

**PM2.5 National Ambient Air Quality Standard Health Exceedances on July 5, 2023**

On Wednesday, July 5, 2023, there were three (3) 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<sup>3</sup>). A PM2.5 exceedance of the 24-hour NAAQS is measured when the concentration is 35.5 ug/m<sup>3</sup> or greater. The PM2.5 levels were impacted by fireworks from July 4<sup>th</sup> celebrations. 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 7/5/2023**

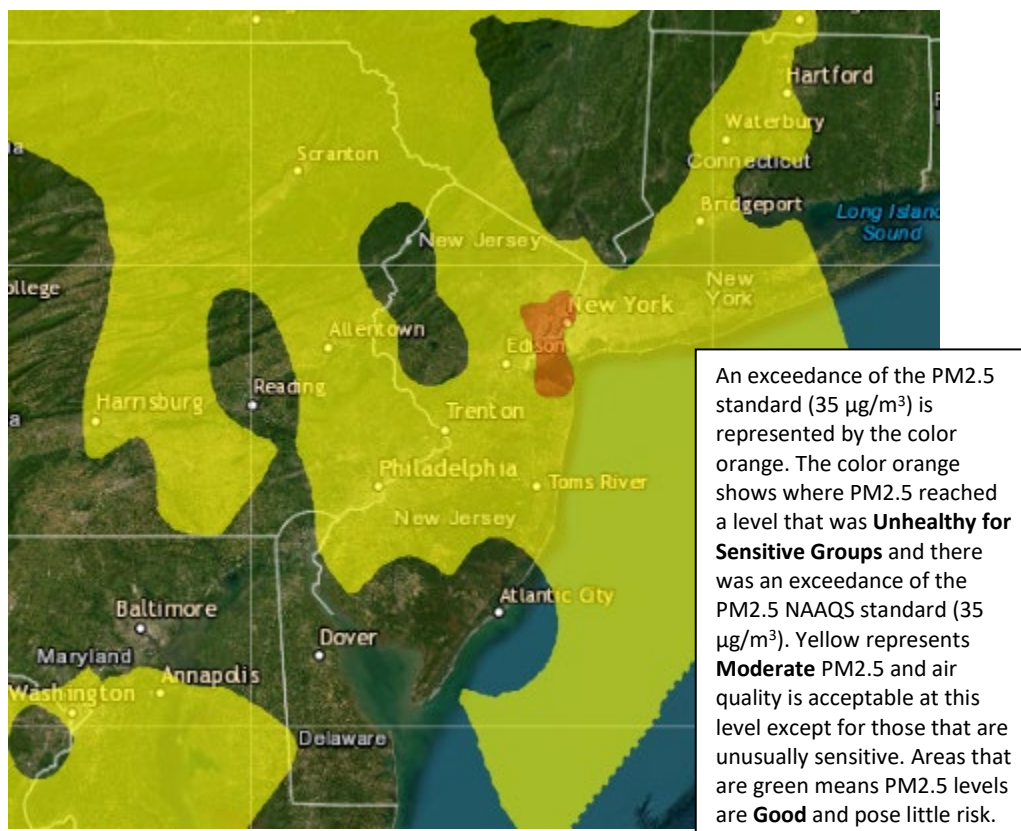
| STATION                  | 24-Hour Average<br>(ug/m <sup>3</sup> ) |
|--------------------------|-----------------------------------------|
| Brigantine               | 11.6                                    |
| Camden Spruce St         | 17.3                                    |
| Columbia                 | 10.8                                    |
| Elizabeth Lab            | 48.1                                    |
| Flemington               | 10.0                                    |
| Fort Lee Near Road       | 32.2                                    |
| Jersey City Firehouse    | 41.5                                    |
| Millville                | 11.6                                    |
| Paterson                 | 17.0                                    |
| Rahway                   | 28.6                                    |
| Rider University         | 17.5                                    |
| Rutgers University       | 23.4                                    |
| Toms River               | 16.0                                    |
| Trenton                  | 19.6                                    |
| Union City High School   | 39.6                                    |
| <b>TOTAL EXCEEDANCES</b> | <b>3</b>                                |

