Influence of Upwind Emissions and Long Island Sound on Connecticut's Air Quality

HAQAST St. Louis

November 6-7, 2025

Connecticut Department of Energy & Environmental Protection

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Connecticut Working Together for Clean Air

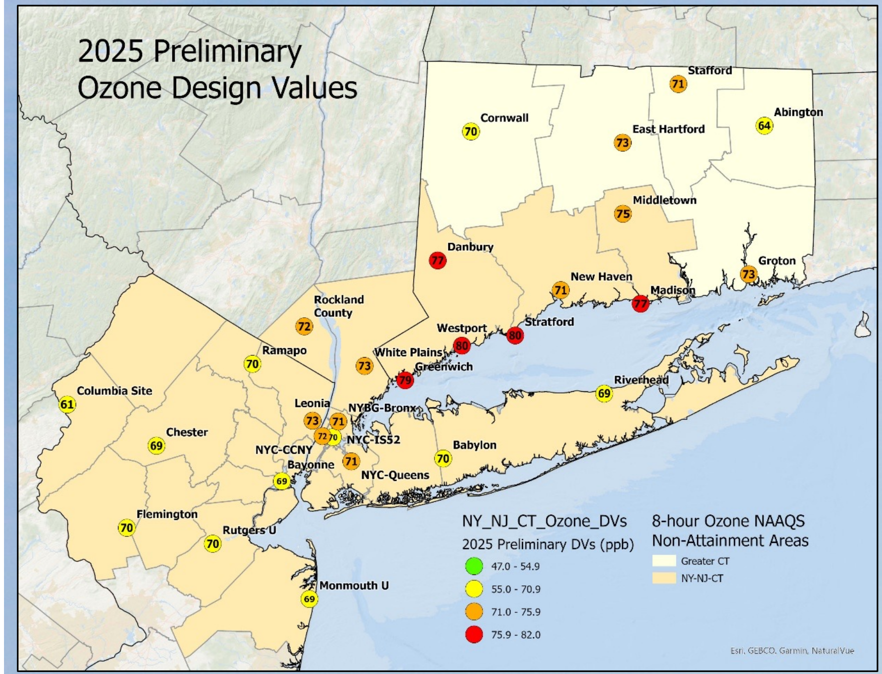
2025 Ozone Season Summary

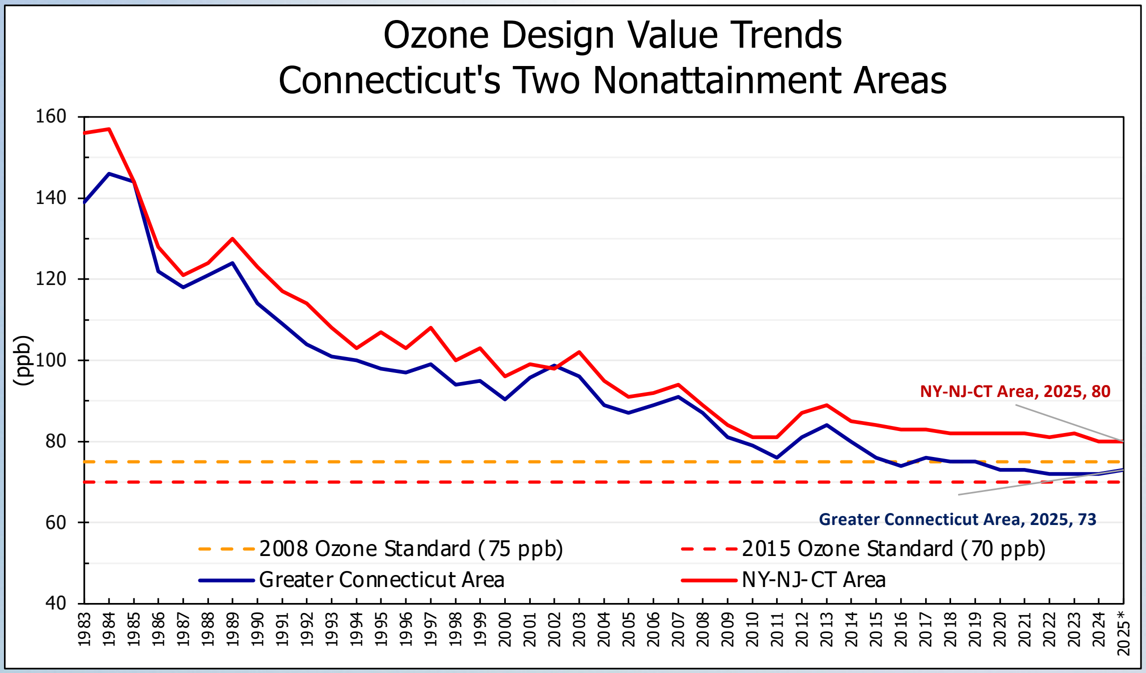
Month	April		May	June							July						Aug				Oct	
Site	**24**	**25**	**12**	**4**	**5**	**6**	**11**	**12**	**23**	**24**	**25**	**1**	**6**	**8**	**16**	**25**	**29**	**4**	**10**	**11**	**12**	**5**	**Site Exceedances**
Abington	60	64	54	60	70	63	61	60	54	58	45	57	63	42	53	48	44	48	58	68	73	M	1
Cornwall	76	72	65	82	90	61	64	62	49	57	44	47	67	41	70	48	45	51	63	68	71	73	6
Danbury	71	63	61	81	92	76	61	64	66	56	49	55	73	47	75	54	46	50	66	79	85	74	9
East Hartford	71	65	60	75	91	72	61	62	59	56	44	51	M	45	67	54	48	58	67	75	91	64	6
Greenwich	58	59	56	60	76	63	69	72	76	70	58	69	66	73	70	75	94	70	74	70	76	M	8
Groton	59	59	55	58	79	59	73	81	46	72	57	41	67	72	51	71	77	69	67	79	63	54	8
Madison	58	55	53	62	79	57	72	86	60	84	77	62	74	65	53	74	85	79	70	75	66	64	10
Middletown	70	64	71	69	86	70	63	65	63	55	46	76	76	54	61	60	59	63	70	81	84	67	6
New Haven	63	51	50	52	54	66	67	64	52	58	49	M	76	66	63	61	40	72	65	76	60	M	3
Stafford	71	69	61	73	81	66	58	59	58	57	32	51	73	42	60	52	43	41	61	69	72	61	5
Stratford	58	56	55	63	83	63	73	80	62	79	75	76	72	75	70	84	92	66	75	82	68	61	12
Westport	62	60	56	64	90	65	72	71	64	71	57	72	72	72	68	75	95	72	80	81	75	64	13
Site Exceedances	4	1	1	4	10	2	4	5	1	4	2	3	7	4	1	5	5	3	3	8	8	2	87
# days > Federal Standard	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	

