quality alerts in real-time.
- Smoke particulates became trapped in the boundary layer overnight and were slow to disperse the next day. Air quality alerts were maintained for all of Connecticut, except Litchfield County.