From the out-of-state stations adjacent to New Jersey, there were no 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 7/5/2023**

| STATE | STATION                    | 24-Hour Average<br>(ug/m <sup>3</sup> ) |
|-------|----------------------------|-----------------------------------------|
| CT    | Bridgeport                 | 16.4                                    |
| CT    | Danbury                    | 11.1                                    |
| CT    | New Haven - Criscuolo Park | 11.7                                    |
| CT    | Waterbury                  | 13.2                                    |
| DE    | KILLENS (Kent Co.)         | No Data                                 |
| DE    | LUMS 2 (New Castle Co.)    | No Data                                 |
| DE    | MLK (New Castle Co.)       | No Data                                 |
| DE    | Rte 9 Del City             | No Data                                 |
| DE    | SEAFORD (Sussex Co.)       | No Data                                 |
| MD    | Fair Hill                  | 10.8                                    |
| NY    | Bklyn - PS274              | No Data                                 |
| NY    | CCNY                       | 31.2                                    |
| NY    | Division Street            | No Data                                 |
| NY    | Eisenhower Park            | 31.2                                    |
| NY    | Fresh Kills                | 13.4                                    |
| NY    | Holtsville                 | 15.6                                    |
| NY    | Manhattan/IS143            | No Data                                 |
| NY    | Maspeth                    | 30.0                                    |
| NY    | Queens                     | 20.8                                    |
| NY    | Queens Near-Road           | 21.4                                    |
| NY    | White Plains               | 8.8                                     |
| PA    | Allentown                  | 13.6                                    |
| PA    | Chester                    | 12.2                                    |
| PA    | Freemansburg               | 13.0                                    |
| PA    | Marcus Hook                | 12.1                                    |
| PA    | New Garden                 | 11.5                                    |
| PA    | Norristown                 | 12.8                                    |
| PA    | FAB (Philadelphia Co.)     | 14.3                                    |
| PA    | MON (Philadelphia Co.)     | No Data                                 |
| PA    | NEW (Philadelphia Co.)     | 16.3                                    |
| PA    | RIT (Philadelphia Co.)     | 17.4                                    |
| PA    | TOR (Philadelphia Co.)     | 21.0                                    |
|       | <b>TOTAL EXCEEDANCES</b>   | <b>0</b>                                |

Figure 1. PM2.5 Air Quality Index for Saturday, July 5, 2023



Source: [www.airnow.gov](http://www.airnow.gov)

For PM2.5 terminology definitions see NJDEP Air Quality Planning's Glossary and Acronyms webpage: <https://www.nj.gov/dep/airmon/glossary.html>