Good (0-54 ppb)
Moderate (55-70 ppb)
Unhealthy for Sensitive Groups (71-85 ppb)
Unhealthy (86-105 ppb)
Very Unhealthy (>106 ppb)

- Connecticut had 22 exceedance days with a maximum 8-hour average of 95 ppb on July 29th and 4 days reaching UNHEALTHY ozone levels.

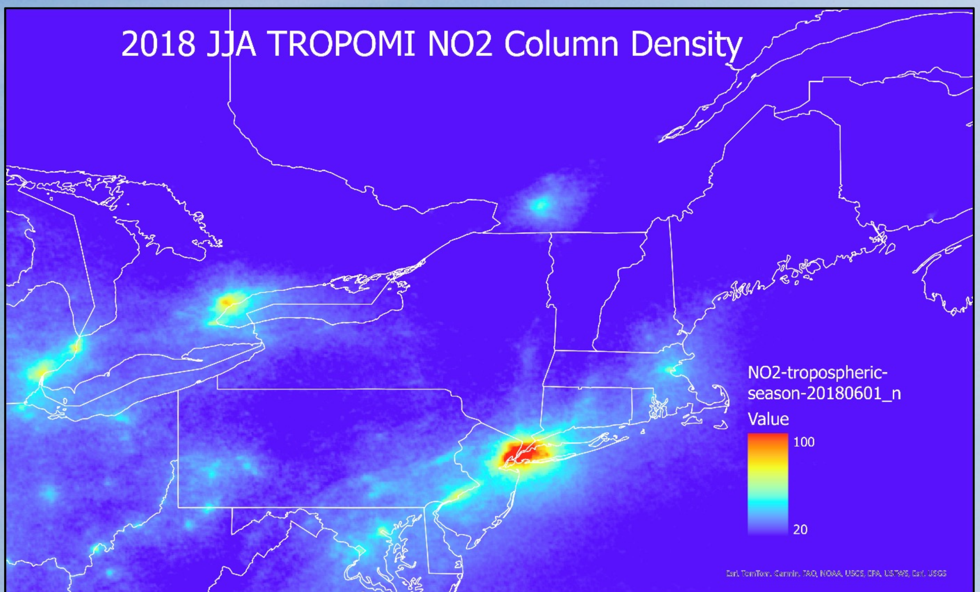
Preliminary Ozone Design Values

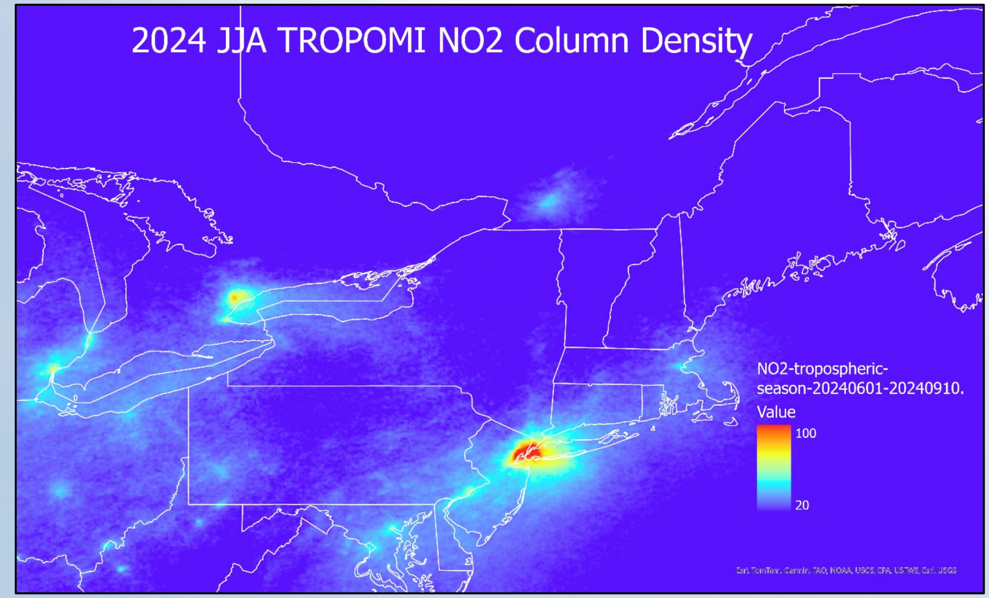




- Connecticut remains in ozone non-attainment with slowly decreasing design values in the past decade.

