PM2.5 National Ambient Air Quality Standard Health Exceedances on June 6, 2023

Exceedance Locations and Levels

On Tuesday, June 6, 2023, there were eleven (11) 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 6/6/2023

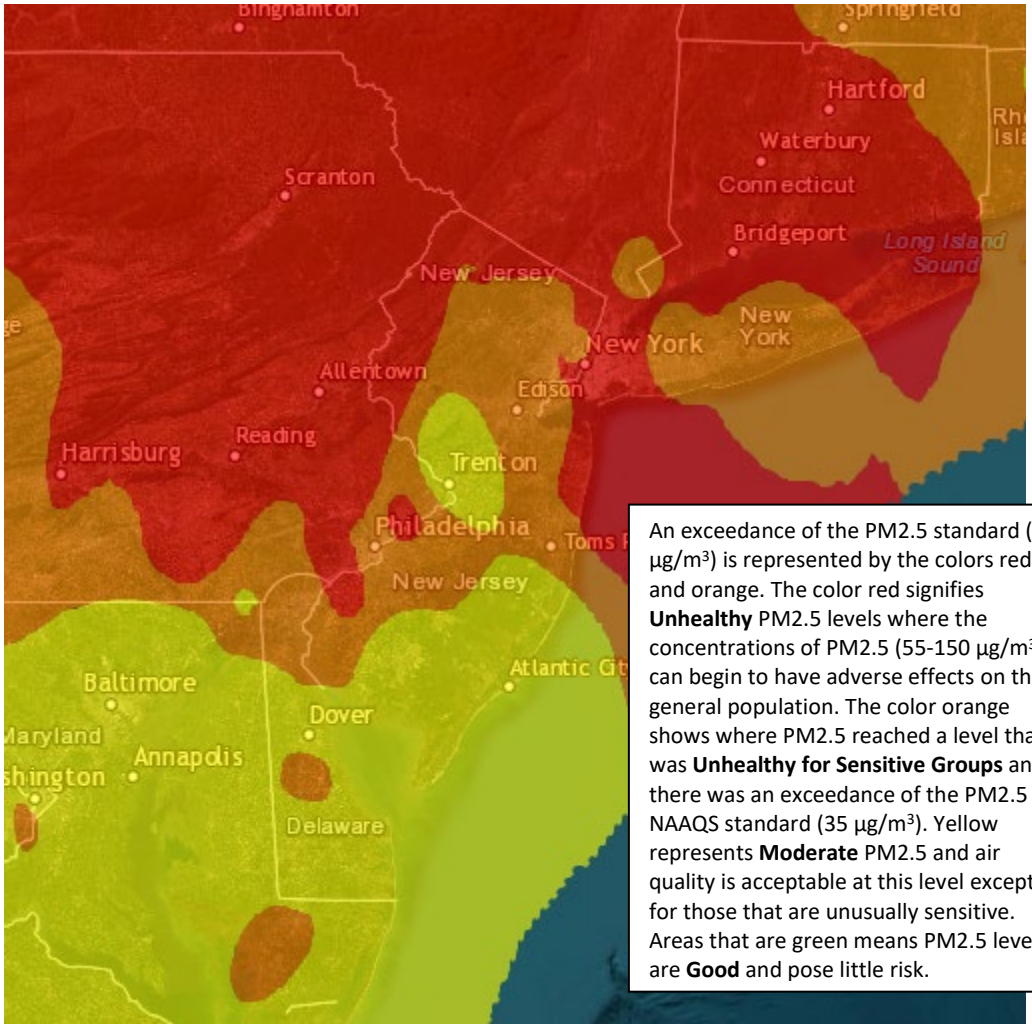
STATION	24-Hour Average (ug/m^3)
Brigantine	30.5
Camden Spruce St	44.3
Columbia	No Data
Elizabeth Lab	64.1
Flemington	58.1
Fort Lee Near Road	66.5
Jersey City Firehouse	52.7
Millville	27.1
Paterson	66.3
Rahway	63.5
Rider University	47.2
Rutgers University	55.7
Toms River	49.4
Trenton	No Data
Union City High School	55.4
TOTAL EXCEEDANCES	**11**

