



# Connecticut Department of Energy and Environmental Protection



# July 15-18 , 2016 OTR and Connecticut Ozone Exceedances

By Michael Geigert

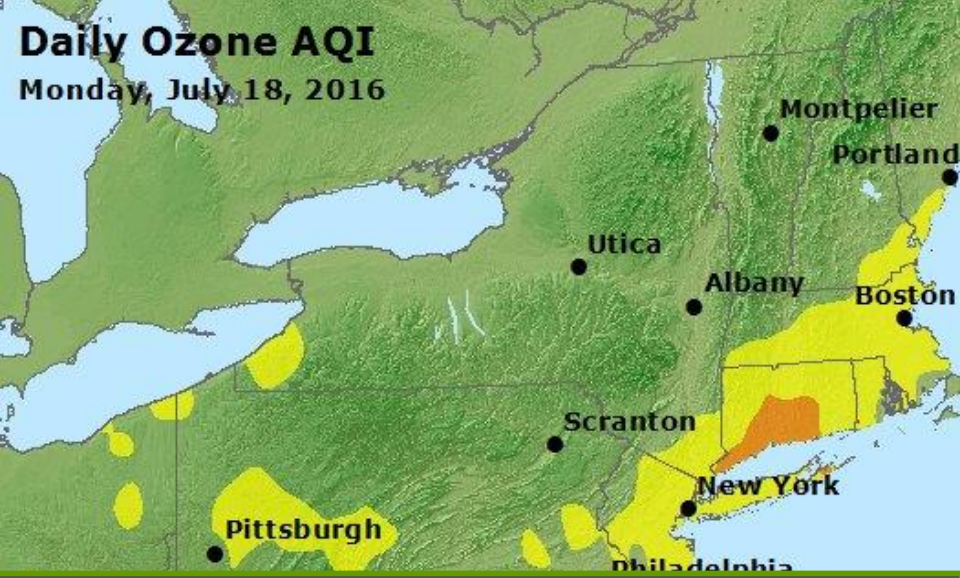
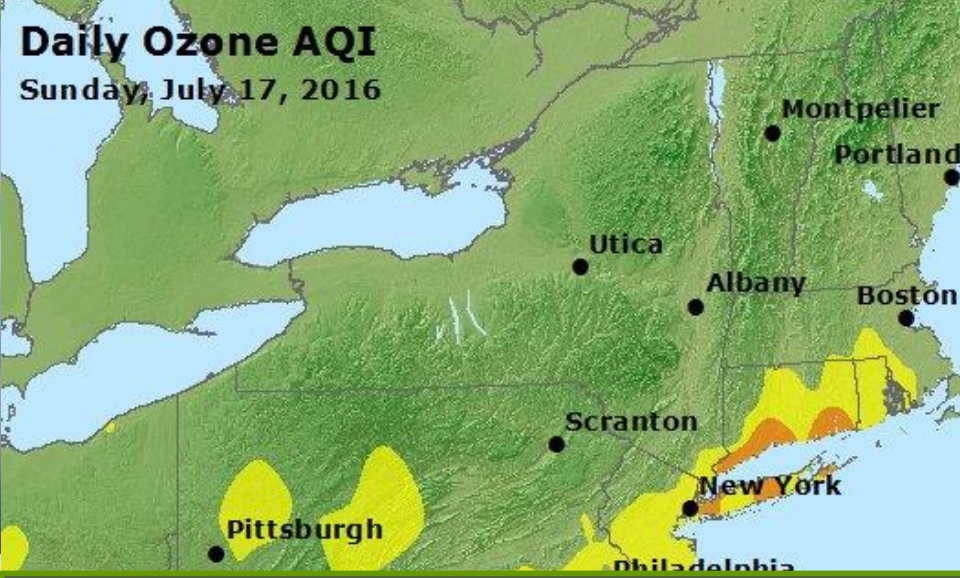


Connecticut Department of Energy and Environmental Protection

# Summary

- 4-day Moderate to USG Event along the I-95 corridor;
- Connecticut had exceedances on each day;
- Connecticut has 18 exceedance days to date;
- Over the 4 days, there were 29 USG levels monitored:
  1. 17 sites above 70 ppb ozone NAAQS, 7 sites in CT
  2. 9 sites above (2008) 75 ppb ozone NAAQS, 6 sites in CT
  3. 0 sites above (1997) 84 ppb ozone NAAQS, 0 sites in CT





# Regional AQI Maps

# Table of OTR Monitoring Sites

- 4 consecutive days of USG in Connecticut.