2018 & 2024 Summer NO_2 Column

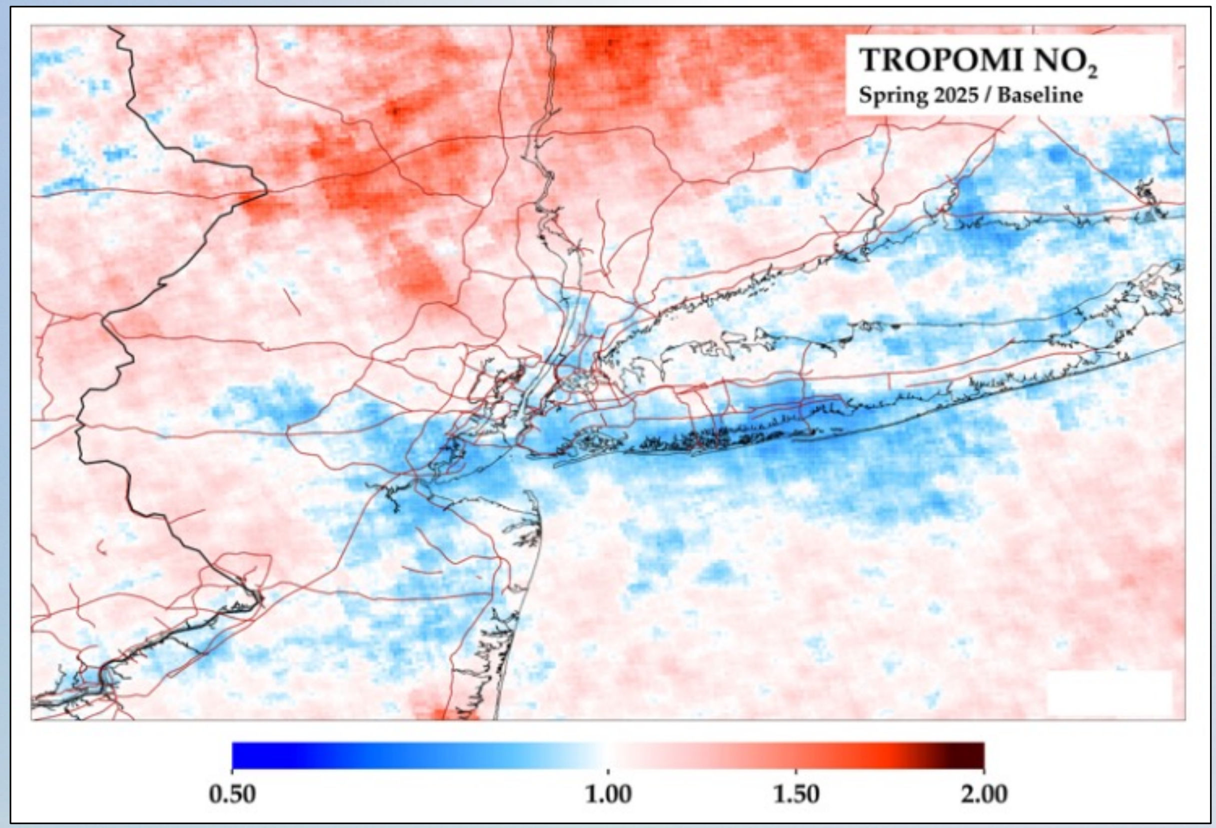




- The New York City Metro NO_2 plume significantly impacts ozone levels in Connecticut, particularly southwestern portions of the state.
- TROPOMI data shows a decreasing trend from 2018 to 2024 for the New York City Metro area during the summer months.