From the out-of-state stations adjacent to New Jersey, there were 26 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 6/6/2023

STATE	STATION	24-Hour Average (ug/m^3)
CT	Bridgeport	83.8
CT	Danbury	72.1
CT	New Haven - Criscuolo Park	65.8
CT	Waterbury	60.1
DE	KILLENS (Kent Co.)	35.7
DE	LUMS 2 (New Castle Co.)	40.6
DE	MLK (New Castle Co.)	51.2
DE	Rte 9 Del City	46.2
DE	SEAFORD (Sussex Co.)	33.5
MD	Fair Hill	34.5
NY	Bklyn - PS274	82.2
NY	CCNY	64.8
NY	Division Street	No Data
NY	Eisenhower Park	47.9
NY	Fresh Kills	47.8
NY	Holtsville	43.9
NY	Manhattan/IS143	57.2
NY	Maspeth	54.8
NY	Queens	101
NY	Queens Near-Road	74.6
NY	White Plains	53.1
PA	Allentown	81.6
PA	Chester	62.7
PA	Freemansburg	81.3
PA	Marcus Hook	59.8
PA	New Garden	49.7
PA	Norristown	59.5
PA	FAB (Philadelphia Co.)	36.7
PA	MON (Philadelphia Co.)	No Data
PA	NEW (Philadelphia Co.)	63.2
PA	RIT (Philadelphia Co.)	No Data
PA	TOR (Philadelphia Co.)	No Data
	TOTAL EXCEEDANCES	**26**

Figure 1. PM2.5 Air Quality Index for June 6, 2023



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 Tuesday June 6th multiple PM2.5 exceedances occurred across the region due to a complex atmospheric setup allowing for the meteorological transport of wildfire smoke over the northeastern United States. High pressure dominated the area throughout the day with temperatures reaching into the mid to upper 70s, allowing for dry conditions and light northwesterly winds, leading to little atmospheric ventilation. Sunny skies turned hazy as wildfire smoke blanketed the region, resulting in limited sunshine as the day progressed. A surface trough was noted early throughout the nonattainment area, allowing polluted air and wildfire smoke from Canadian wildfires to mix down to the surface and increase concentrations of fine particulates. By the early evening, a cold front moved through the region, bringing an influx of additional wildfire smoke, causing levels of PM2.5 to spike into the USG and unhealthy range.

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 Tuesday June 6th. Warm temperatures and low dewpoints the week prior created an ideal environment for the rapid spread of hundreds of wildfires across southern Canada. Dense plumes of wildfire smoke from the uncontrolled fires were transported in a southerly direction on Monday night under the influence of strong low pressure anchored over Nova Scotia, as seen in Figure 2. A weak cold front over the southern Great Lakes region was also able to push south towards the region as the day progressed on Tuesday, allowing for the rapid transport and mixing of dense smoke aloft to the surface. Additionally, a surface trough was in place along the I-95 corridor prior to the cold front's arrival, which allowed additional smoke aloft to mix down to the surface and enhance rapidly rising PM2.5 levels.

Figure 3 shows that PM2.5 levels hovered around the moderate-USG threshold for the majority of the day, with the dense plume of smoke arriving behind the cold front around 5-6 pm. Figure 4 below shows the National Air Quality Index on June 5th, indicating the presence of Canadian wildfire smoke in southern Quebec prior to its transport south into New York.