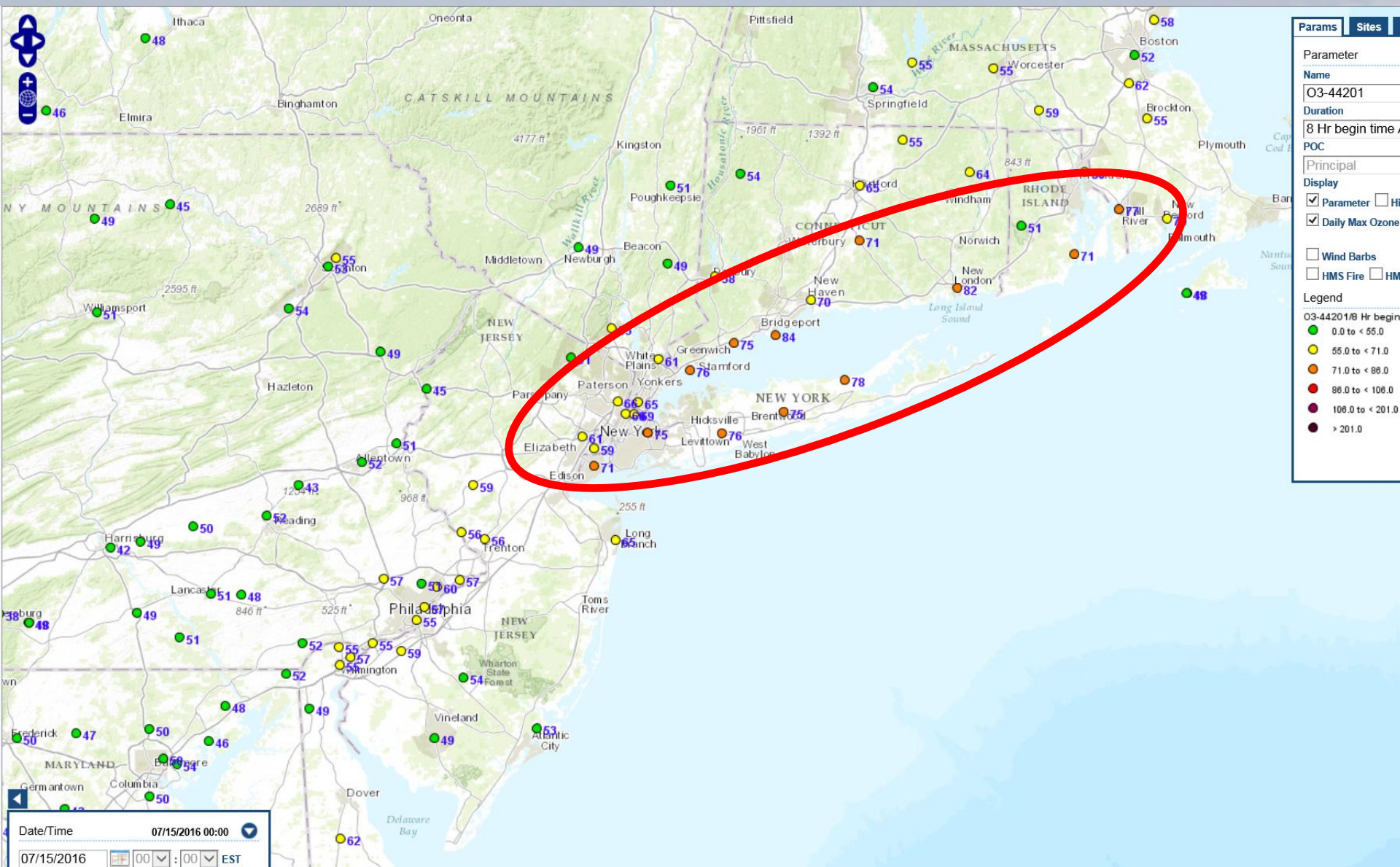
Site	7/15/2016	Site	7/16/2016	Site	7/17/2016	Site	7/18/2016
Stratford	84	Groton Fort Griswold	71	Stratford	79	Middletown	84
Groton Fort Griswold	82	Leonia	71	Greenwich	77	Stratford	83
Riverhead	78	Essex	71	Westport	76	Madison-Beach Road	82
Fall River	77	Babylon	70	Groton Fort Griswold	75	Westport	80
Greenwich	76	Holtsville	69	Queens	71	New Haven - Criscuolo	75
Babylon	76	NEA	68	Holtsville	71	Greenwich	73
Westport	75	Fall River	67	New Haven - Criscuolo	71	E. Milton - Blue Hill	70
Queens	75	Narragansett	67	IS52	71	Groton Fort Griswold	68
Holtsville	75	CCNY	67	Middletown	70	Bar Harbor - Cadillac Mt	68
Middletown	71	Monmouth University	66	Riverhead	69	Queens	67
Susan Wagner	71	Furley	66	CCNY	69	Abington	67
Narragansett	71	Riverhead	65	Babylon	67	Uxbridge	67
New Haven - Criscuolo	70	Susan Wagner	65	Pfizer Lab	67	East Hartford	66
Fairhaven2	70	NEW	65	Leonia	66	Harrison Township	66
IS52	69	Queens	64	Edgewood	65	LYNN	65
Port Clyde	68	Rockland Cty	64	Clarksboro	64	Stafford	65
Cape Elizabeth	67	Rutgers University	64	Essex	64	Susan Wagner	64
Kennebunkport	67	IS52	63	Bayonne	63	Danbury	64
TRURO	67	Newark Firehouse	63	Harrison Township	63	Kennebunkport	63
Leonia	66	Beltsville	63	Fall River	62	E Providence	63
East Hartford	65	Fairhaven2	62	Monmouth University	62	Fair Hill	63
Monmouth University	65	BRIS	62	Bar Harbor - Cadillac Mt	62	Rutgers University	63
Pfizer Lab	65	Aldino	62	NEW	61	W Greenwich	62
Abington	64	Edgewood	62	Fair Hill	61	Port Clyde	61
KILLENS	62	Stratford	61	Narragansett	60	White Plains	61
E. Milton - Blue Hill	62	Middletown	61	BELLFNT2	60	Worcester	61
White Plains	61	Bayonne	61	E Providence	60	Newburyport	61
Newark Firehouse	61	ALLE	61	Camden Spruce St	60	Brockton	61
Horn Point	61	YOR1	61	PG Equestrian Center	60	Babylon	60

# CT Monitoring Site Design Value Update

			To Date 2016 Compliance Status			
			x = Violating NAAQS			
	To Date:	2015	2008	1997	Next Possible NAAQS in Violation	
	2016	NAAQS	NAAQS	NAAQS	(key monitor in each NA area is highlighted in RED)	
	DV					
of SWCT NYC Portio Area n	Danbury	78	X	X	Four more 102+ ppb days violates 1997 NAAQS	
	Greenwich	81	X	X	Four more 93+ ppb days violates 1997 NAAQS	
	Madison	76	X	X	Four more 105+ ppb days violates 1997 NAAQS	
	Middletown	79	X	X	Four more 97+ ppb days violates 1997 NAAQS	
	New Haven - Criscuolo Park	75	X		One more 75+ ppb days violates 2008 NAAQS	
	Stratford	79	X	X	Four more 95+ ppb days violates 1997 NAAQS	
	Westport	82	X	X	<b>Two more 87+ ppb days violates 1997 NAAQS</b>	
Greater CT	Cornwall	72	X		Three more 86+ ppb days violates 2008 NAAQS	
	East Hartford	74	X		<b>Two more 76+ ppb days violates 2008 NAAQS</b>	
	Groton Fort Griswold	72	X		Three more 86+ ppb days violates 2008 NAAQS	
	Stafford	73	X		Three more 79+ ppb days violates 2008 NAAQS	
	Abington (CASTNET)	68			Two more 76+ ppb days violates 2015 NAAQS	