### Weather

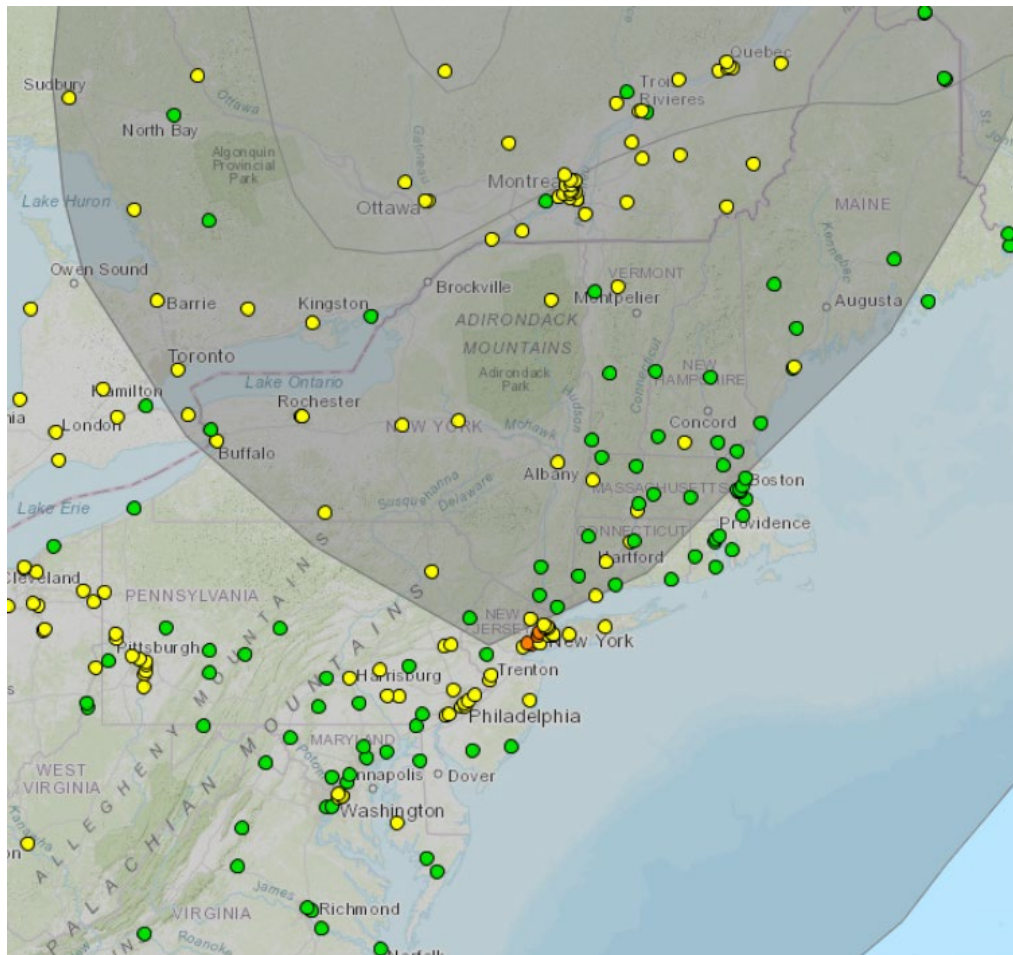
On Wednesday July 5<sup>th</sup>, a broad swath of high pressure sat over the Mid-Atlantic and southeastern United States, providing the region with calm/light winds, clear skies, and elevated humidity. With the July 4<sup>th</sup> holiday the day prior, many firework displays were observed throughout the New York City metropolitan area in the evening and into the overnight hours. Limited atmospheric ventilation as a result of high pressure allowed smoke from the firework displays to hover near the surface and aloft. A weak frontal boundary was also draped along the I-95 corridor during the evening and overnight hours leading into the 5<sup>th</sup>, allowing residual smoke aloft to mix back down to the surface. The particulate matter exceedances noted on this day were very localized to the NYC metropolitan area, indicating that firework smoke was likely the cause of this brief spike in PM2.5 concentrations. As the day progressed, a light southeast flow developed, allowing any leftover smoke to dissipate or transport to the north.

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

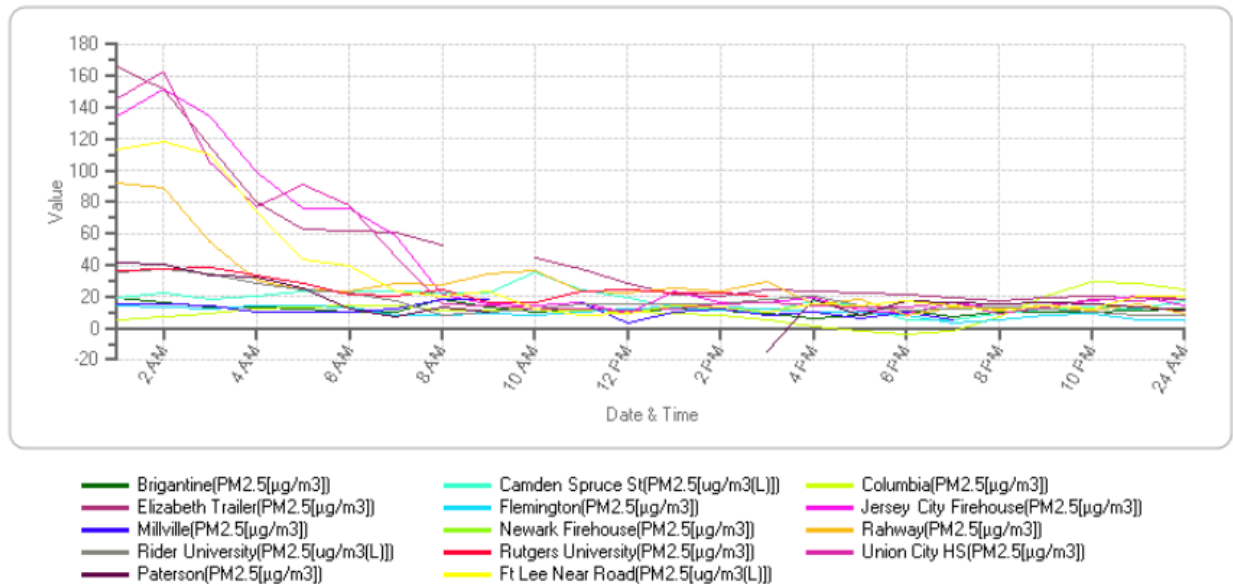
In the previous weeks, the United States and Canada have experienced elevated PM2.5 concentrations due to wildfires burning in eastern Canada resulting in wildfire smoke moving throughout the atmosphere and being transported into different regions. As a result, a very diffuse smoke plume aloft continues to linger across the region. Figure 2 shows the AirNow Fire and Smoke Map for July 5<sup>th</sup>, which