Figure 2. AirNow Fire and Smoke Map, Smoke Plume for June 6, 2023

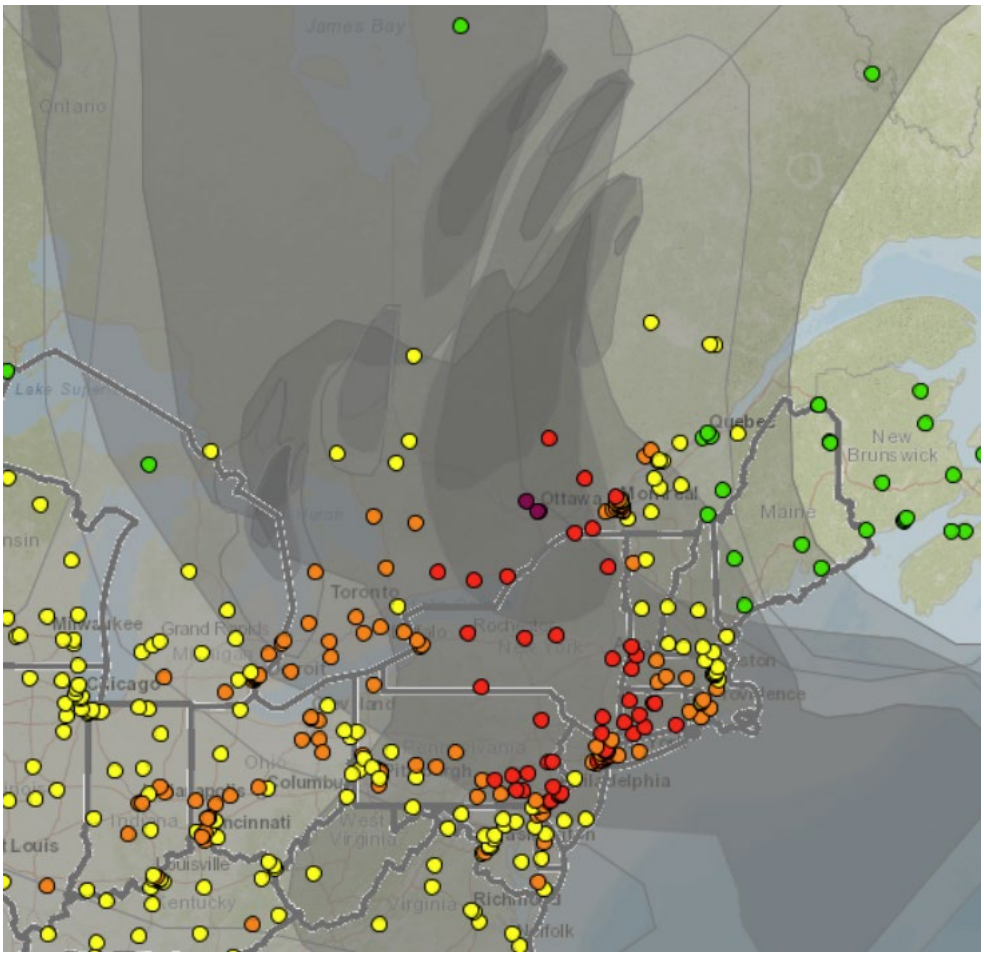
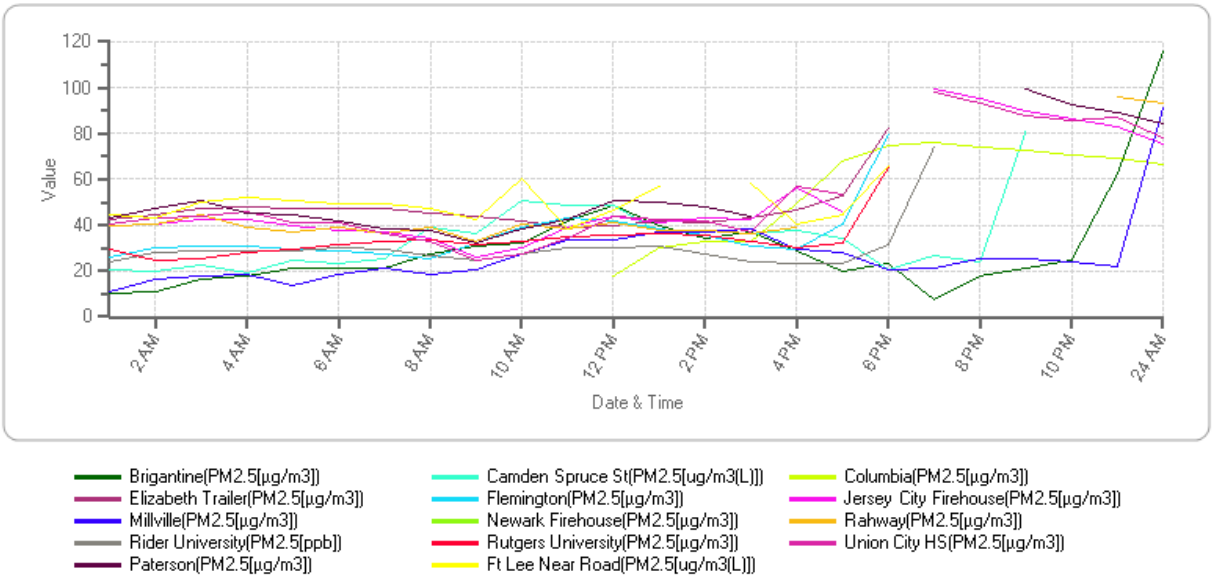


