Ozone National Ambient Air Quality Standard Health Exceedances on September 7, 2023

Exceedance Locations and Levels

On Thursday, September 7, 2023, 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 9/7/2023

STATION	Daily Maximum 8-Hr Average (ppb)
Ancora State Hospital	60
Bayonne	63
Brigantine	58
Camden Spruce St	No Data
Chester	60
Clarksboro	59
Colliers Mills	60
Columbia	27
Flemington	67
Leonia	66
Millville	61
Monmouth University	58
Ramapo	59
Rider University	67
Rutgers University	65
Washington Crossing*	68
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 nonattainment areas, there were four (4) exceedances of the ozone NAAQS. See Table 2.

Table 2. Ozone Concentrations at Out-of-State Monitoring Stations in New Jersey's Ozone Nonattainment Areas on 9/7/2023

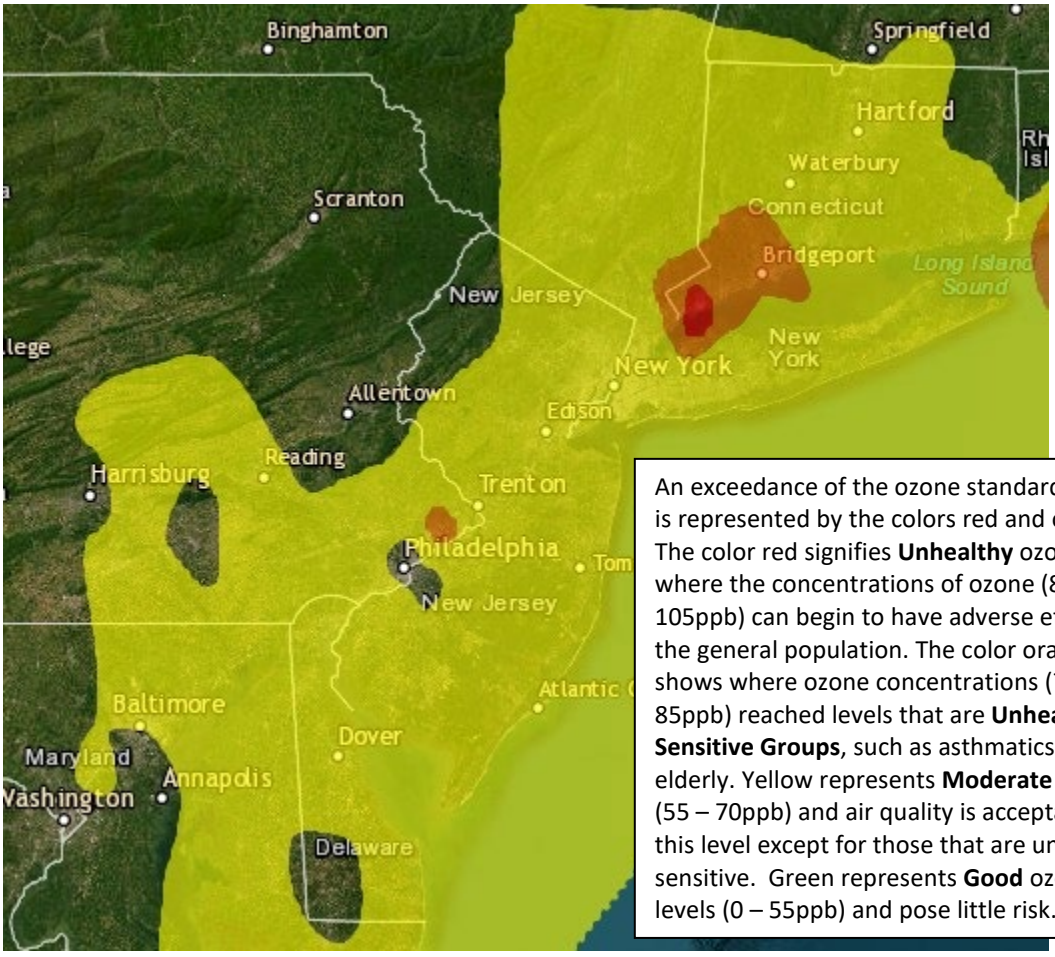
STATE	STATION	Daily Maximum 8-Hr Average (ppb)
CT	Danbury	70
CT	Greenwich	87
CT	Madison-Beach Road	69
CT	Middletown-CVH-Shed	61
CT	New Haven	54
CT	Stratford	77
CT	Westport	76
DE	BCSP (New Castle Co.)	59
DE	BELLFNT2 (New Castle Co.)	58
DE	KILLENS (Kent Co.)	56
DE	LEWES (Sussex Co.)	59
DE	LUMS 2 (New Castle Co.)	59
DE	MLK (New Castle Co.)	63
DE	SEAFORD (Sussex Co.)	53
MD	Fair Hill	60
NY	Babylon	61
NY	Bronx - IS52	64
NY	CCNY	66
NY	Flax Pond	63
NY	Fresh Kills	62
NY	Holtsville	No Data
NY	Pfizer Lab	67
NY	Queens	62
NY	Riverhead	58
NY	Rockland Cty	65
NY	White Plains	70
PA	BRIS (Bucks Co.)	70
PA	CHES (Delaware Co.)	65
PA	NEWG (Chester Co.)	58
PA	NORR (Montgomery Co.)	59
PA	LAB (Philadelphia Co.)	54
PA	NEA (Philadelphia Co.)	72
PA	NEW (Philadelphia Co.)	63
	TOTAL EXCEEDANCES	4

