Ozone National Ambient Air Quality Standard Health Exceedances on July 25, 2020

Exceedance Locations and Levels

On Saturday, July 25, 2020, there were no exceedances in New Jersey of the National Ambient Air Quality Standard (NAAQS) for ozone (daily maximum 8-hour average of 70 ppb). See Table 1.

Table 1. New Jersey Ozone Concentrations on 7/25/2020

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	40
Bayonne	60
Brigantine	No Data
Camden Spruce St	50
Chester	42
Clarksboro	45
Colliers Mills	40
Columbia	46
Flemington	47
Leonia	64
Millville	40
Monmouth University	45
Newark Firehouse	59
Ramapo	43
Rider University	56
Rutgers University	53
Washington Crossing*	58
TOTAL EXCEEDANCES	0

*The Washington Crossing station is operated and maintained by EPA as part of the nationwide Clean Air Status and Trends Network (CASTNET).

From the out-of-state stations within New Jersey's ozone non-attainment areas, there were two (2) exceedance of the ozone NAAQS. See Table 2.

Table 2. Ozone Concentrations at Out-of-State Monitoring Stations in New Jersey's Ozone Non-Attainment Areas on 7/25/2020

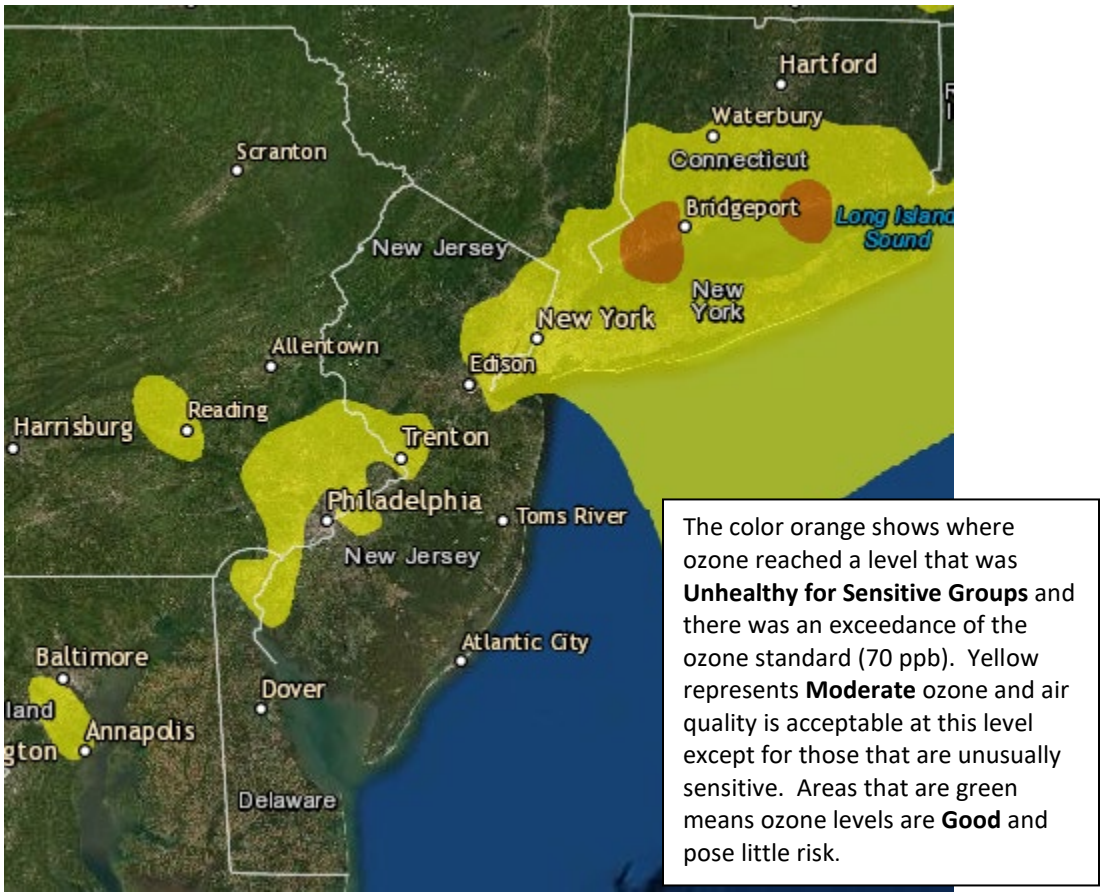
STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	59
CT	Greenwich	60
CT	Madison-Beach Road	71
CT	Middletown-CVH-Shed	56
CT	New Haven	59
CT	Stratford	67
CT	Westport	77
DE	BCSP (New Castle Co.)	51
DE	BELLFNT2 (New Castle Co.)	54
DE	KILLENS (Kent Co.)	44
DE	LEWES (Sussex Co.)	47
DE	LUMS 2 (New Castle Co.)	49
DE	MLK (New Castle Co.)	61
DE	SEAFORD (Sussex Co.)	44
MD	Fair Hill	53
NY	Babylon	57
NY	Bronx - IS52	60
NY	CCNY	67
NY	Fresh Kills	55
NY	Holtsville	56
NY	Pfizer Lab	66
NY	Queens	62
NY	Riverhead	61
NY	Rockland Cty	44
NY	White Plains	67
PA	BRIS (Bucks Co.)	52
PA	CHES (Delaware Co.)	60
PA	NEWG (Chester Co.)	49
PA	NORR (Montgomery Co.)	60
PA	LAB (Philadelphia Co.)	51
PA	NEA (Philadelphia Co.)	65
PA	NEW (Philadelphia Co.)	58
	TOTAL EXCEEDANCES	2