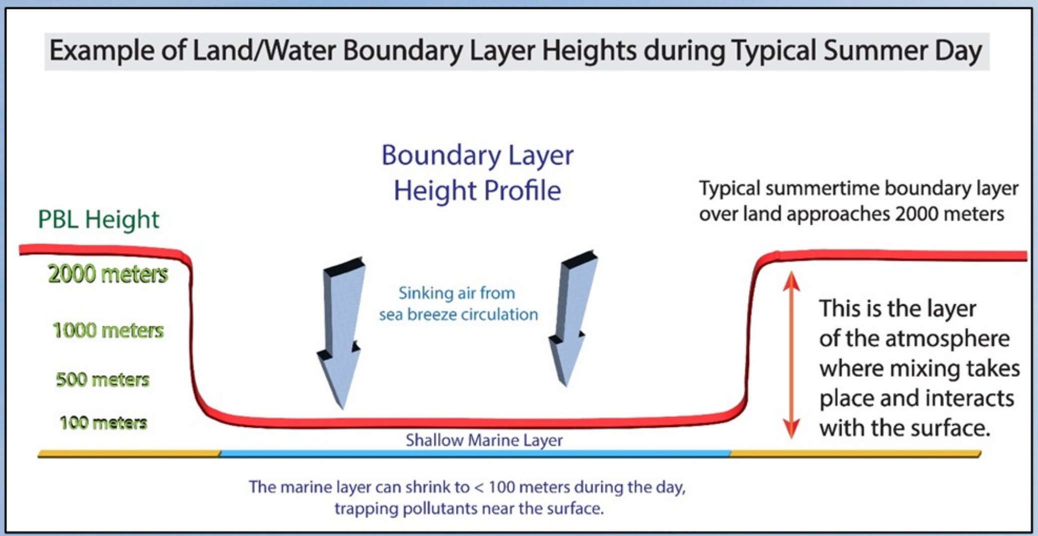
NYC Congestion Pricing

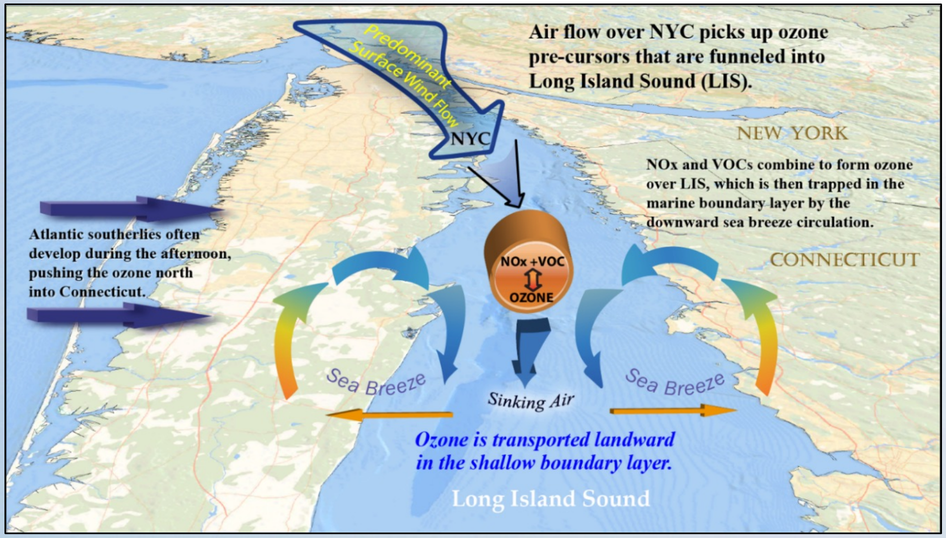
- There is no signal in Manhattan due to congestion pricing.
  - NO_2 differences are well within uncertainties due to natural variability and the instrument measurement.
- We will continue to evaluate impacts to NO_2 levels.



Courtesy of Dan Goldberg, George Washington University
The “Baseline” is every March through May since 2019 excluding 2020.

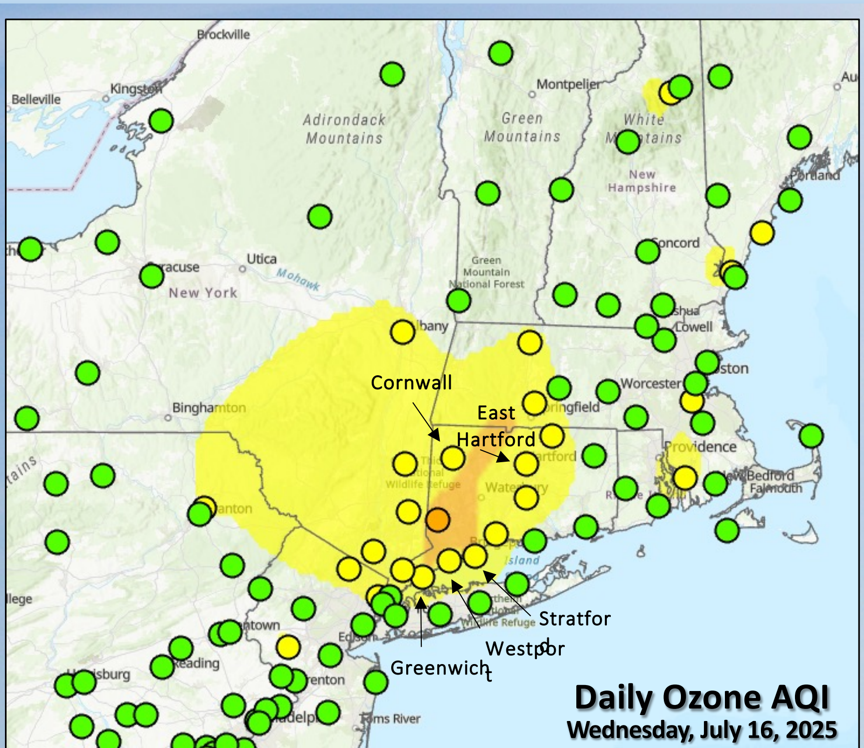
Land/Water Interface





- Low PBL heights trap pollutants in the shallow marine layer over Long Island Sound on a typical exceedance day.
- The conceptual model of ozone formation over Long Island Sound shows how southwest winds and the sea breeze impact ozone levels in Connecticut.