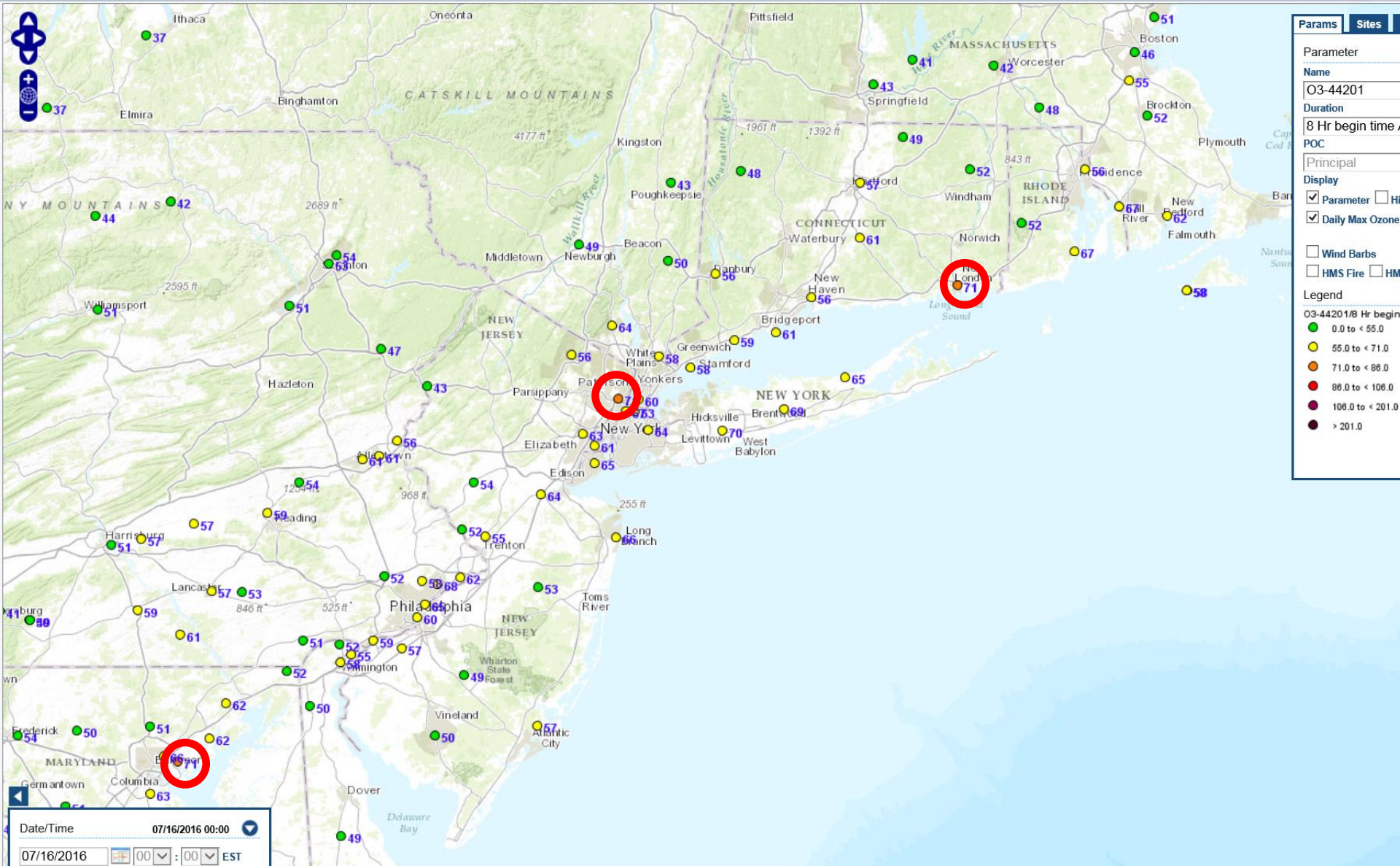
# July 15, 2016 Peak Northeast Ozone

- Exceedances for Connecticut, New York, Rhode Island and Massachusetts.



# July 16, 2016 Peak Northeast Ozone

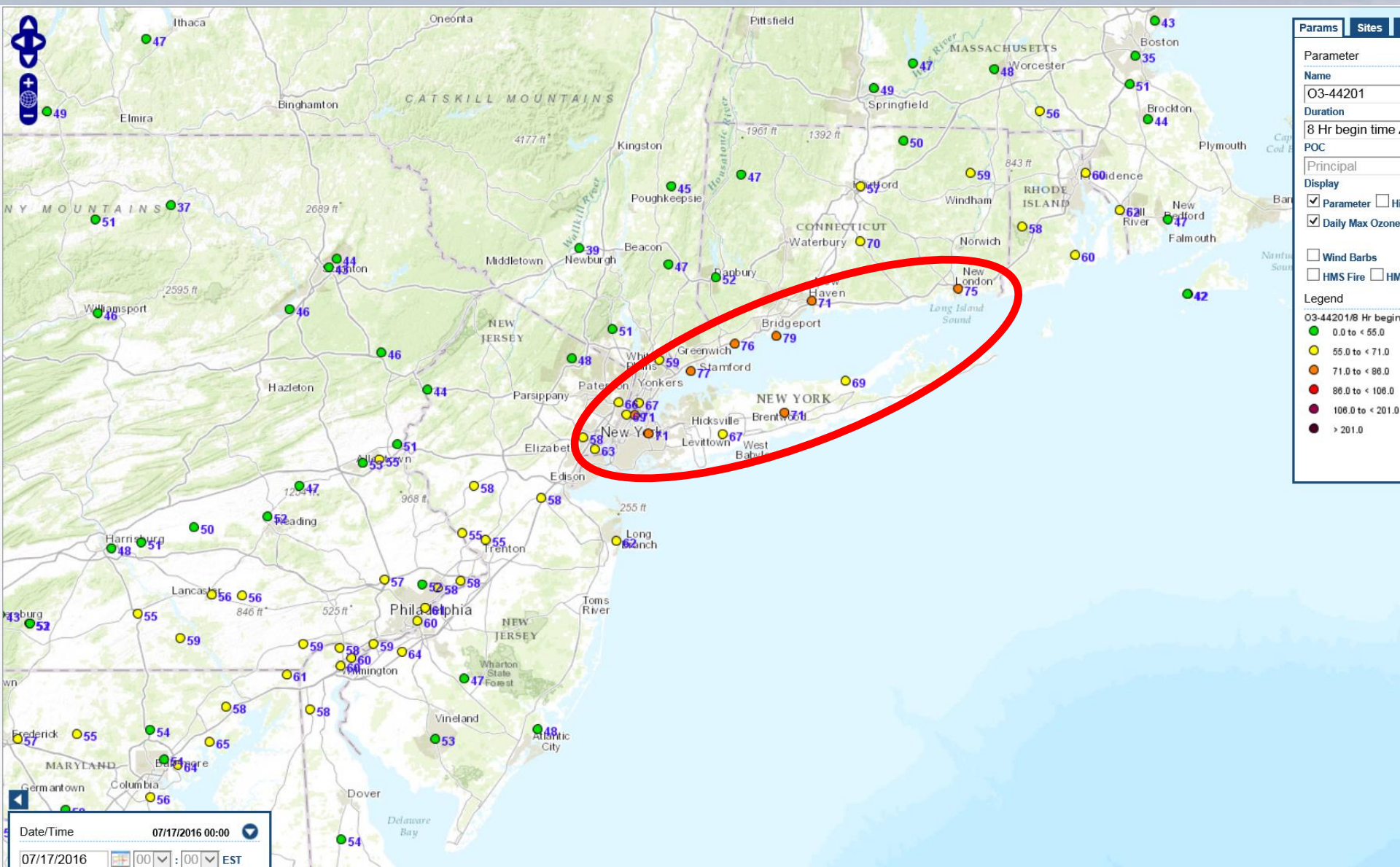
- Exceedances for Connecticut, New Jersey and Maryland.