depicts the smoke plume in gray and the AQI levels across the region. PM<sub>2.5</sub> concentrations at the surface generally remain in the good/moderate threshold except for the exceedance locations. As noted above, the PM exceedances observed in the figure are likely due to residual smoke from firework displays and limited atmospheric ventilation occurring during the late evening hours of July 4<sup>th</sup>. Figure 3 shows that hourly PM<sub>2.5</sub> concentrations remained elevated in the overnight and early morning hours on July 5<sup>th</sup> and gradually came down as the day progressed.

**Figure 2. AirNow Fire and Smoke Map, Smoke Plume for July 5, 2023**



**Figure 3. PM2.5 1-hr Concentrations for July 5, 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 <sup>3</sup> ) |
|-------|------------------------|--------------------------------------------------|
| NJ    | Elizabeth Trailer      | 43.7                                             |
| NJ    | Jersey City Firehouse  | 41.5                                             |
| NJ    | Union City High School | 39.6                                             |

Figure 4. 48-hour Back Trajectories for July 5, 2023 at 10 meters

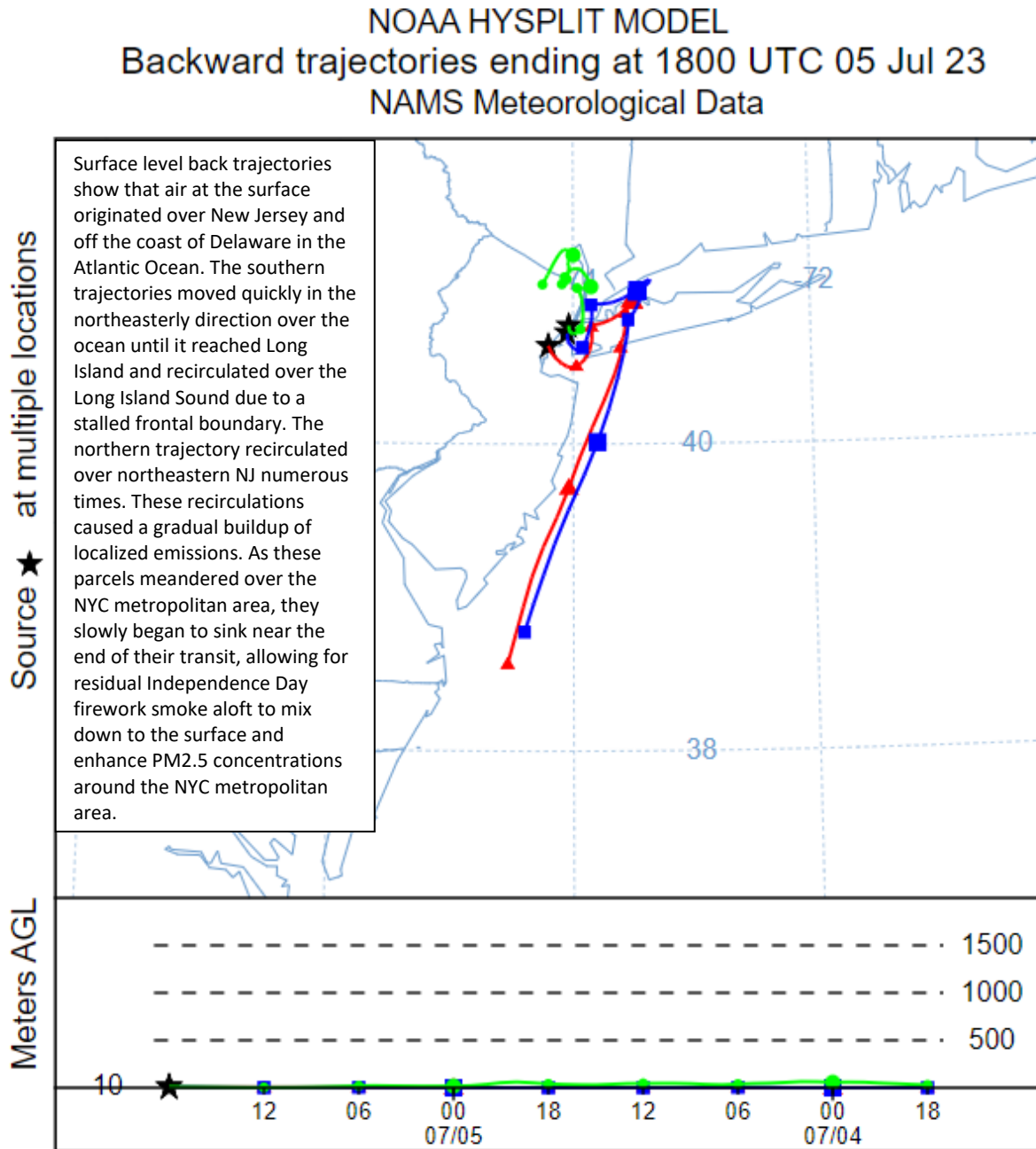


Figure 5. 48-hour Back Trajectories for July 5, 2023 at 500 meters

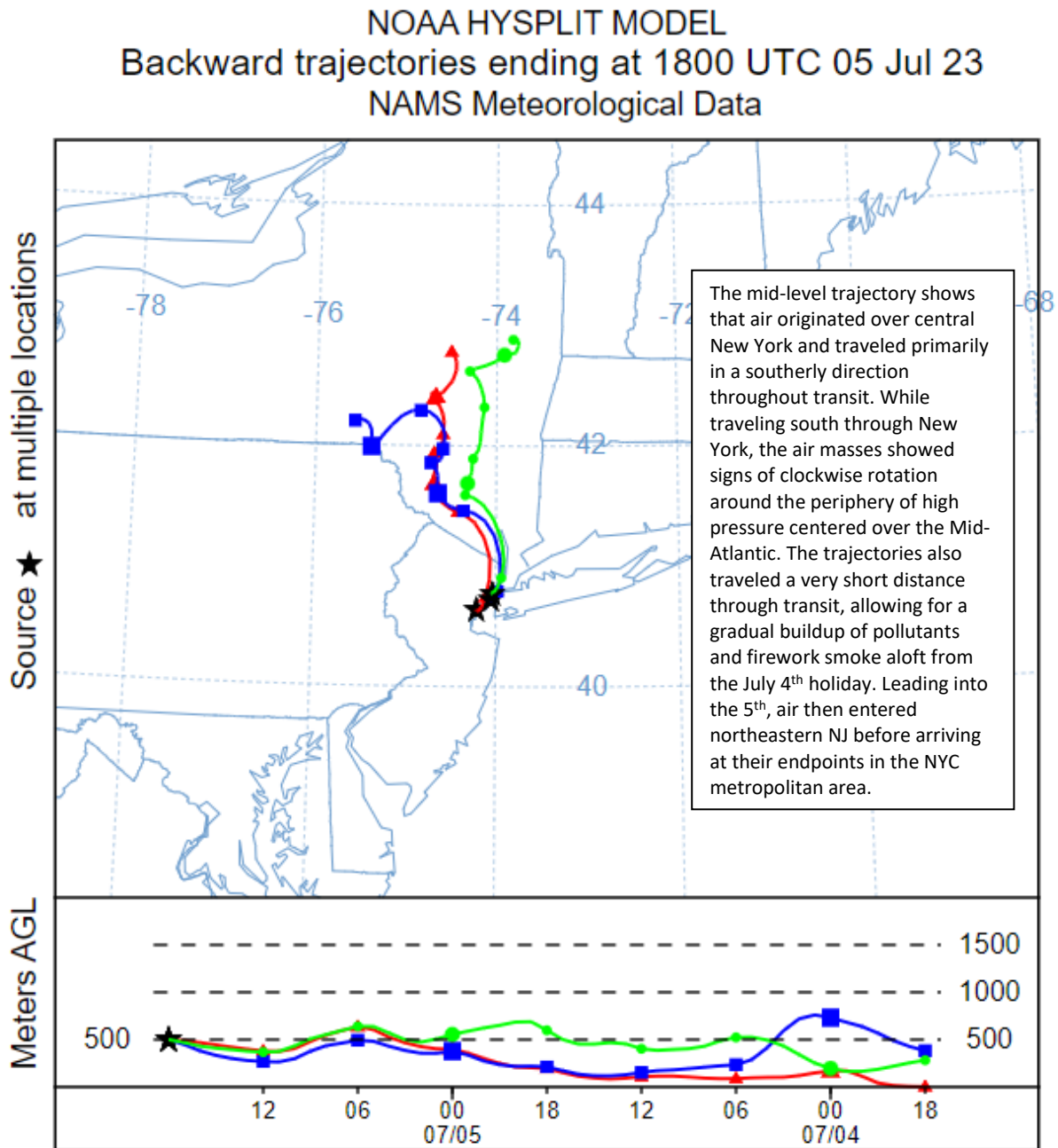
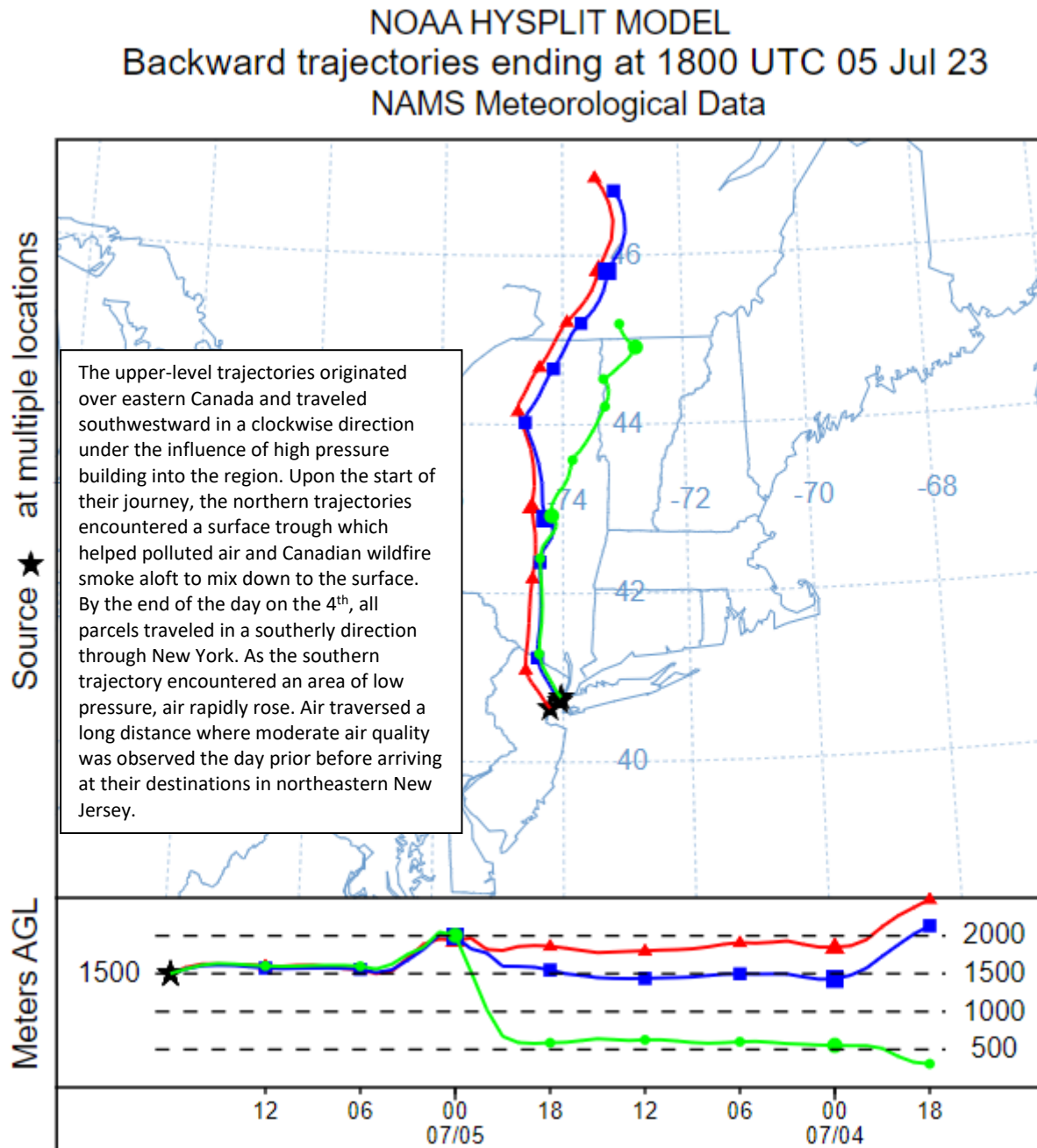


