PM2.5 National Ambient Air Quality Standard Health Exceedances on June 7, 2023

Exceedance Locations and Levels

On Wednesday, June 7, 2023, there were fifteen (15) sites in New Jersey that exceeded the National Ambient Air Quality Standard (NAAQS) for PM2.5 (24-hour average of 35 micrograms/cubic meter, ug/m^3). A PM2.5 exceedance of the 24-hour NAAQS is measured when the concentration is 35.5 ug/m^3 or greater. The PM2.5 levels are being impacted by smoke from wildfires in Canada. See Table 1.

Note, all of NJ is in attainment for the PM2.5 annual and 24-hour NAAQS and there are no downwind nonattainment areas from NJ.

Table 1. New Jersey PM2.5 Concentrations on 6/7/2023

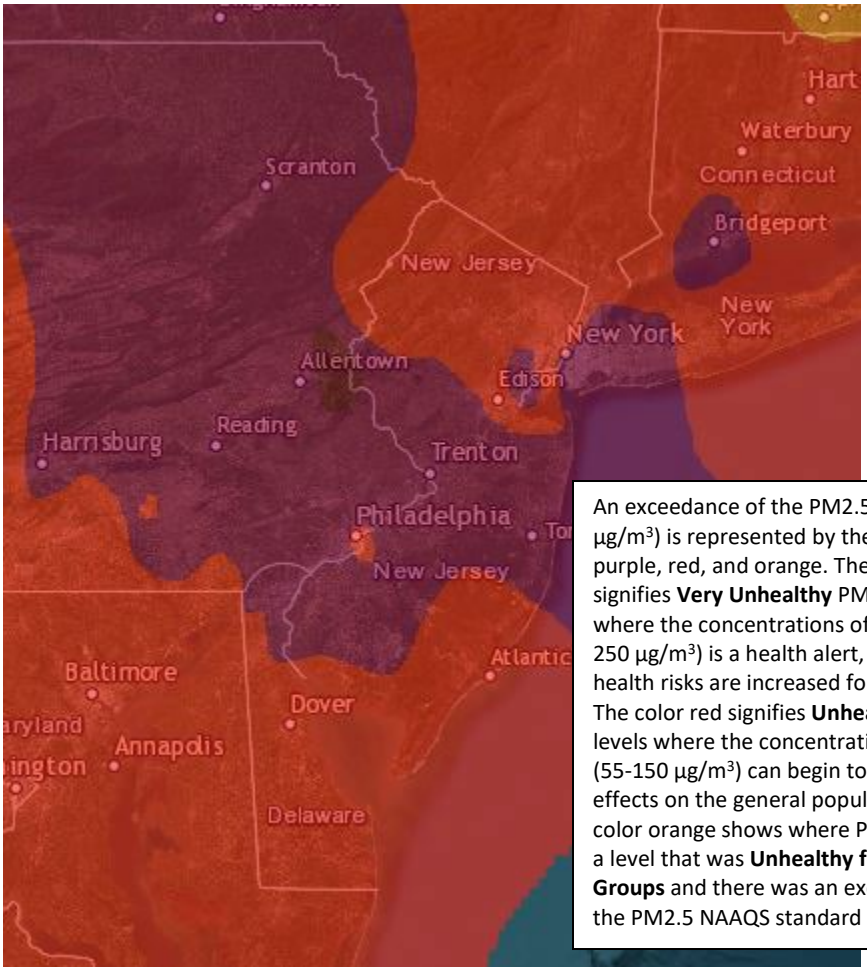
STATION	24-Hour Average (ug/m^3)
Brigantine	124.3
Camden Spruce St	135.9
Columbia	120.7
Elizabeth Lab	151.5
Flemington	187.1
Fort Lee Near Road	120.6
Jersey City Firehouse	110.4
Millville	106.4
Paterson	123.4
Rahway	150.5
Rider University	152.8
Rutgers University	172.1
Toms River	172.7
Trenton	169.3
Union City High School	114.0
TOTAL EXCEEDANCES	**15**

From the out-of-state stations adjacent to New Jersey, there were 24 exceedances of the PM2.5 NAAQS. See Table 2.