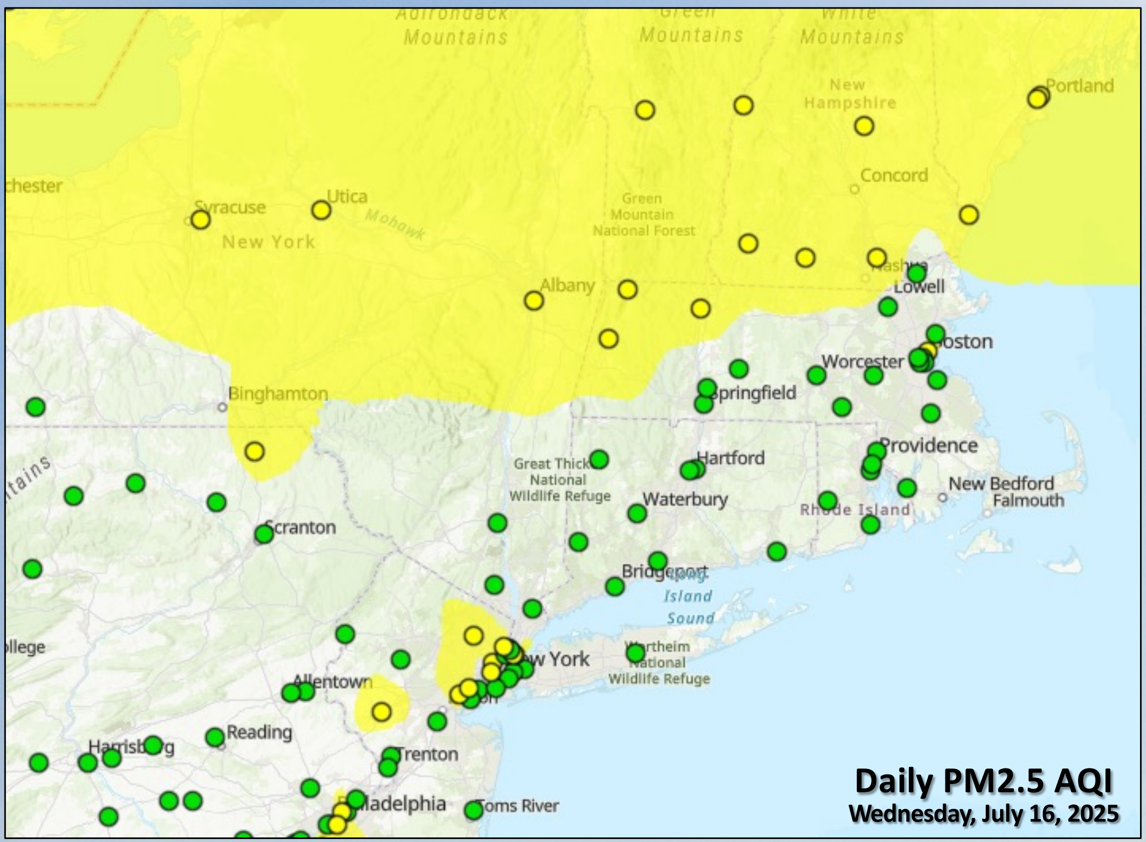
Ozone AQI Map & Summary: July 16, 2025



Date (LST)	Site	Site AQS	Max 8-Hr Ozone (ppb)
7/16/2025	**Danbury**	**90011123**	**75**
7/16/2025	**Cornwall**	**90050005**	**70**
7/16/2025	**Greenwich**	**90010017**	**70**
7/16/2025	**Stratford**	**90013007**	**70**
7/16/2025	Rockland Cty	360870005	69
7/16/2025	CHICOPEE	250130008	68
7/16/2025	**Westport**	**90019003**	**68**
7/16/2025	**East Hartford**	**90031003**	**67**
7/16/2025	Middleport	360631006	64
7/16/2025	Millbrook	360270007	64
7/16/2025	White Plains	361192004	64
7/16/2025	Mt Ninham	360790005	63
7/16/2025	**New Haven**	**90090027**	**63**
7/16/2025	Amherst	360290002	62
7/16/2025	Loudonville	360010012	62
7/16/2025	**Middletown**	**90079007**	**61**
7/16/2025	PittsfieldES	250030008	60
7/16/2025	**Stafford**	**90131001**	**60**
7/16/2025	Ramapo	340315001	59
7/16/2025	Leonia	340030006	58