The number of days in 2023 on which exceedances of the ozone NAAQS were recorded for all the states within New Jersey's ozone nonattainment areas is summarized in Table 3.

Table 3. Number of Days Ozone NAAQS was Exceeded in NJ's Nonattainment Areas in 2023

STATE	# of Days NAAQS was Exceeded January 1 – September 7, 2023 NAAQS = 70 ppb
Connecticut	20
Delaware	4
Maryland	3
New Jersey	17
New York	15
Pennsylvania	11

Figure 1. Ozone Air Quality Index for September 7, 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

High pressure continued to weaken over the eastern United States on Thursday, September 7th as a surface trough approached from the west. This atmospheric setup allowed for another unseasonably hot and humid day across the region. Early sunshine was observed, with fair weather clouds developing by mid-morning. Winds varied slightly over the nonattainment area with southern locations seeing a steady south wind for much of the day and locations to the north observing more of a southwesterly flow. This wind pattern aided in the regional transport of not only previously polluted air but localized urban emissions, leading to a rise in ozone levels under favorable weather conditions. Meanwhile, a surface trough developed just west of New Jersey mid-day and slowly moved eastward in the afternoon and evening hours. Although the associated showers and thunderstorms generally remained northwest and north of the nonattainment area, a change in wind pattern over both the Philadelphia metropolitan area and over southwestern Connecticut indicated that the trough did pass over those locations late in the day. The presence of this trough would have allowed for vertical mixing in the atmosphere, further enhancing ozone levels in these locations, leading to multiple exceedances on this day.