Table 2. PM2.5 Concentrations at Out-of-State Monitoring Stations Adjacent to New Jersey on 6/7/2023

STATE	STATION	24-Hour Average (ug/m^3)
CT	Bridgeport	166.6
CT	Danbury	130.5
CT	New Haven - Criscuolo Park	128.8
CT	Waterbury	97.5
DE	KILLENS (Kent Co.)	124.0
DE	LUMS 2 (New Castle Co.)	141.1
DE	MLK (New Castle Co.)	178.8
DE	Rte 9 Del City	162.8
DE	SEAFORD (Sussex Co.)	128.0
MD	Fair Hill	110.7
NY	Bklyn - PS274	173.7
NY	CCNY	No Data
NY	Division Street	No Data
NY	Eisenhower Park	No Data
NY	Fresh Kills	152.4
NY	Holtsville	118.8
NY	Manhattan/IS143	128.9
NY	Maspeth	No Data
NY	Queens	203.5
NY	Queens Near-Road	132.7
NY	White Plains	120.9
PA	Allentown	243.7
PA	Chester	195.8
PA	Freemansburg	258.9
PA	Marcus Hook	190.3
PA	New Garden	163.2
PA	Norristown	209.6
PA	FAB (Philadelphia Co.)	No Data
PA	MON (Philadelphia Co.)	No Data
PA	NEW (Philadelphia Co.)	211.1
PA	RIT (Philadelphia Co.)	No Data
PA	TOR (Philadelphia Co.)	No Data
	TOTAL EXCEEDANCES	**24**

Figure 1. PM2.5 Air Quality Index for June 7, 2023



An exceedance of the PM2.5 standard (35 µg/m^3) is represented by the colors purple, red, and orange. The color purple signifies **Very Unhealthy** PM2.5 levels where the concentrations of PM2.5 (150-250 µg/m^3) is a health alert, and the health risks are increased for everyone. The color red signifies **Unhealthy** PM2.5 levels where the concentrations of PM2.5 (55-150 µg/m^3) can begin to have adverse effects on the general population. The color orange shows where PM2.5 reached a level that was **Unhealthy for Sensitive Groups** and there was an exceedance of the PM2.5 NAAQS standard (35 µg/m^3).

Source: www.airnow.gov

For ozone terminology definitions see NJDEP Air Quality Planning's Glossary and Acronyms webpage: https://www.nj.gov/dep/airmon/glossary.html

Weather

On Wednesday June 7th, widespread PM2.5 exceedances occurred across the region due to atmospheric wind patterns transporting wildfire smoke from Canada into the United States. High pressure began to build into the area on Wednesday behind a departing cold front, with temperatures reaching into the mid 70s across the region. As the day progressed, light northwesterly winds brought a large influx of wildfire smoke, originating from Quebec, Canada, into the region. This area of smoke caused PM 2.5 levels to begin to climb dramatically as it entered the state, causing air quality to quickly climb into the unhealthy and very unhealthy categories (Figure 2).

Where Did the Air Pollution that Caused PM2.5 Come From?

Widespread wildfires throughout southern portions of Quebec and Ontario ignited and/or continued to burn earlier this week leading up to this regional PM2.5 exceedance event on June 6th and 7th. Warm temperatures and low dewpoints the week prior created an ideal environment for the rapid ignition and spread of hundreds of wildfires across southern Canada. Dense smoke from the day prior had blanketed the region and lingered overnight into Wednesday morning, allowing for a deteriorated air mass to start the day. An additional large plume of smoke from the uncontrolled fires continued to transport in a southerly direction on Tuesday morning as strong low pressure remained anchored over Nova Scotia. This plume began to impact the region around noon, blanketing the area in a thick haze with very limited visibility, as seen in Figure 3. Additionally, a surface trough positioned itself along the I-95 corridor throughout much of the day, allowing additional smoke aloft to mix down and enhance residual PM2.5 levels at the surface from the day prior.