The number of days in 2020 on which exceedances of the ozone NAAQS were recorded for all the states within New Jersey's ozone non-attainment areas is summarized in Table 3.

Table 3. Number of Days Ozone NAAQS was Exceeded in NJ's Non-Attainment Areas in 2020

STATE	# of Days NAAQS was Exceeded January 1 – July 25, 2020 NAAQS = 70 ppb
Connecticut	7
Delaware	1
Maryland	0
New Jersey	4
New York	4
Pennsylvania	3

Figure 1. Ozone Air Quality Index for July 25, 2020



Source: www.airnow.gov

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

Weather

High pressure dominated much of the weather pattern for the northeastern United States on Saturday July 25, 2020. Partly sunny skies, warm temperatures, and light/variable winds observed throughout the non-attainment area allowed for isolated regions of elevated ozone, with levels reaching the unhealthy for sensitive groups category (USG) at the Connecticut monitors.

A large high pressure system gradually built over the northeastern United States throughout the day on July 25th. Partly to mostly sunny skies and temperatures near 90 degrees were observed in the non-attainment area while winds were noted to be very light and variable as high pressure moved over head. The varying, light nature of winds on this day as well as the variation in cloud cover across the region likely helped to influence the localized transport of emissions and the production of ozone in the non-attainment area, limiting ozone formation in some locations while enhancing ozone levels in others. Locations along the Connecticut coastline, the area that saw the highest levels of ozone on this day, experienced mostly sunny skies and a generally light southwesterly flow. These favorable weather conditions helped enhance the localized transport of emissions in and around the NYC metropolitan area and Long Island Sound region, allowing ozone levels to increase at the surface.

The ozone exceedances noted at Westport and Madison-Beach, CT on July 25th can be attributed to favorable weather conditions for ozone formation and the localized transport of emissions in/around the NYC metropolitan area and Long Island Sound region.

Where Did the Air Pollution that Caused Ozone Come From?

Please note, this exceedance is occurring while COVID-19 restrictions in New Jersey are in place, which have impacted transportation, business operations and energy use. As more data becomes available, the Department may have a better characterization of the conditions that influenced elevated ozone pollution levels in 2020.

Figures 2, 3, and 4 show the back trajectories starting at different wind heights for the monitored exceedances on July 21, 2020. The figures illustrate where the air came from during the 48 hours preceding the 8-hour ozone standard exceedance. Two monitoring stations were chosen to run back trajectories and are listed in Table 4 below.

Table 4. Monitoring Stations with an 8-hr Ozone Exceedance that were Selected to Run 48-hr Back Trajectories

STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Westport	77
CT	Madison-Beach Road	71

Back trajectories from July 25th show that the exceedances observed in Connecticut were heavily influenced by the transport of local emissions at the surface from the Long Island Sound. Favorable weather features, such as high pressure, led to the recirculation of pollutants over the New York City metropolitan center and over the Long Island Sound with little atmospheric ventilation. This transport in

combination with favorable weather conditions mentioned above assisted ozone concentrations rising into the unhealthy for sensitive groups (USG) category on this day.