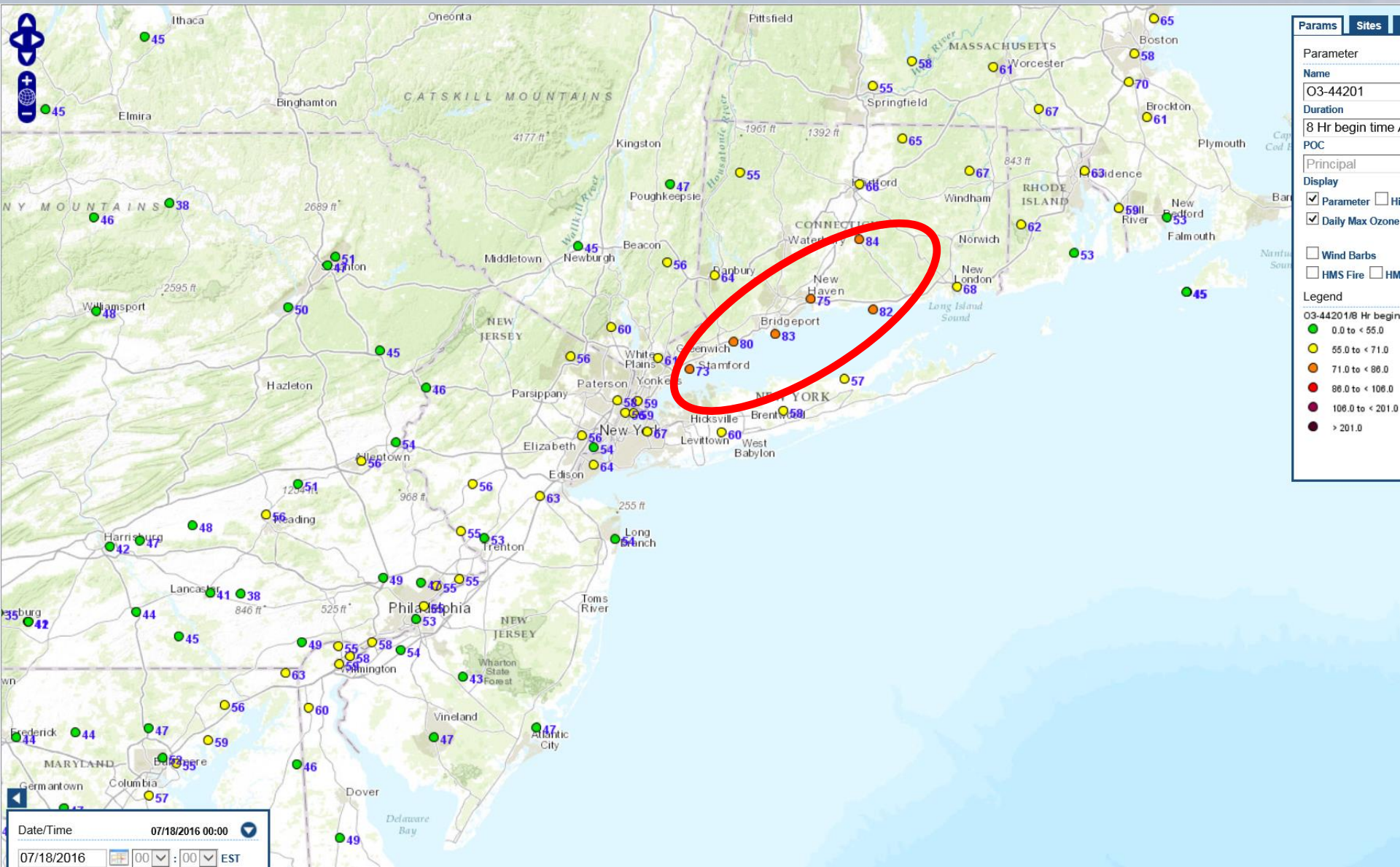
# July 17, 2016 Peak Northeast Ozone

- Exceedances for Connecticut and New York.



# July 18, 2016 Peak Northeast Ozone

- Exceedances for only Connecticut.