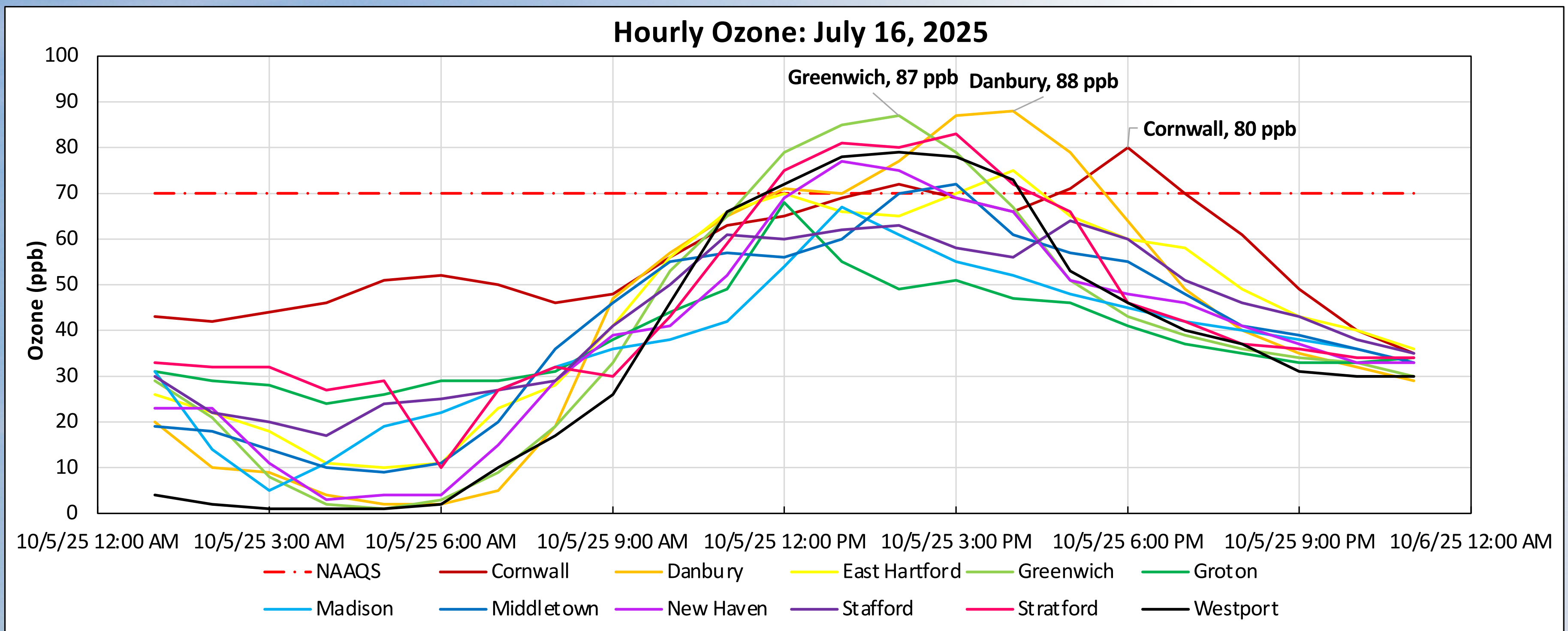
- Danbury was the only site to record an exceedance in the Northeast; however, three sites in Connecticut reached 70 ppb and many other sites in Connecticut, western Massachusetts, and the Hudson River Valley reached the upper MODERATES.

PM2.5 AQI Map: July 16, 2025



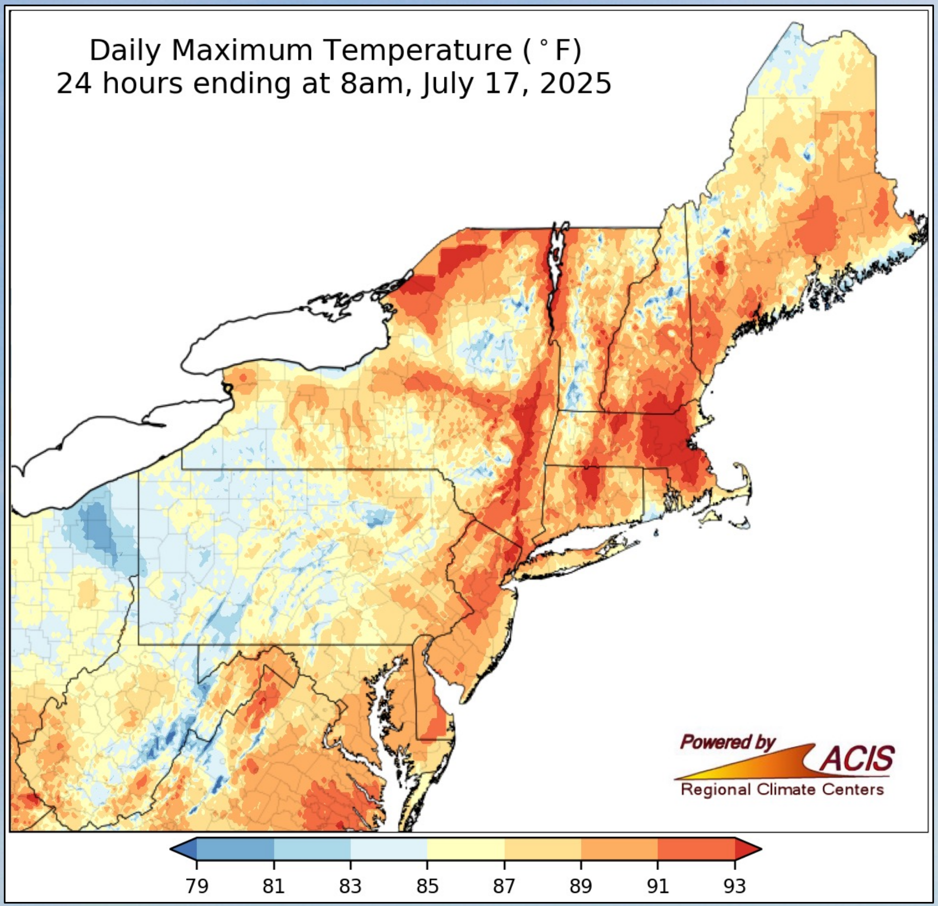
- Connecticut PM2.5 levels remained GOOD statewide.
- MODERATE PM2.5 levels primarily impacted northern portions of the Northeast.