Figure 4 shows that PM2.5 levels hovered in the Unhealthy range early in the day, with the dense plume of smoke arriving in northern New Jersey around 11 am. This caused PM2.5 levels to skyrocket into the Very Unhealthy and even Hazardous range throughout the afternoon and evening hours as the plume continued south. Figure 8 below shows the National Air Quality Index on June 5th, indicating the presence of residual Canadian wildfire smoke in the northeast, with the additional plume of smoke transporting in a southerly direction from southern Quebec and Ontario.

Figure 2. AirNow Fire and Smoke Map, Smoke Plume for June 7, 2023

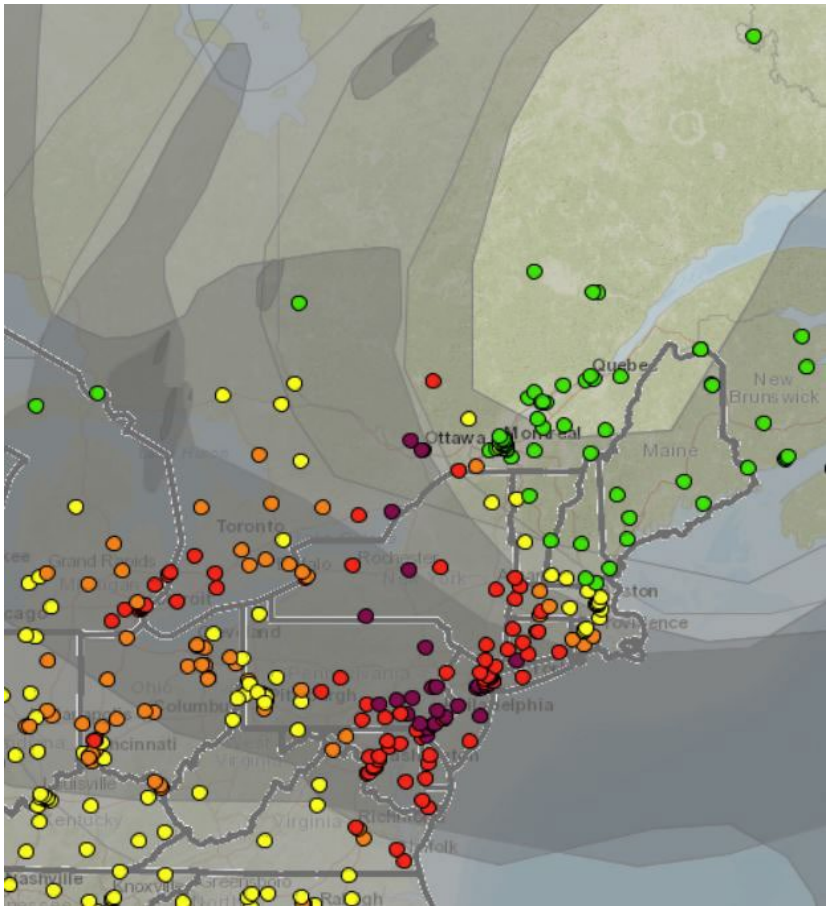