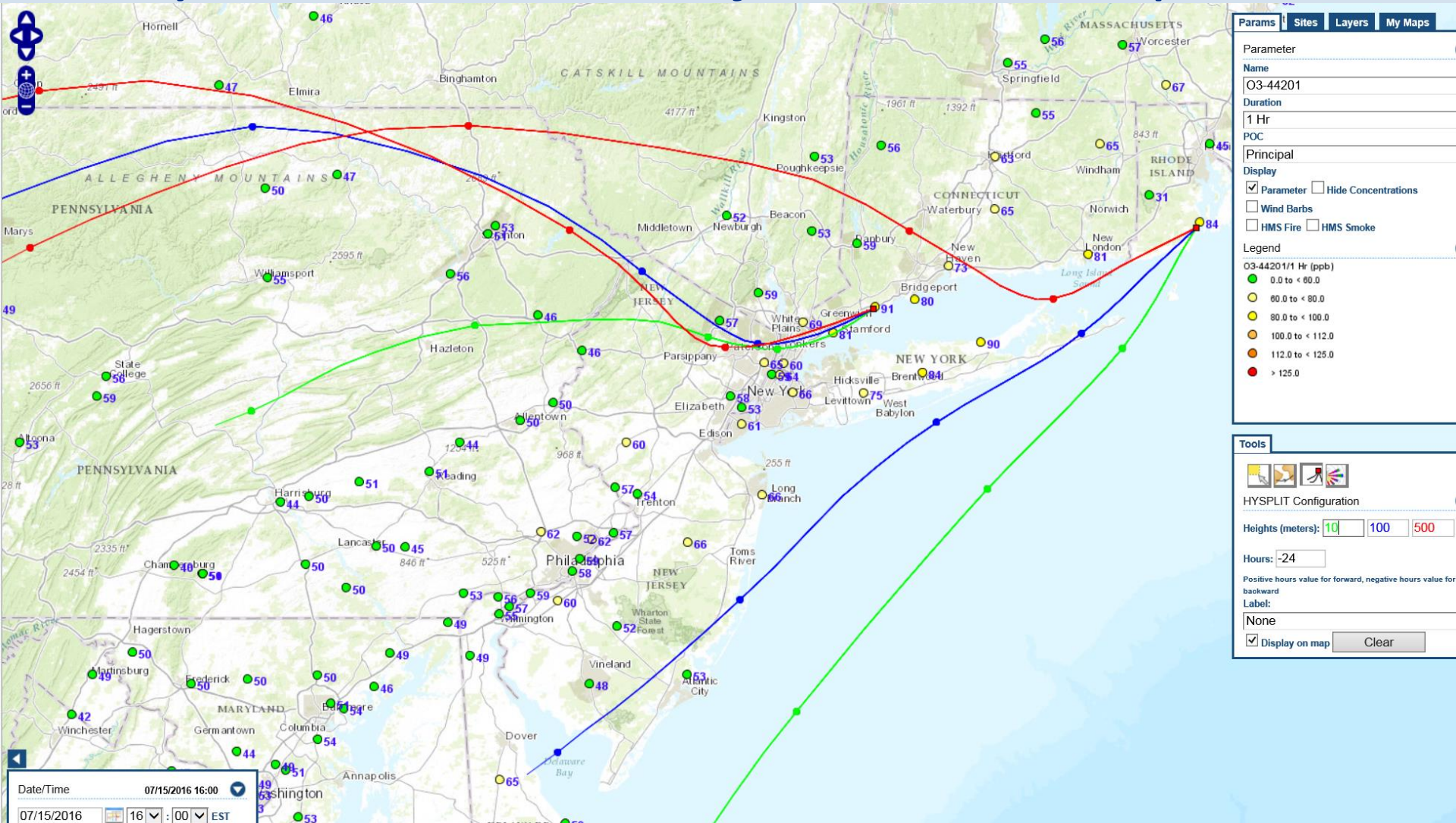
**Params** **Sites**

Parameter  
Name: O3-44201  
Duration: 8 Hr begin time  
POC: [Principal]  
Display:  
 Parameter  H  
 Daily Max Ozone  
 Wind Barbs  
 HMS Fire  HM

**Legend**  
O3-44201/8 Hr begin  
● 0.0 to < 55.0  
● 55.0 to < 71.0  
● 71.0 to < 86.0  
● 86.0 to < 106.0  
● 106.0 to < 201.0  
● > 201.0

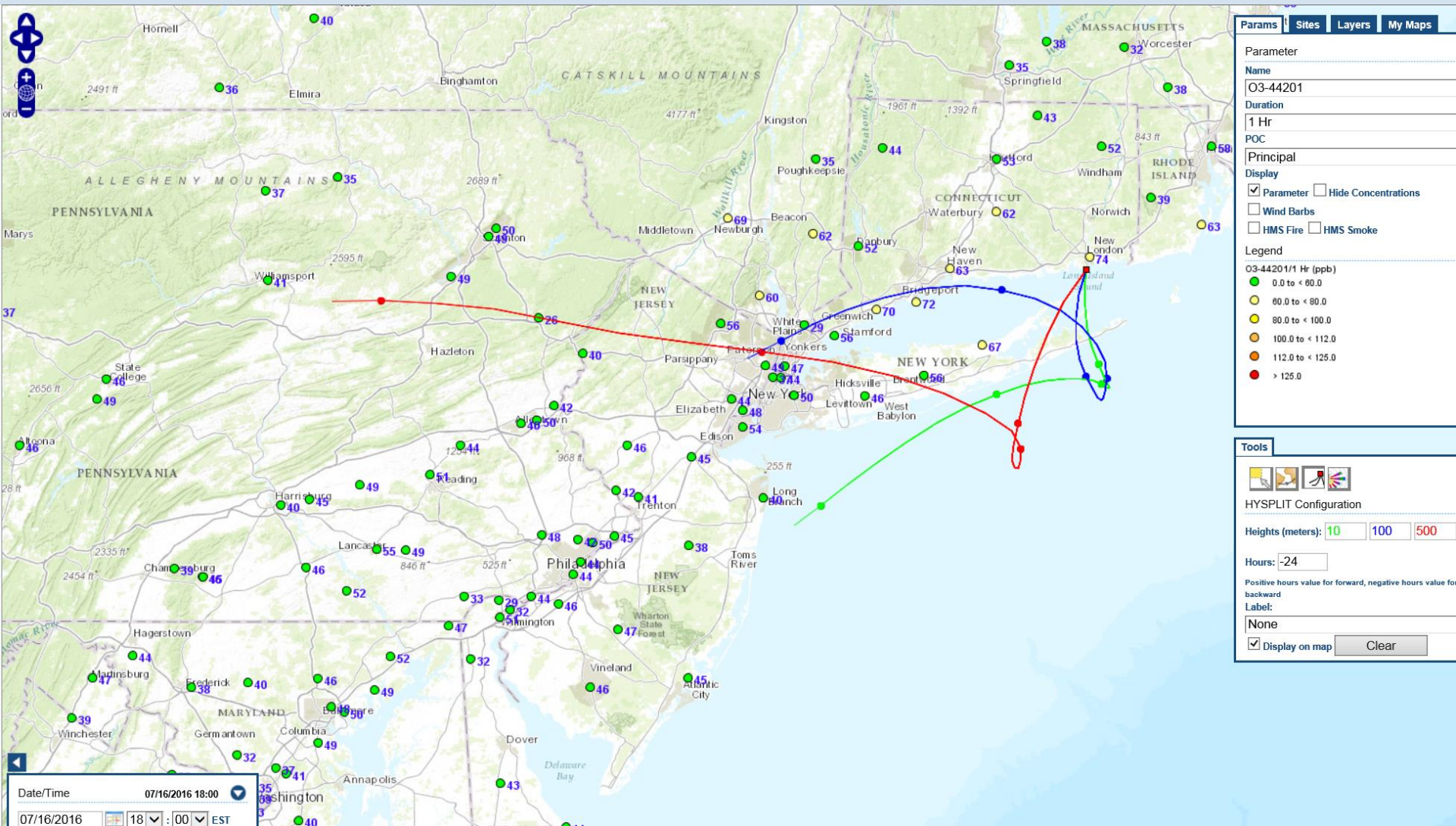
Date/Time: 07/18/2016 00:00  
07/18/2016 00:00 EST