Connecticut Hourly Ozone: July 16, 2025



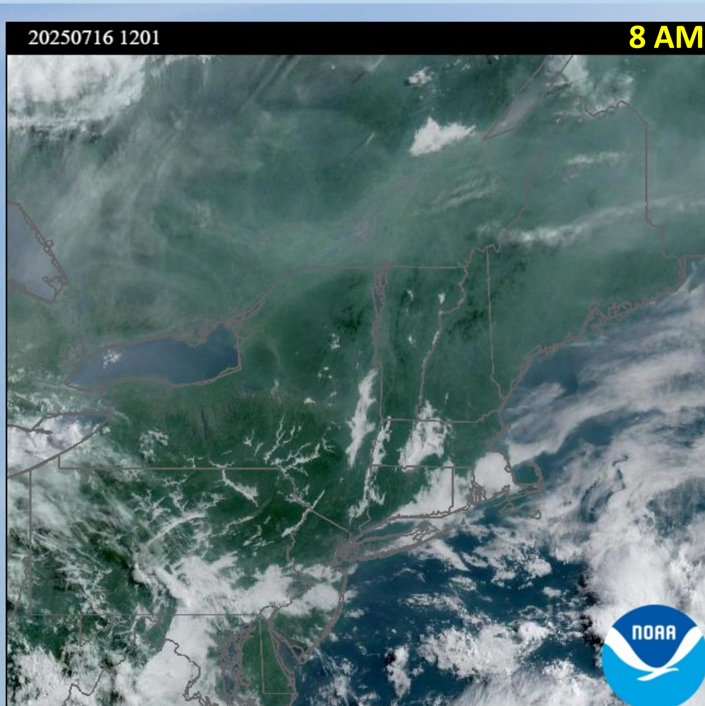
- The coastal sites peaked in the early afternoon followed by Danbury (88 ppb) at 4 PM and Cornwall (80 ppb) at 6 PM.

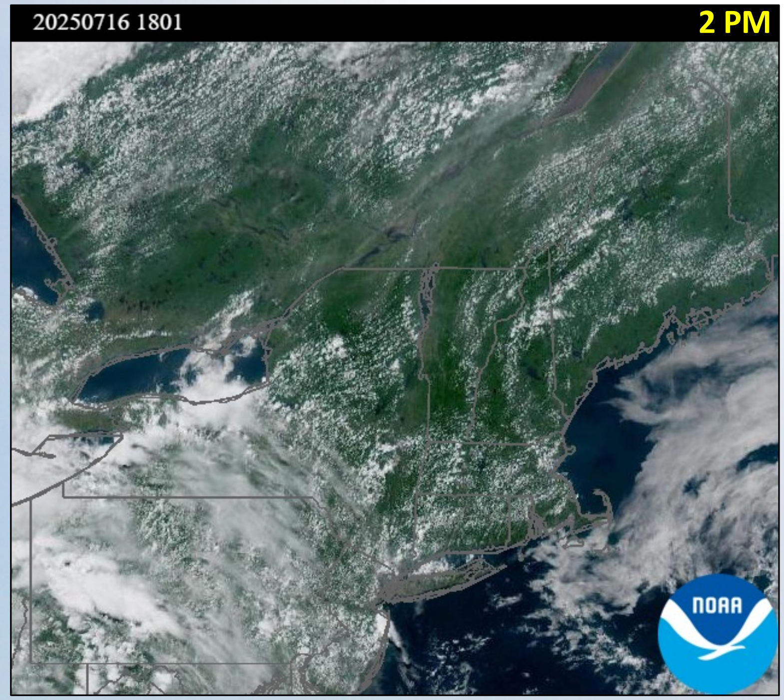
Daily Maximum Temperatures: July 16, 2025



- The daily maximum temperature at Bradley International Airport was 93°F.
- Temperatures reached the mid to upper 80s and into the low 90s across Connecticut, with the highest temperatures in central Connecticut.