Figure 3. PM2.5 1-hr Concentrations for June 6, 2023



Figures 4, 5, and 6 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 7). 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	83.8
CT	Waterbury	60.1
DE	KILLENS (Kent Co.)	35.7
NJ	Elizabeth Lab	64.1
NJ	Rahway	63.5
NJ	Camden Spruce St	44.3
NY	CCNY	64.8
NY	Holtsville	43.9
PA	Allentown	81.6
PA	Chester	62.7

Figure 4. 48-hour Back Trajectories for June 6, 2023 at 10 meters

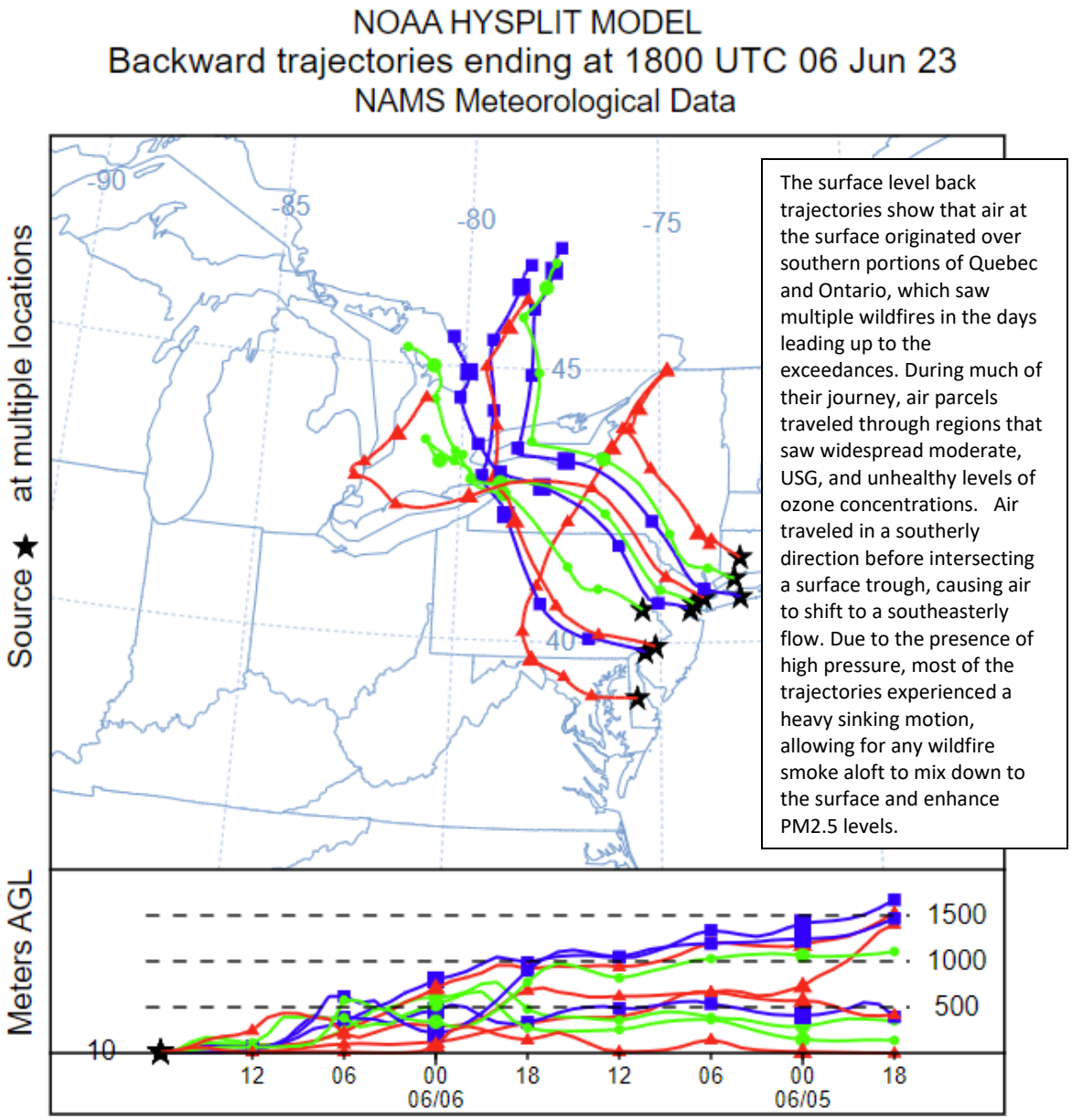


Figure 5. 48-hour Back Trajectories for June 6, 2023 at 500 meters

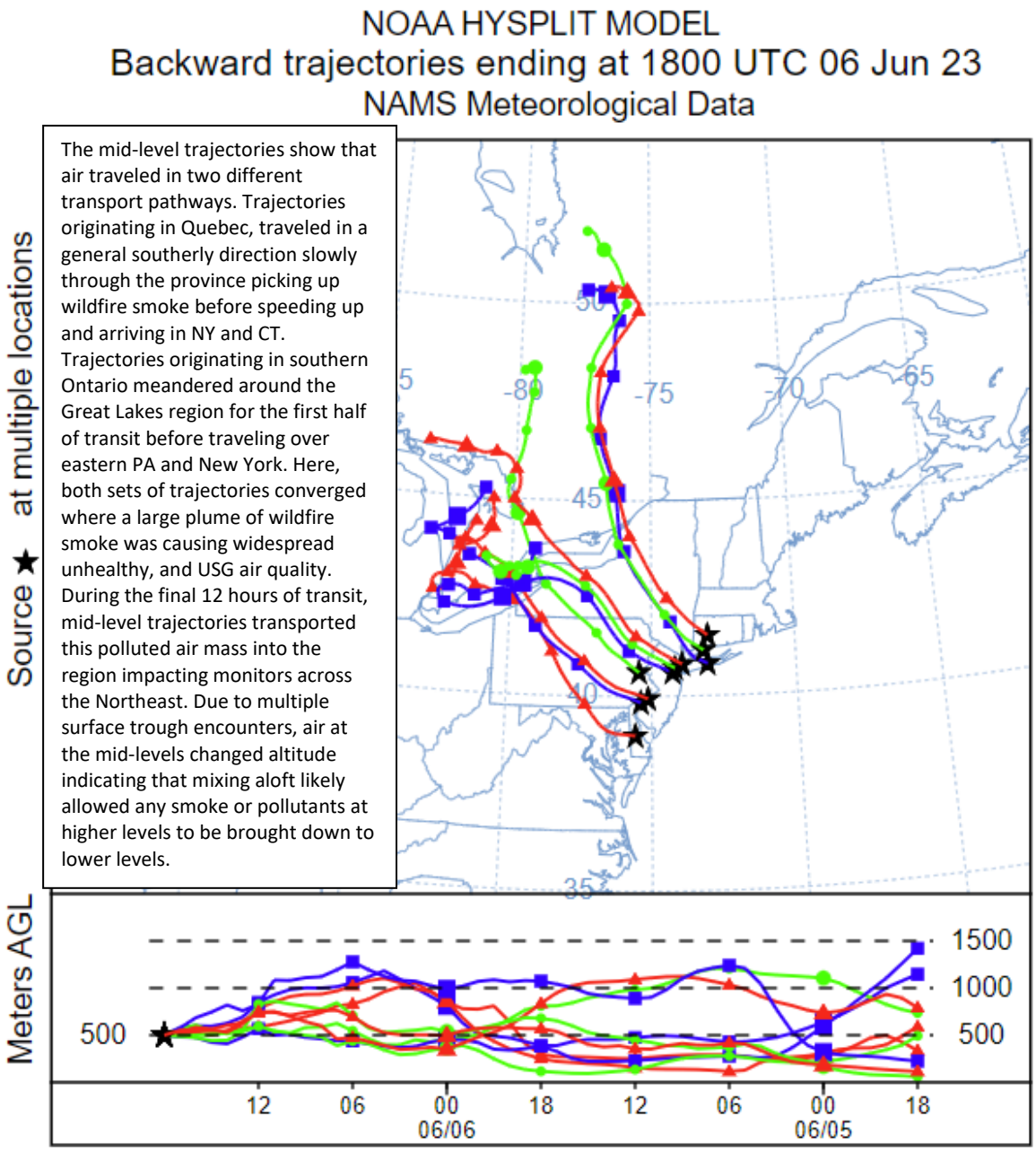


Figure 6. 48-hour Back Trajectories for June 6, 2023 at 1500 meters