Figure 2 shows that surface level air (10 meters) originated off the coast of central New Jersey and traveled in a northeasterly direction over Long Island. After reaching the Long Island Sound, the air rotated in a clockwise direction following a high-pressure system overhead, along with a broad frontal boundary also influencing the air to remain stagnant. This recirculation allowed the surface level air to pick up additional localized emissions from cars, trucks, and industry from the NYC metropolitan area. The parcels then meandered very slowly to their final destinations in Connecticut.

Figure 3 shows that the mid-level back trajectories (500 meters) originated in Quebec and moved in a southward direction through New England and upstate New York. As high pressure took control of the region, the air mass began to slow down over the New York City metropolitan area. Winds became light and variable at this time and some recirculation occurred around Long Island Sound and New York City, picking up pollutants from local industry before arriving at its destination on the Connecticut coast. In Figure 4, upper-level trajectories (1500 meters) originated in southern Ontario before moving southeastward through New York State. As it passed through the New York City metropolitan area and central Connecticut, the air became strongly influenced by high pressure and experienced a gentle sinking motion before arriving at its endpoint.

Figure 5 shows the National Air Quality Index observed on July 24th, the day prior to the exceedance. As shown in the figure, much of the region observed good air quality on this day. Despite a regionally clean air mass, the transport of local emissions from peaking units in Long Island and mobile sources from New York City by winds at the surface and aloft may have contributed to elevated ozone concentrations in Connecticut. This transport in combination with widespread high pressure created a favorable environment for ozone production leading to two exceedances.