Figure 3. GOES-East Satellite Imagery at 1 pm, June 7, 2023

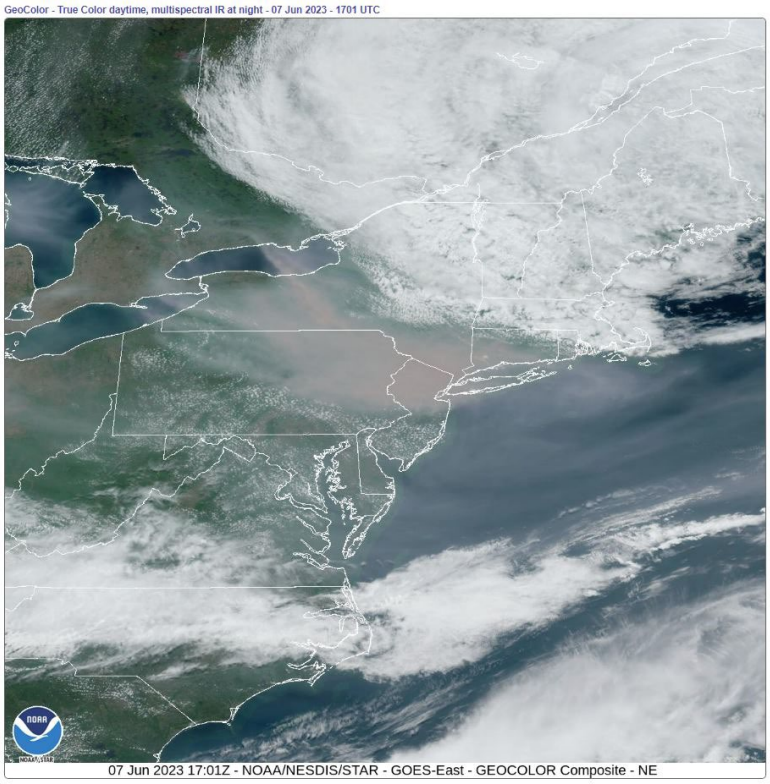
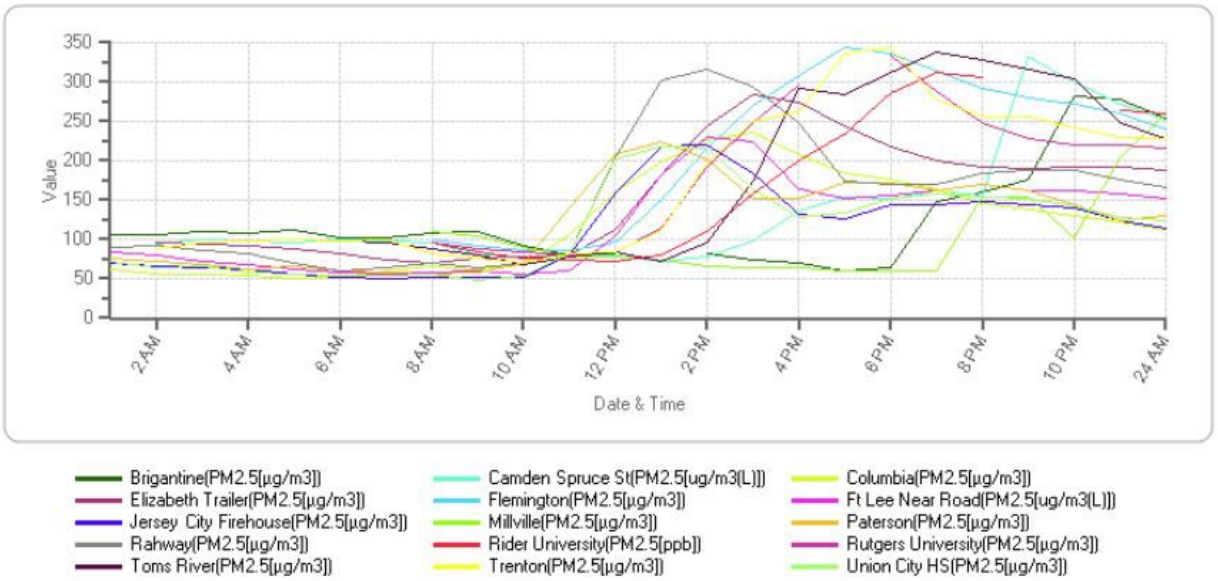


Figure 4. PM2.5 1-hr Concentrations for June 7, 2023



Figures 5, 6, and 7 show the back trajectories of different wind heights for the monitored exceedance(s) on this day. The figures illustrate where the air came from during the 48 hours preceding the 24-hour PM2.5 exceedances. A transport analysis is provided with each figure shown below along with a map of the National Air Quality Index for the previous day (Figure 8). The monitoring station(s) that were chosen to model back trajectories are listed in Table 3.