# July 15, 2016 Back Trajectories 4:00 pm EST



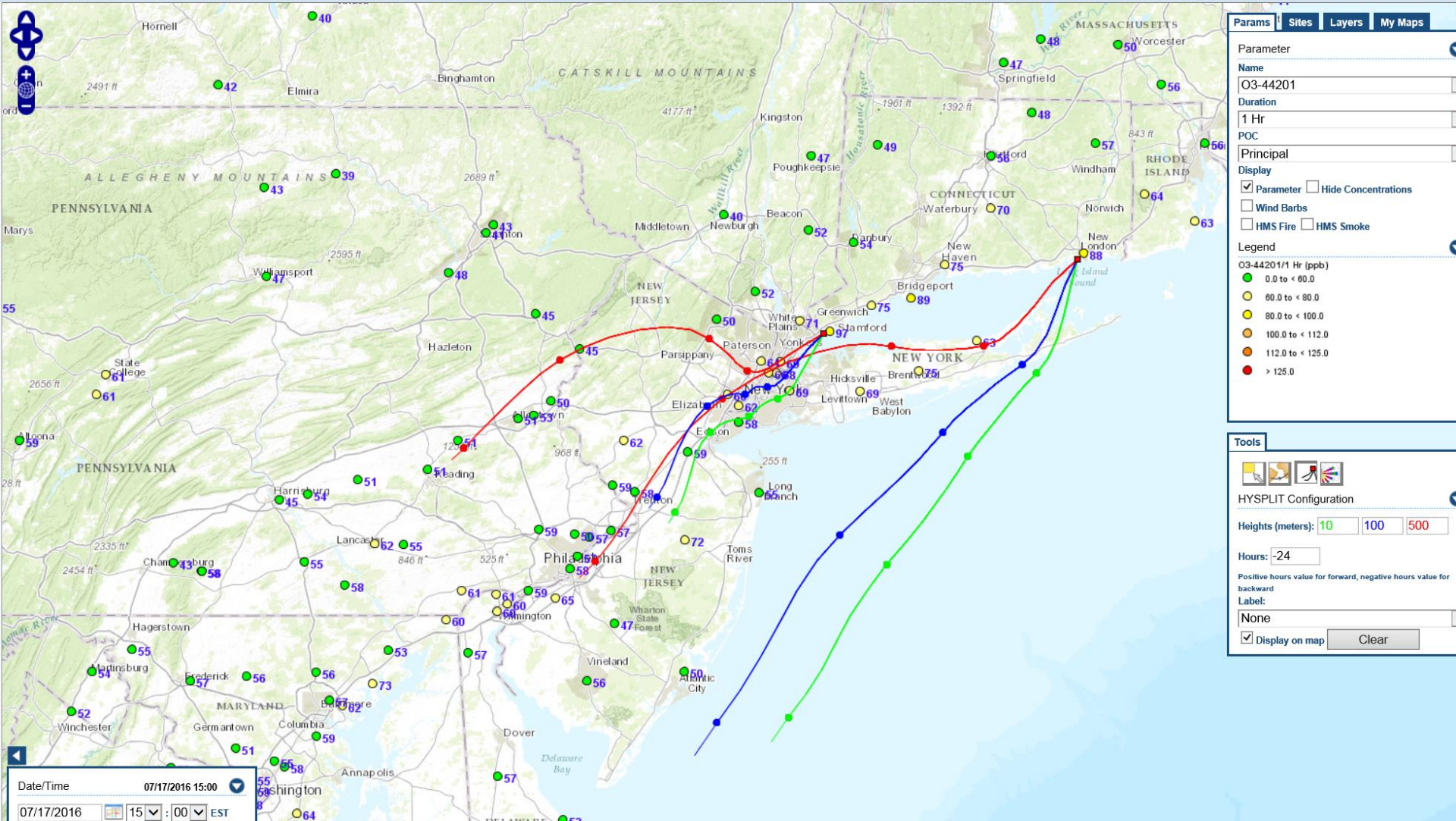
Low level trajectories originated from metro NYC to Westport. This plume was transported into LIS and eastward along the coast.

# July 16, 2016 Back Trajectories 6:00 pm EST



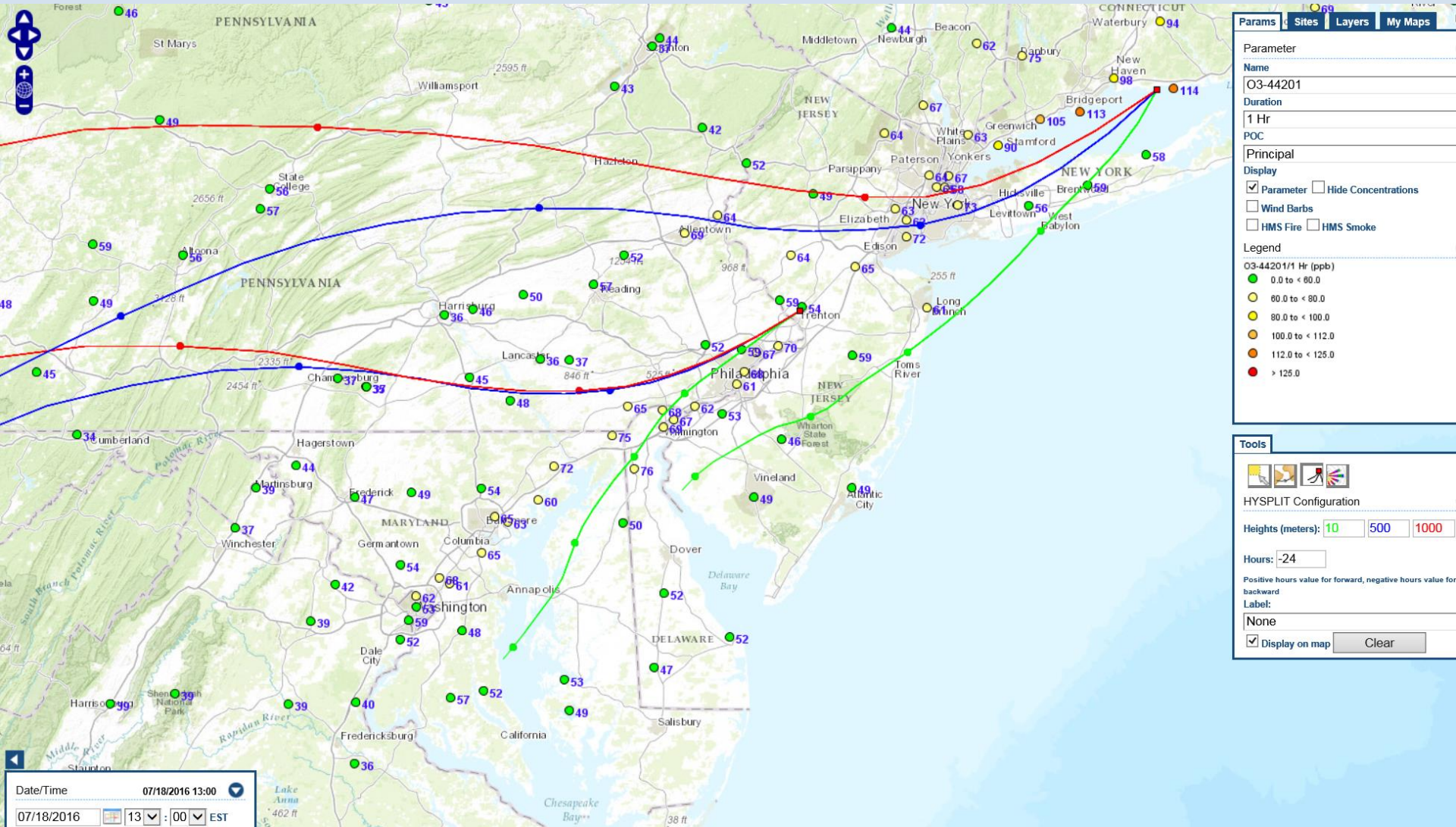
Light west winds from 100-500 meters transported ozone precursors into LIS from metro NYC. South winds, later in the day, pushed ozone north into SE Connecticut.