Figure 2. 48-hour Back Trajectories for July 25, 2020 at 10 meters

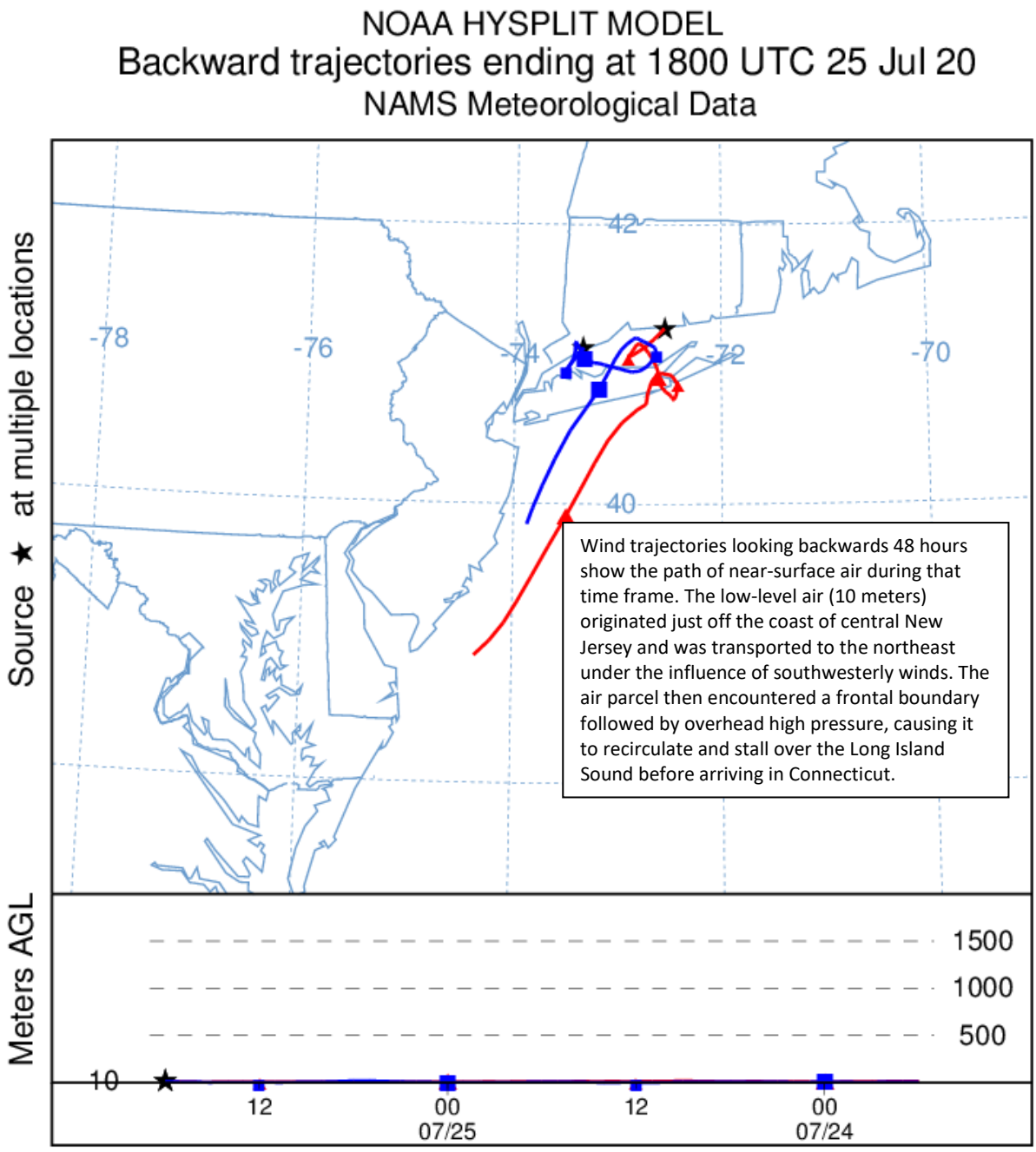


Figure 3. 48-hour Back Trajectories for July 25, 2020 at 500 meters

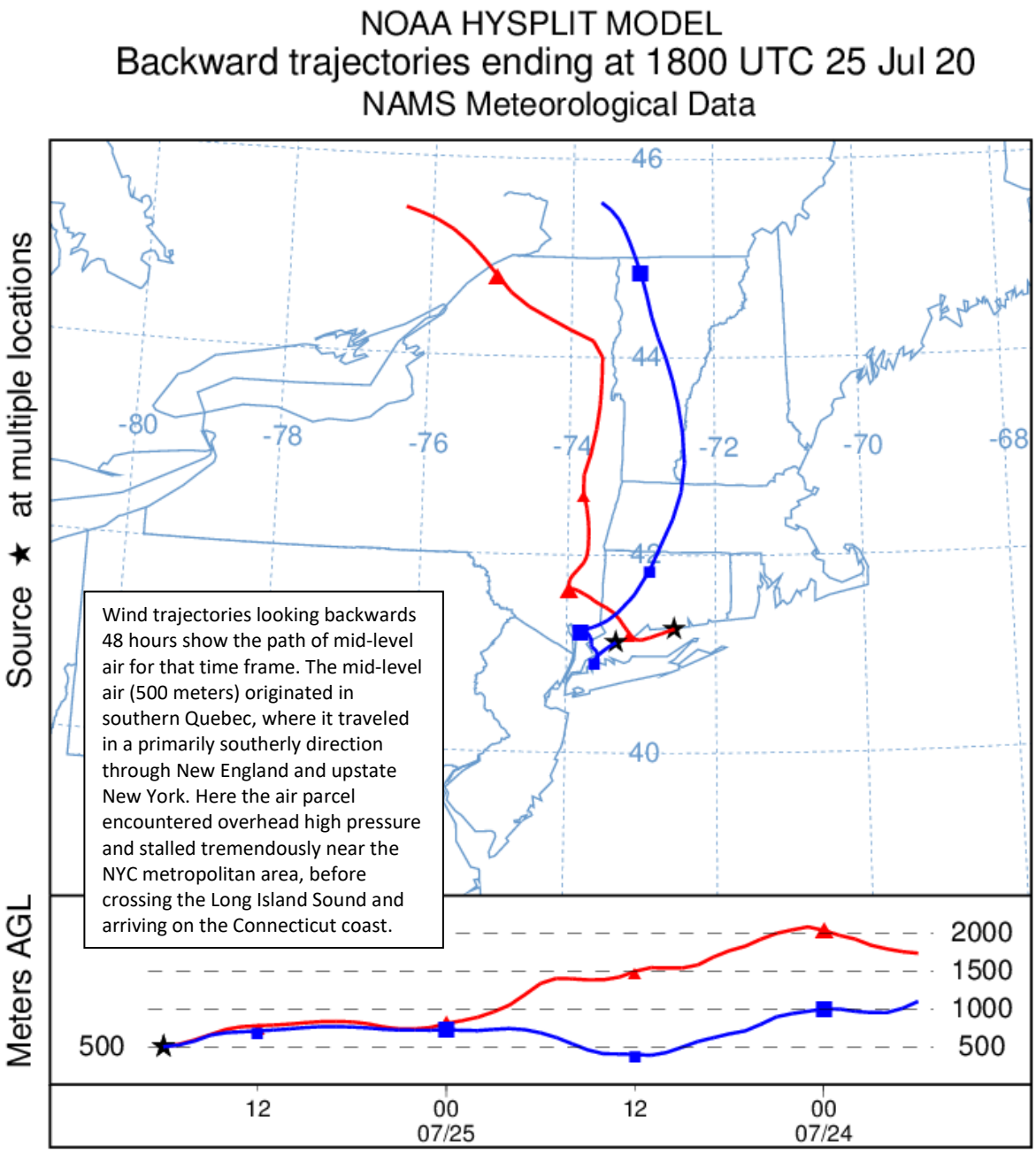


Figure 4. 48-hour Back Trajectories for July 25, 2020 at 1500 meters

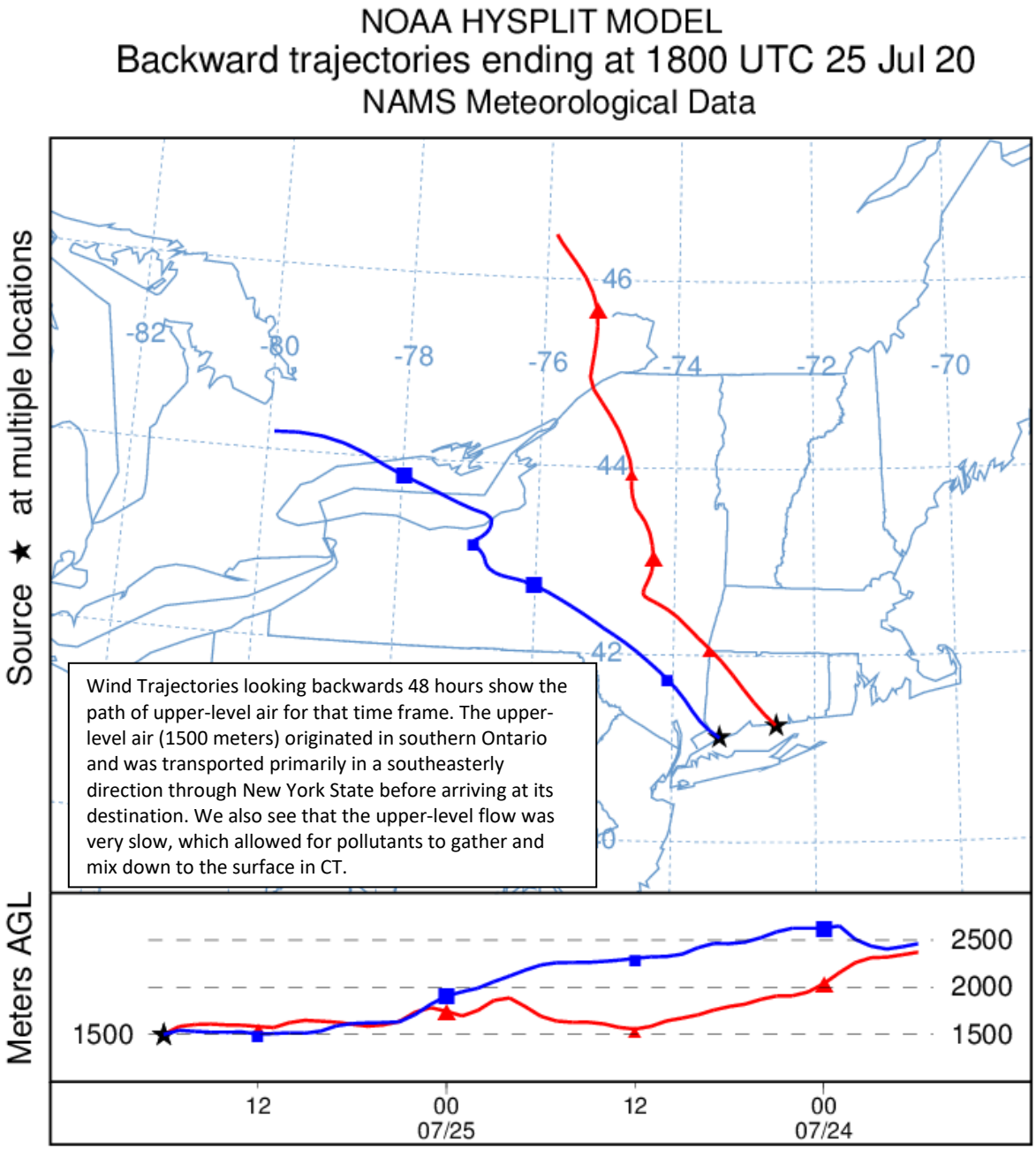