Table 3. Monitoring Stations with a 24-hr PM2.5 Exceedance that were selected to Run 48-hr Back Trajectories

STATE	STATION	Daily Maximum 24-Hr Average (ug/m^3)
CT	Bridgeport	166.6
CT	Waterbury	97.5
DE	KILLENS (Kent Co.)	124.0
NJ	Elizabeth Lab	151.5
NJ	Rahway	150.5
NJ	Camden Spruce St	135.9
NY	Queens	203.5
NY	Holtsville	118.8
PA	Allentown	243.7
PA	Chester	195.8

Figure 5. 48-hour Back Trajectories for June 7, 2023 at 10 meters

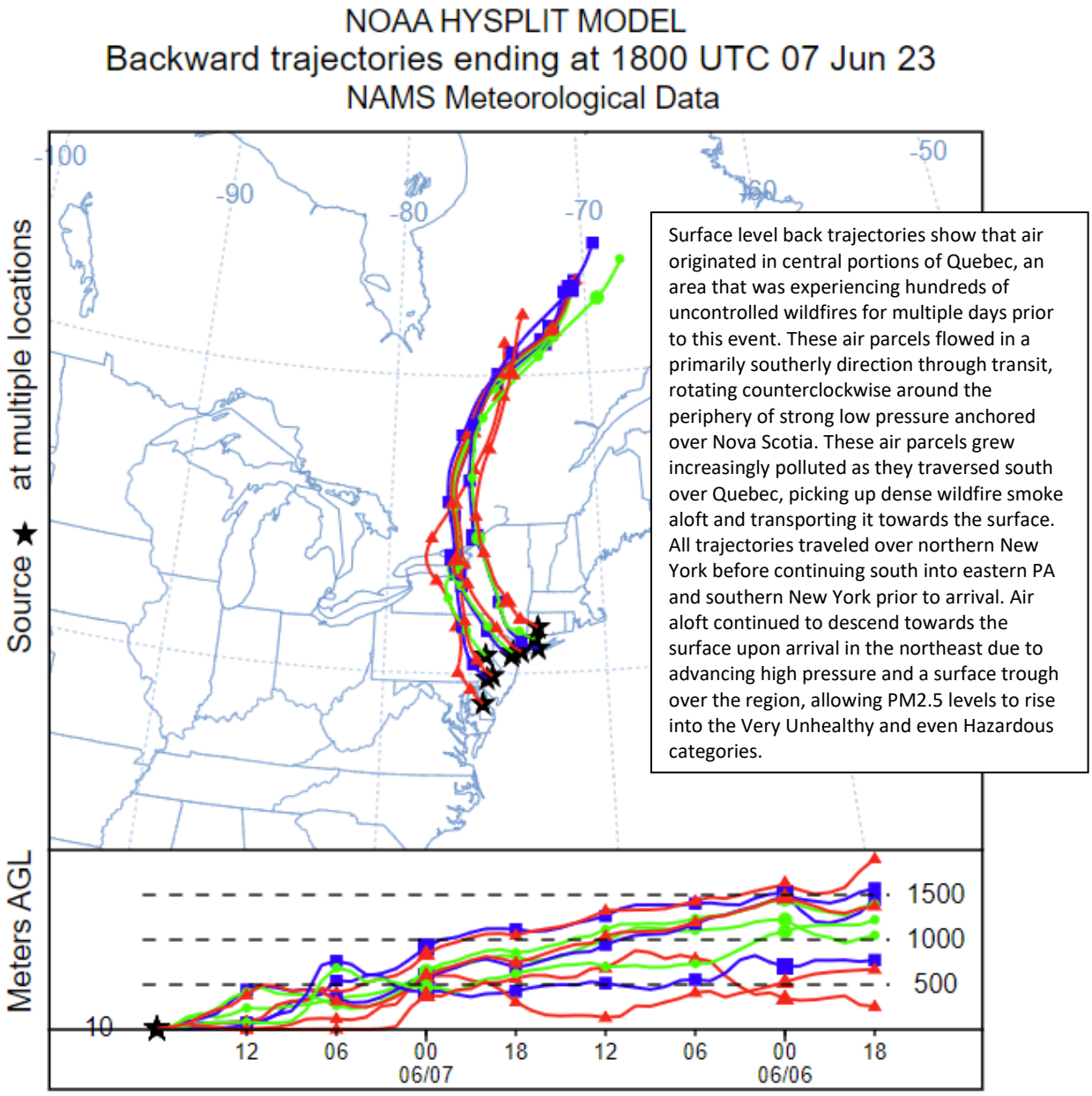


Figure 6. 48-hour Back Trajectories for June 7, 2023 at 500 meters