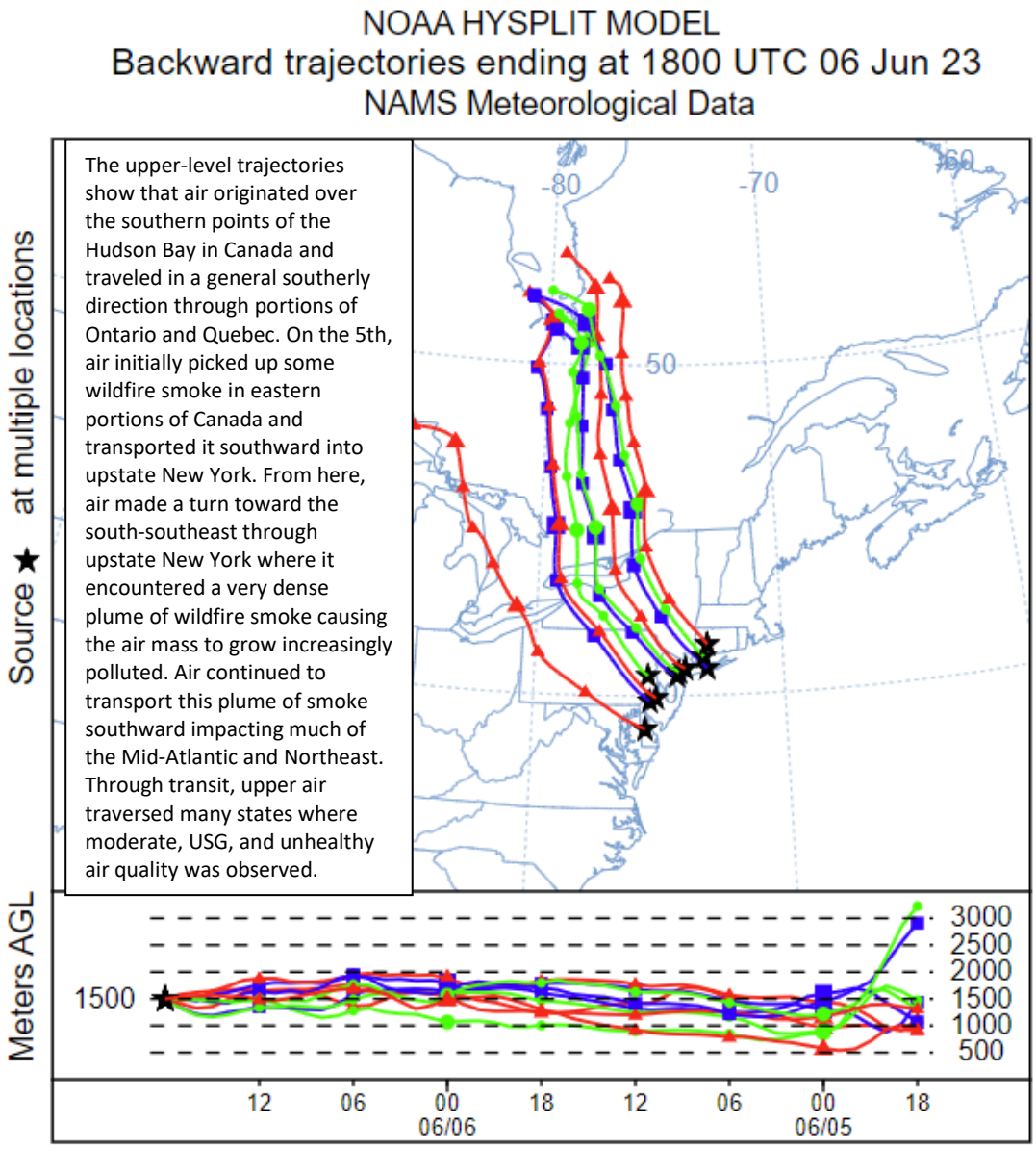
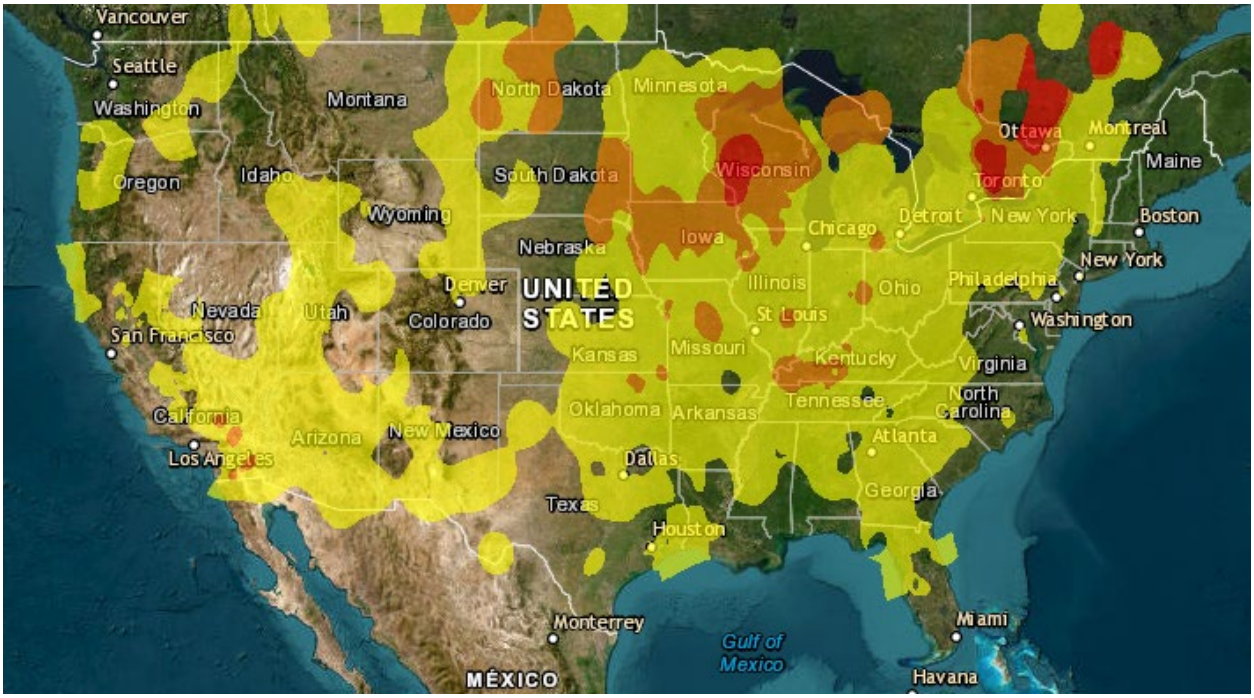


Figure 7. Air Quality Index for the United States on June 5, 2023



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 .