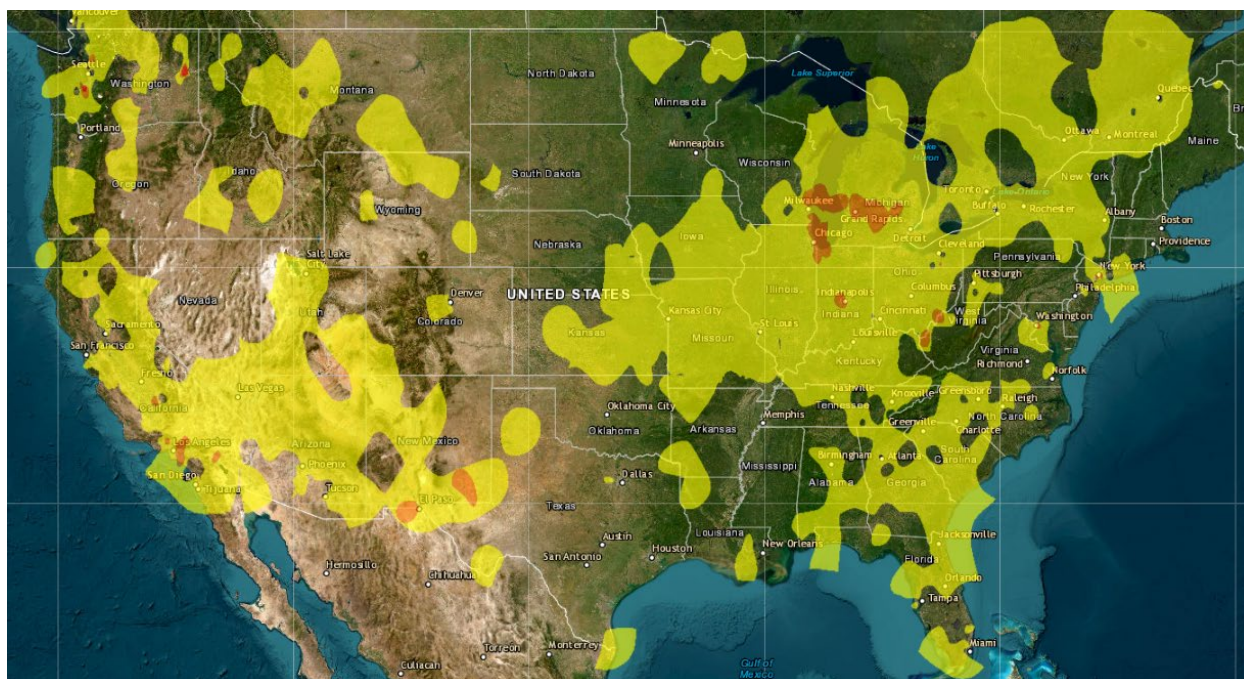


Figure 6. 48-hour Back Trajectories for July 5, 2023 at 1500 meters





**Figure 7. Air Quality Index for the United States on July 4, 2023**



Source: [www.airnow.gov](http://www.airnow.gov)

**Find Out About Air Quality Every Day**

Learn more about your local PM2.5 air quality forecast by visiting the “What’s Your Air Quality Today?” page at <https://www.nj.gov/dep/bagp/aqitoday.html> .