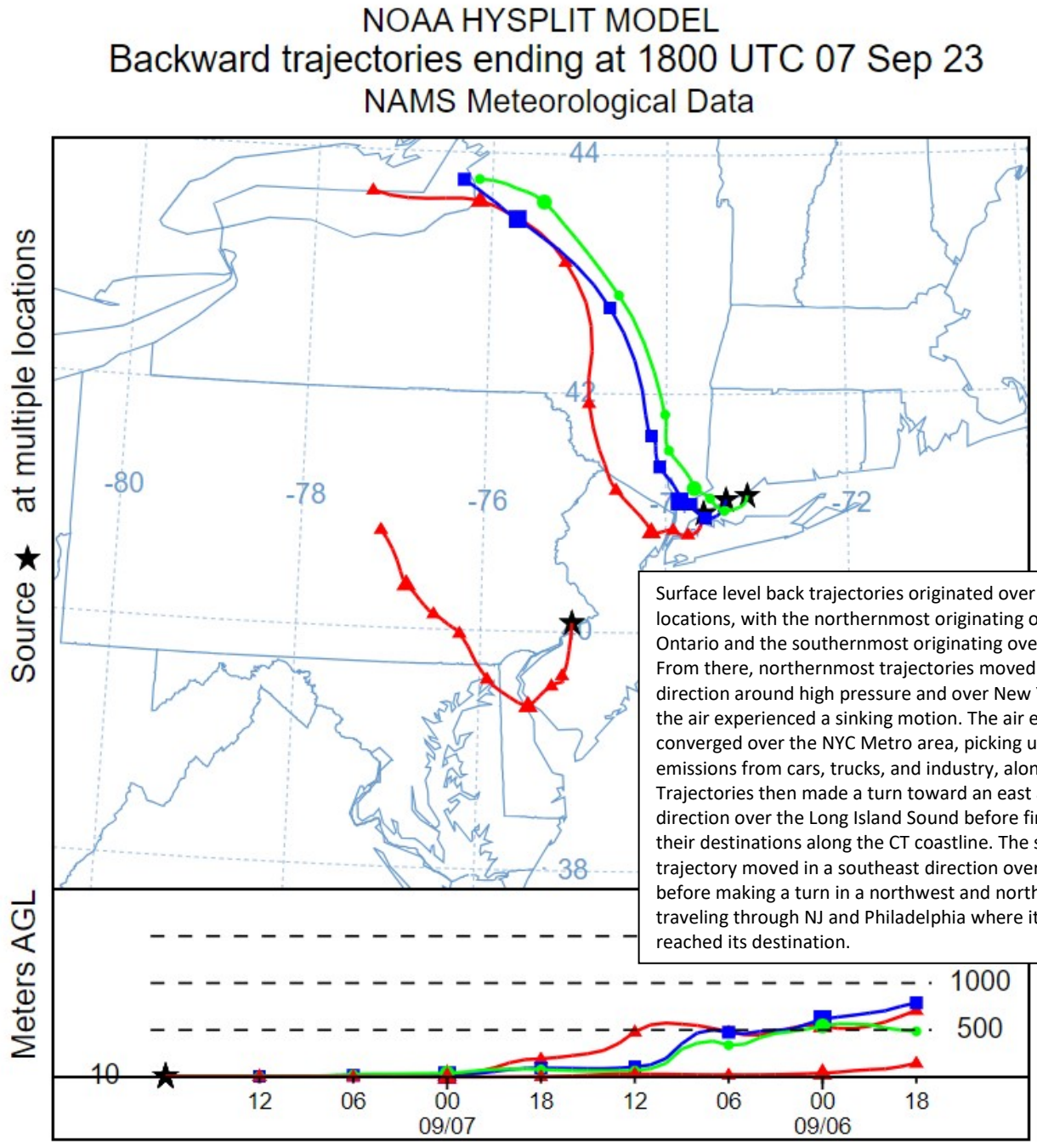
Where Did the Air Pollution that Caused Ozone Come From?

Figures 2, 3, and 4 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 8-hour ozone standard 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 5). The monitoring station(s) that were chosen to model back trajectories are listed in Table 4.