# July 17, 2016 Back Trajectories 3:00 pm EST



Low level trajectories originated from metro NYC into SW Connecticut. Further east, the LIS plume affected coastal Connecticut.

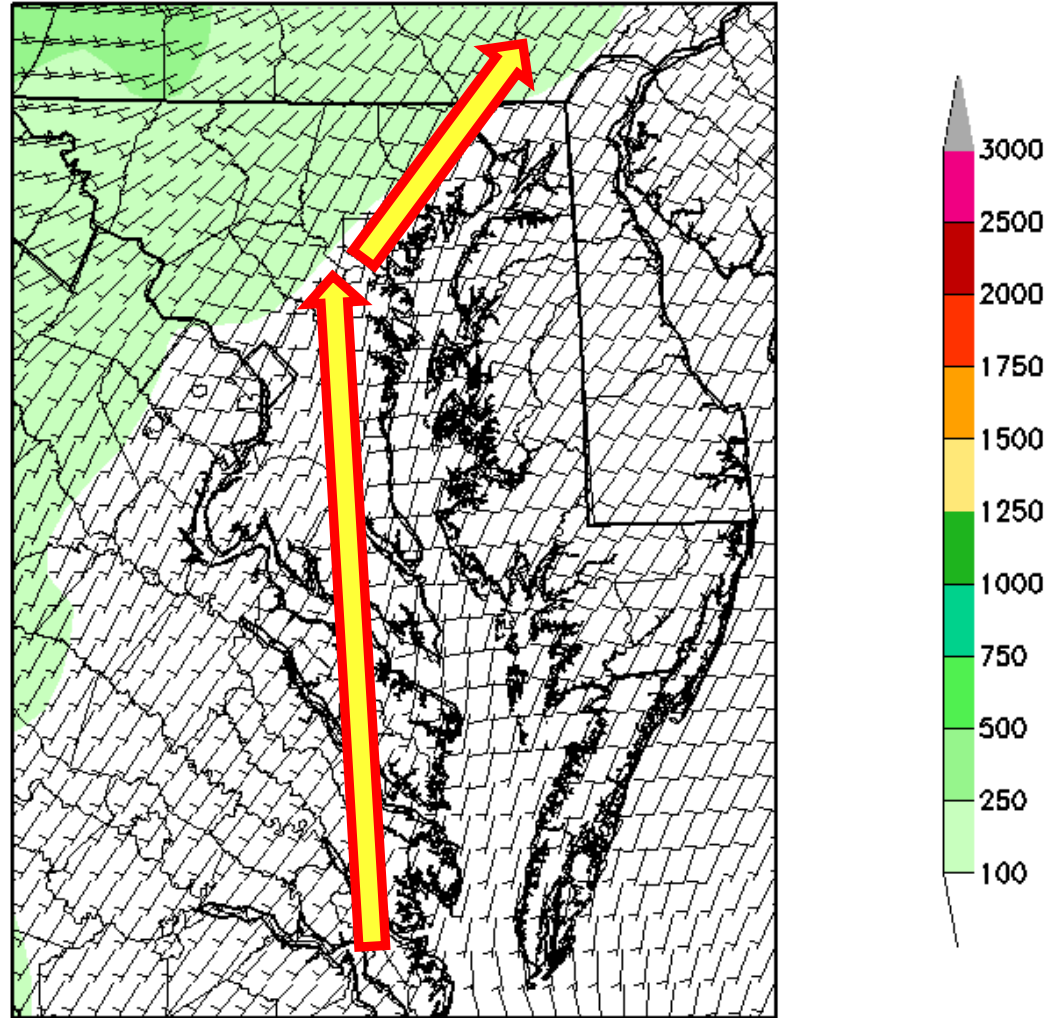
# July 18, 2016 Back Trajectories 1:00 pm EST



Higher-level trajectories to Madison CT between 500-1000 meters originated near the NYC area for the previous 6 hours but from 12-24 hours before originated in western Pennsylvania. Ozone levels from D.C to NYC stayed low despite the precipitation not arriving until 4:00pm