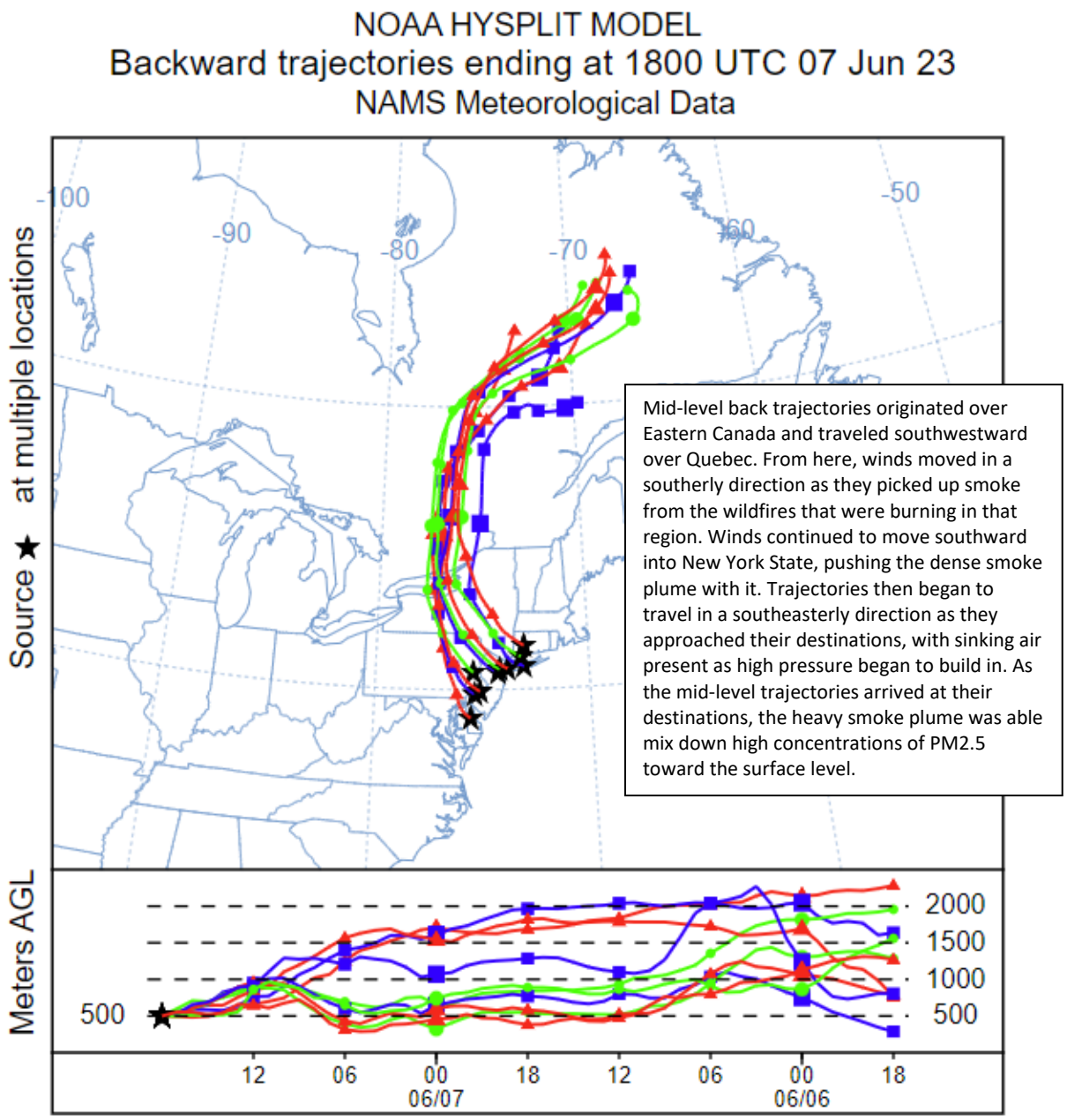


Figure 7. 48-hour Back Trajectories for June 7, 2023 at 1500 meters

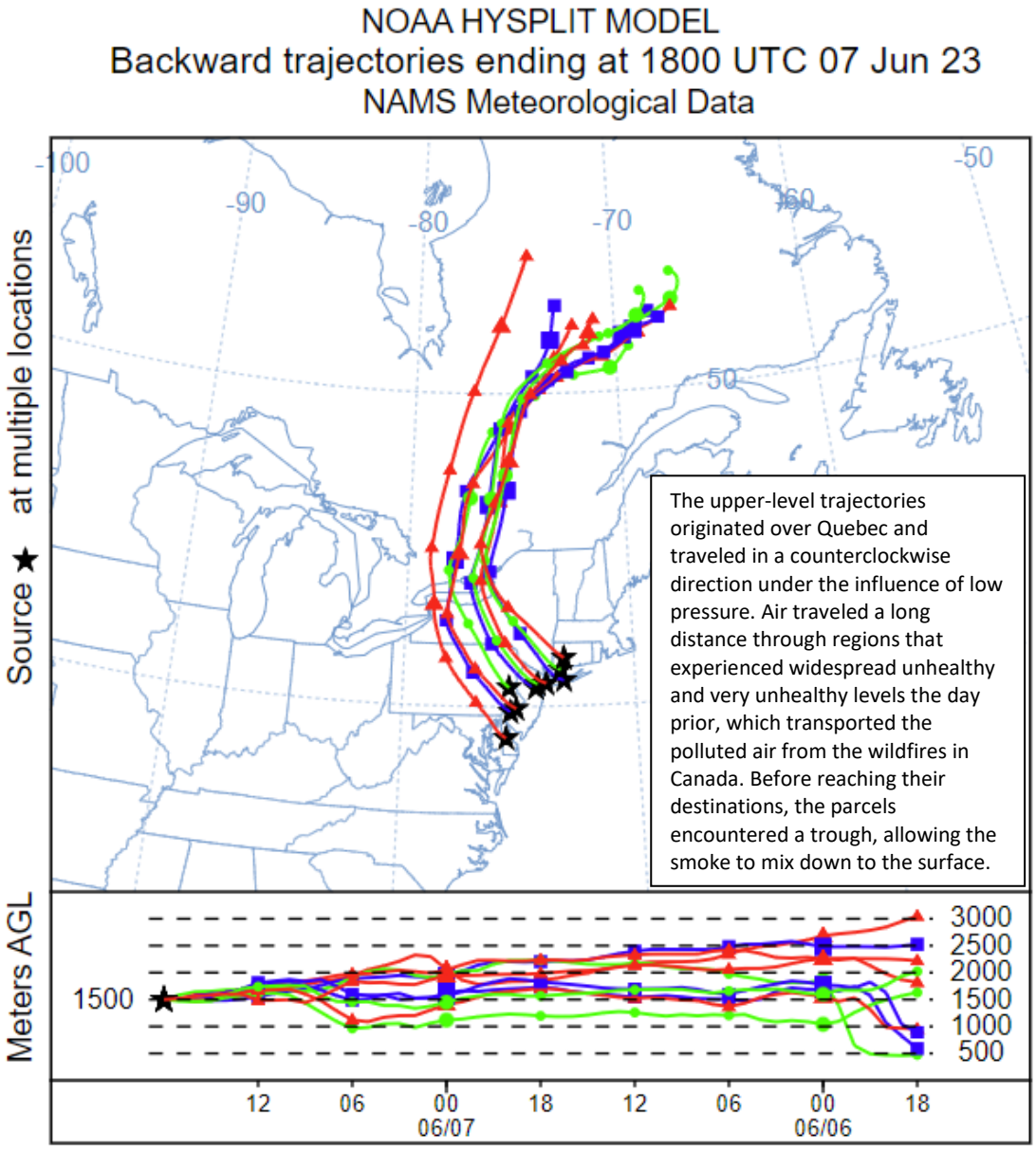
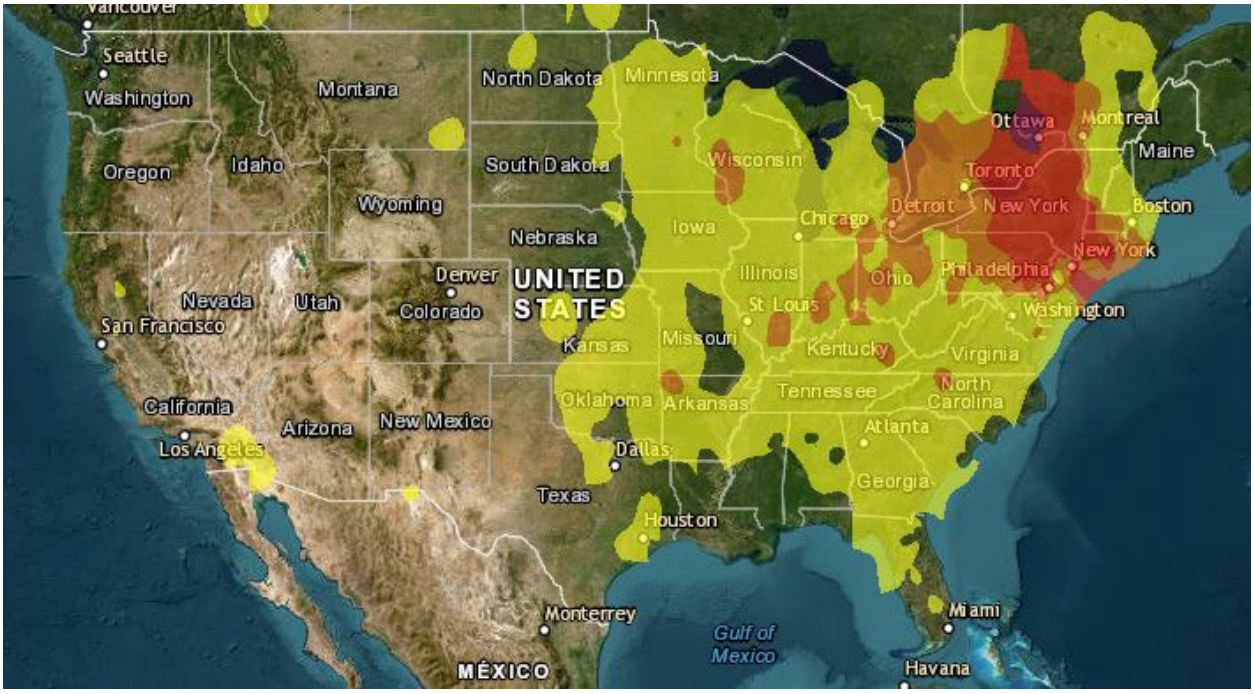


Figure 8. Air Quality Index for the United States on June 6, 2023



Source: www.airnow.gov

Find Out About Air Quality Every Day

Learn more about your local ozone air quality forecast by visiting the "What's Your Air Quality Today?" page at https://www.nj.gov/dep/baqp/aqitoday.html .