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	Greenwich	87
CT	Stratford	77
CT	Westport	76
PA	NEA	72

Figure 2. 48-hour Back Trajectories for September 7, 2023 at 10 meters



Surface level back trajectories originated over various locations, with the northernmost originating over Lake Ontario and the southernmost originating over central PA. From there, northernmost trajectories moved in a clockwise direction around high pressure and over New York State as the air experienced a sinking motion. The air eventually converged over the NYC Metro area, picking up local emissions from cars, trucks, and industry, along the way. Trajectories then made a turn toward an east and northeast direction over the Long Island Sound before finally reaching their destinations along the CT coastline. The southernmost trajectory moved in a southeast direction over MD and DE before making a turn in a northwest and north direction, traveling through NJ and Philadelphia where it finally reached its destination.

Figure 3. 48-hour Back Trajectories for September 7, 2023 at 500 meters

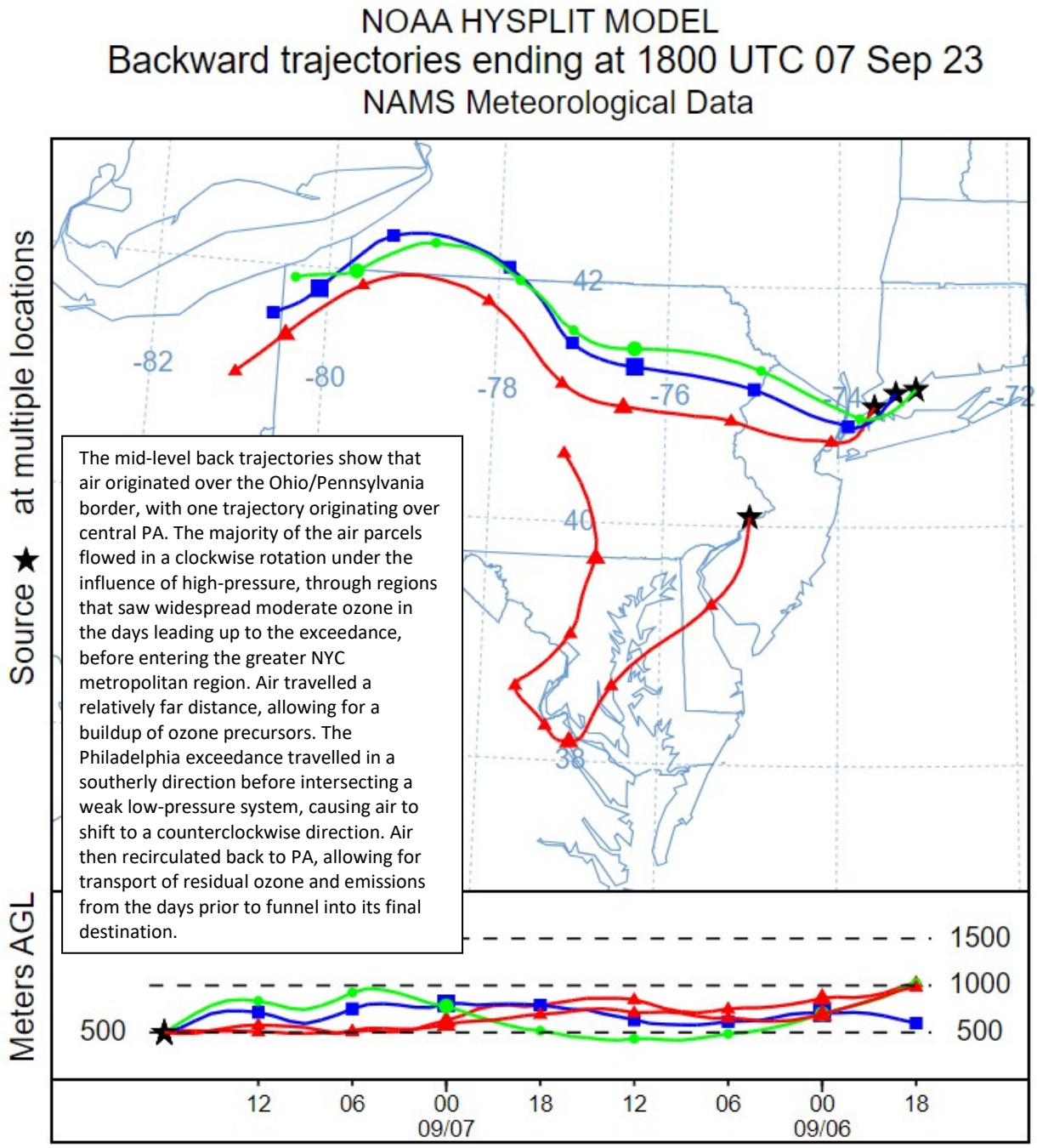


Figure 4. 48-hour Back Trajectories for September 7, 2023 at 1500 meters

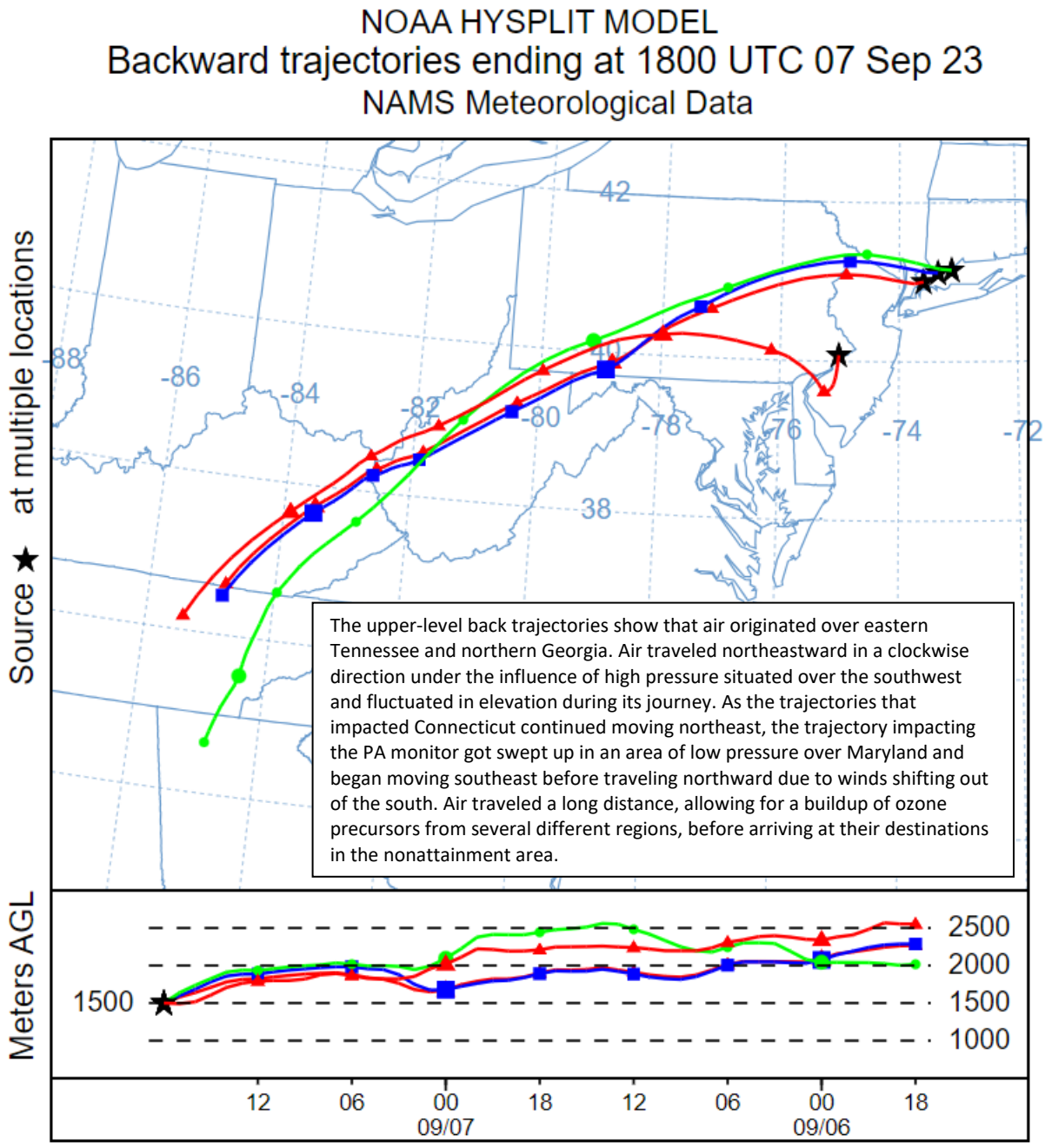
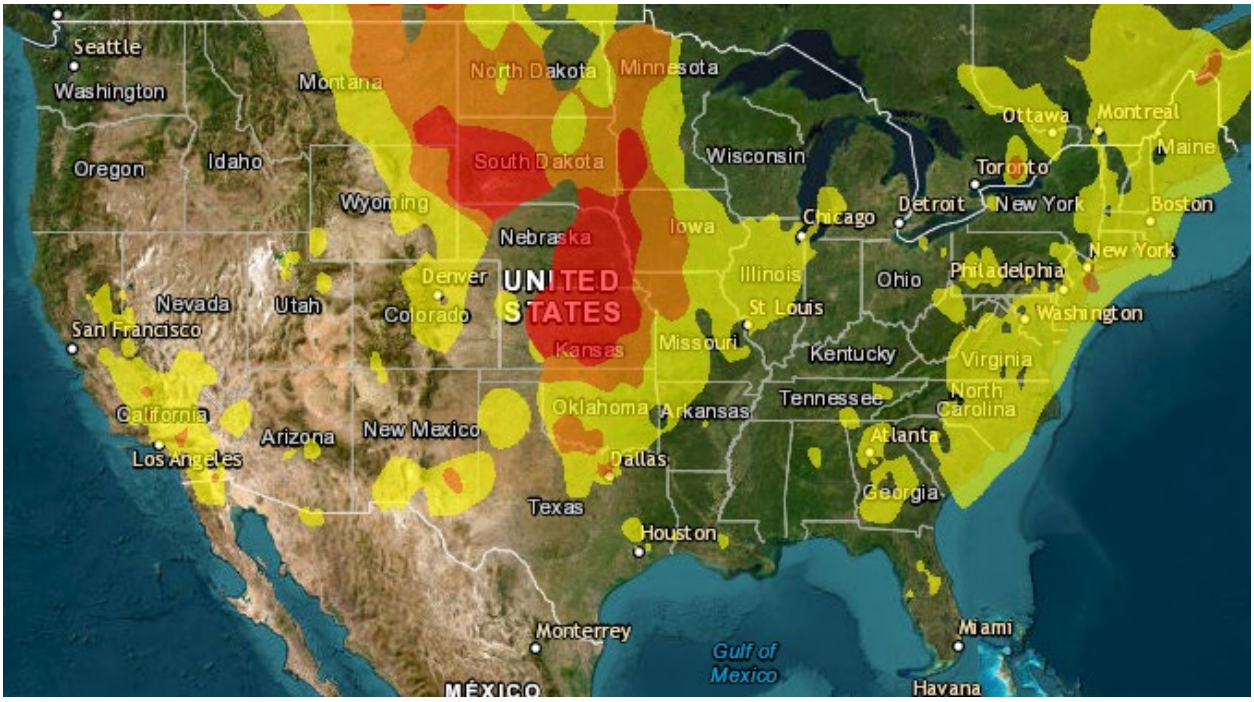


Figure 5. Air Quality Index for the United States on September 6, 2023



Source: www.airnow.gov

How is Ozone Created?

Ground-level ozone is an air pollutant known to cause several 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 https://www.nj.gov/dep/baqp/aqitoday.html .