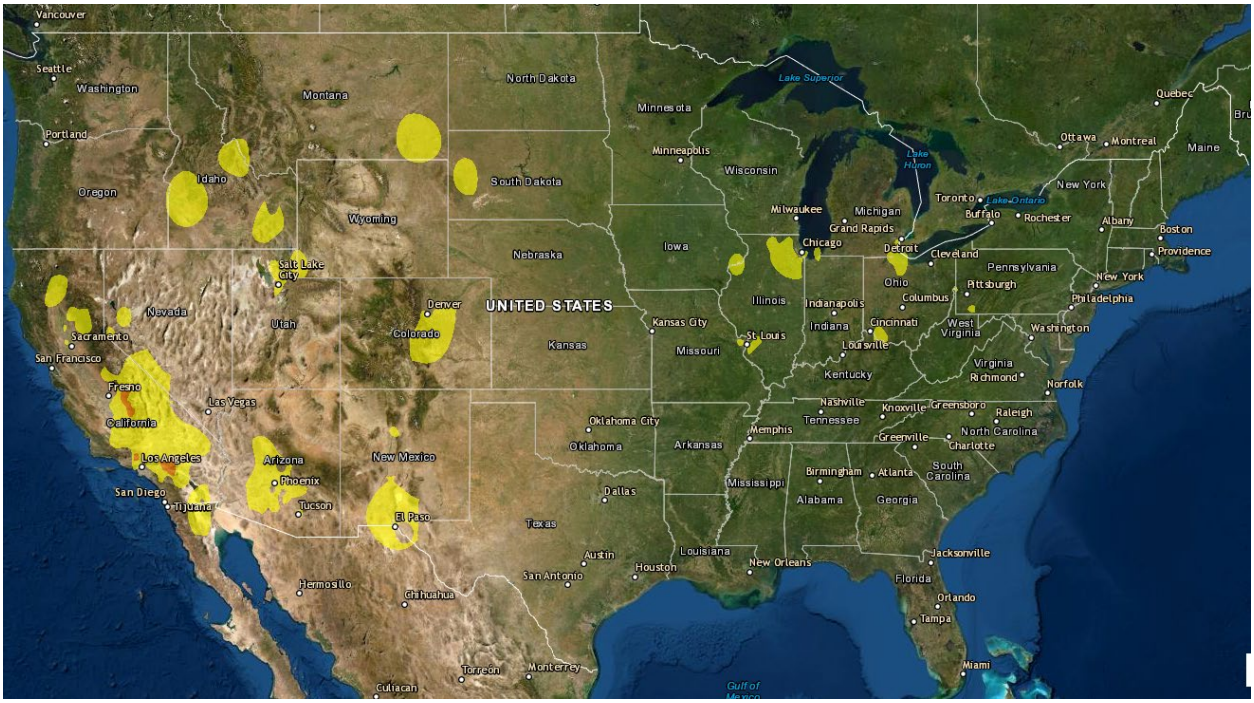


Figure 5. Combined Air Quality Index for the United States on July 24, 2020



Source: www.airnow.gov

How is Ozone Created?

Ground-level ozone is an air pollutant known to cause a number of health effects and negatively impact air quality and the environment in New Jersey. Ozone is formed when oxides of nitrogen (NOx) and volatile organic compounds (VOCs) react in the presence of sunlight. Ozone can irritate any person's lungs, but the effect may be more pronounced for those with existing lung-related deficiencies, and therefore, one should take extra precautions on bad ozone days.

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 http://www.nj.gov/dep/cleanairnj/ .