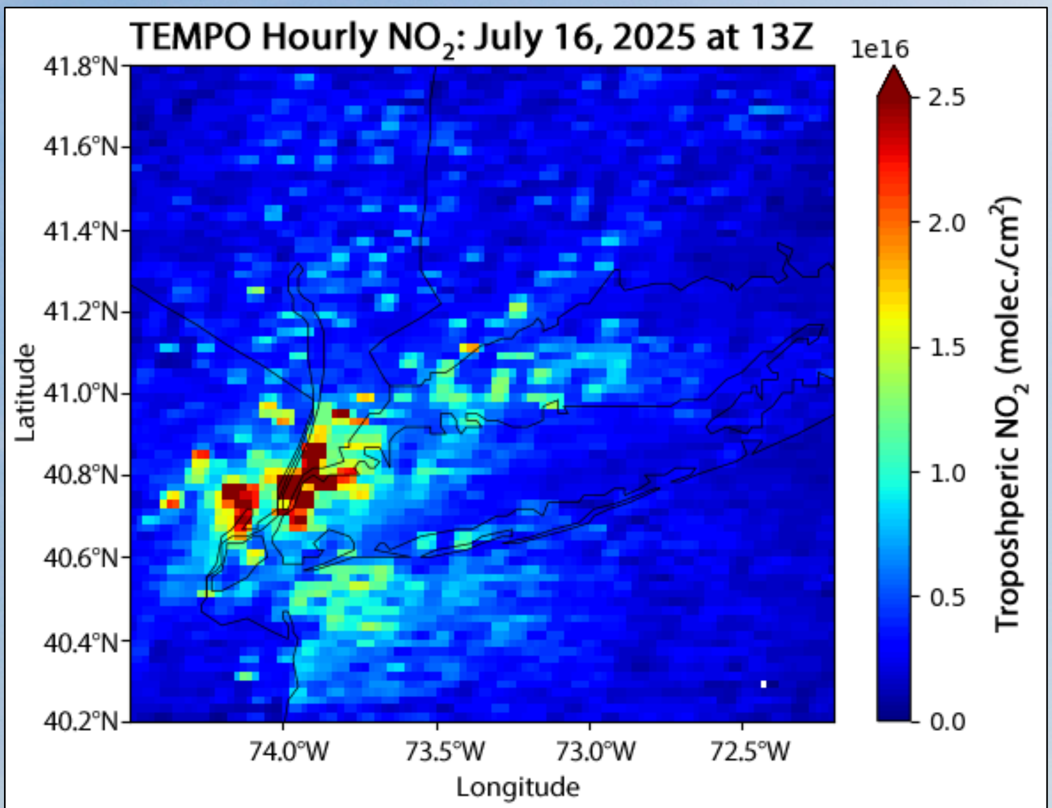
GOES-East GeoColor Satellite Imagery: July 16, 2025





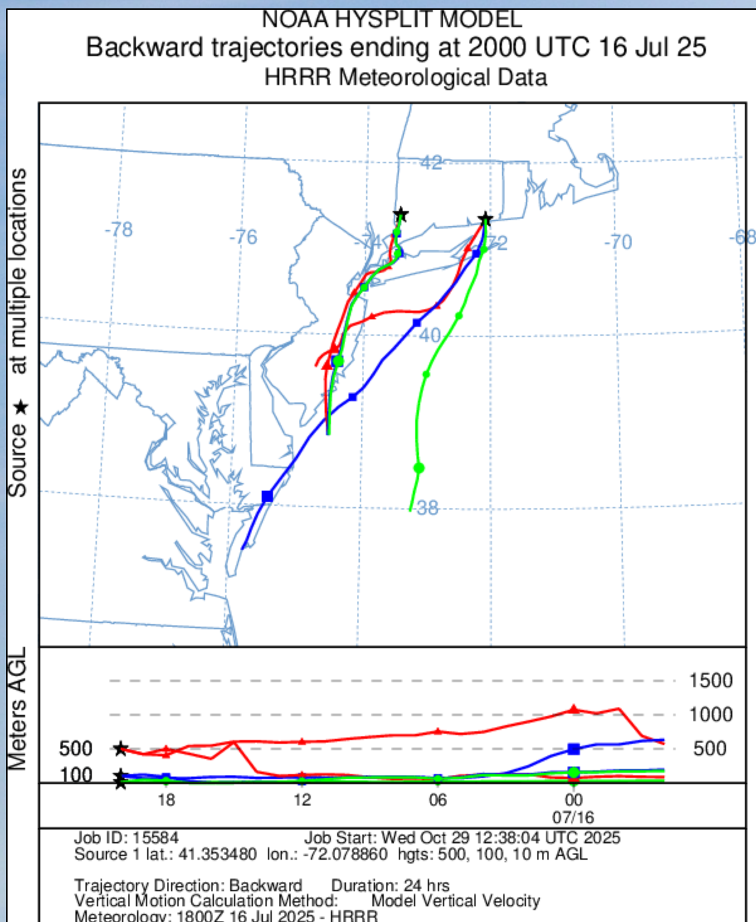
- The morning satellite image (left) shows a smoke plume over northern portions of the northeast with clear skies for western Connecticut, and the afternoon satellite image (right) shows scattered clouds across Connecticut.

Hourly TEMPO NO_2 Animation: July 16, 2025



- The NO_2 plume from the New York City metro area supplies key precursors that contribute to ozone formation over Long Island Sound.
- The highest NO2 levels from the New York City metro plume primarily remain to the west of Connecticut, limiting the highest ozone levels to western Connecticut.

24 Hour HRRR Back Trajectories: July 16, 2025



- The HRRR back trajectories at 4 PM (10–500 m) for Danbury trace air parcels along the New Jersey coastline and over New York City and Long Island Sound before reaching Connecticut.
- Trajectories for Groton are further east with more of an ocean influence.
  - Groton's maximum 8 hour ozone level was GOOD with a few hours of MODERATE levels.

Key Takeaways

- 2025 preliminary ozone design values show that Connecticut remains in ozone non-attainment for the following non-attainment areas:
  - 2015 NAAQS: NY-NJ-CT & Greater CT
  - 2008 NAAQS: NY-NJ-CT
- One of the main contributing factors to ozone production in Connecticut is the proximity to the New York City Metro area and the associated NO_2 plume.
  - Ozone precursors are funneled into Long Island Sound and ozone formation occurs in the presence of sunlight.
- Another contributing factor is ozone being trapped in the shallow boundary over Long Island Sound.
  - Ozone is transported onto the Connecticut coastline by southwest winds and the sea breeze circulation.
  - The sea breeze also transports high ozone levels along the coast to inland monitors.