# Model Winds for Chesapeake Bay, 1:00 pm EST

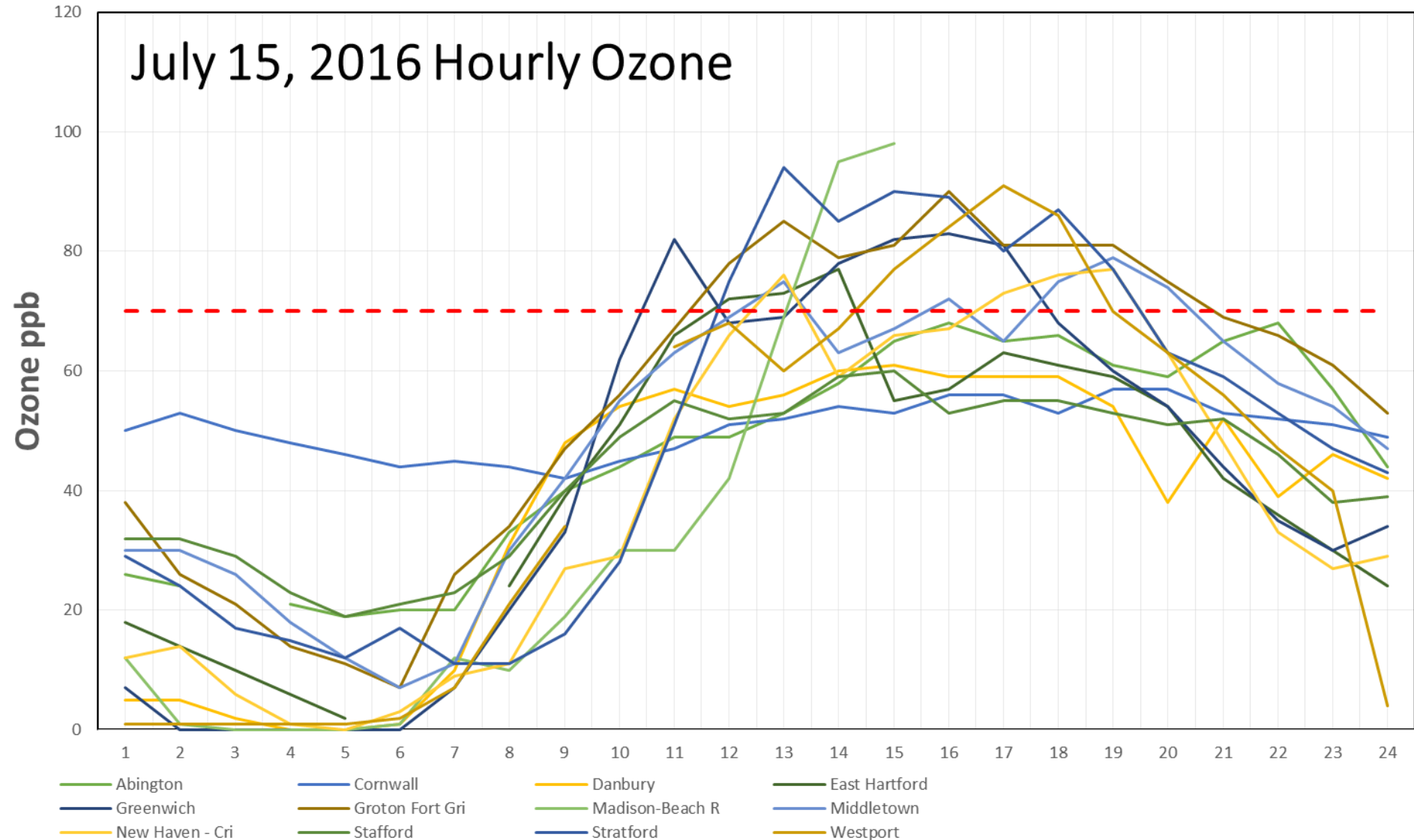
10-M WND, SFC HGT NAM 00H FCST VALID 18Z 18 JUL 2016



Ozone levels started dropping by 1:00 EST in the Mid-Atlantic States, while ozone was soaring along the Connecticut coastal monitors. It appears that maritime air channeled through Chesapeake Bay may have been responsible for quashing the ozone levels up to NYC.

# CT Ozone Monitors July 15, 2016

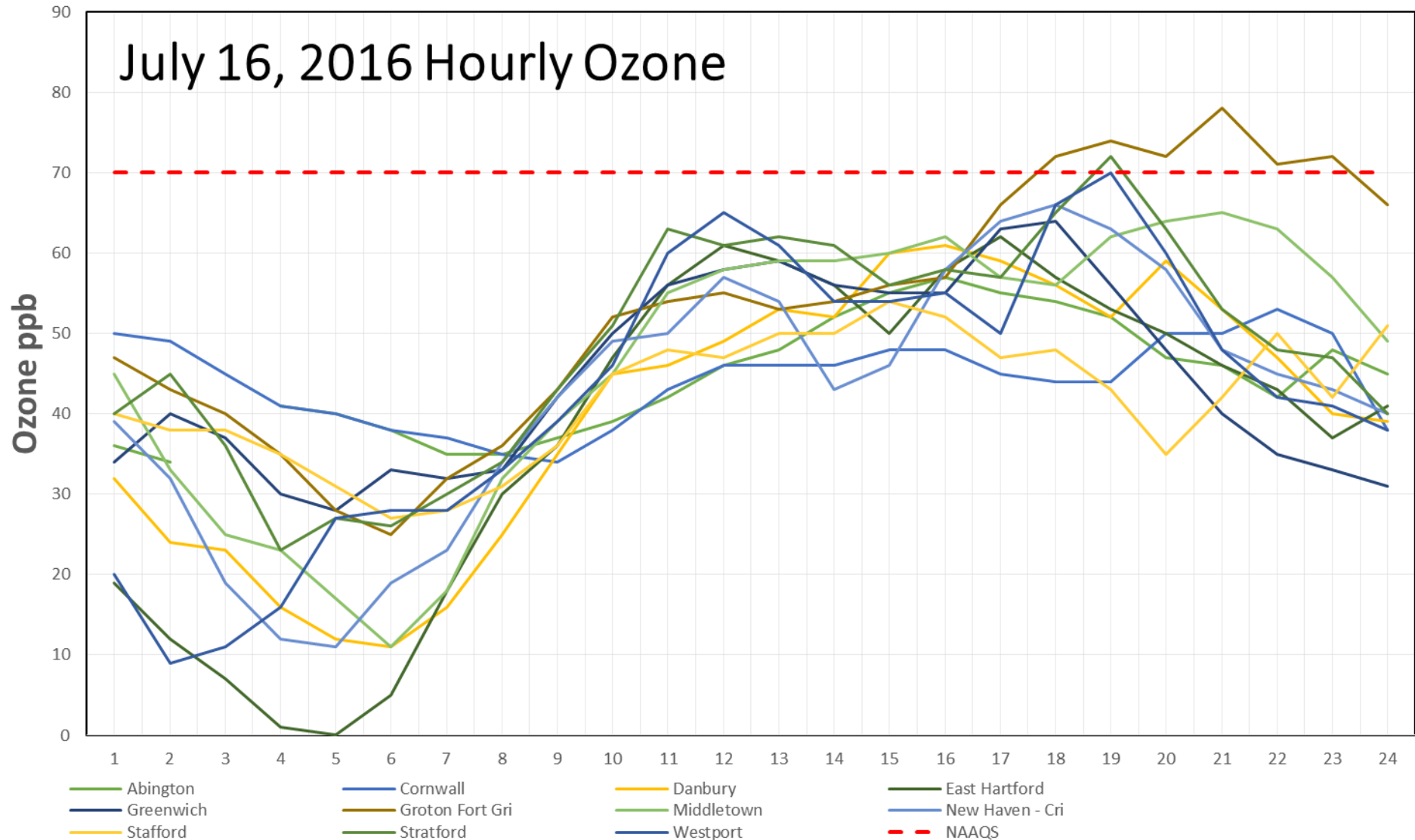
CT coastal sites had USG ozone levels from 12:00 pm to 8:00 pm with Madison peaking at 98 ppb before becoming disabled for the weekend. The plume moved northward to Middletown and dissipated.





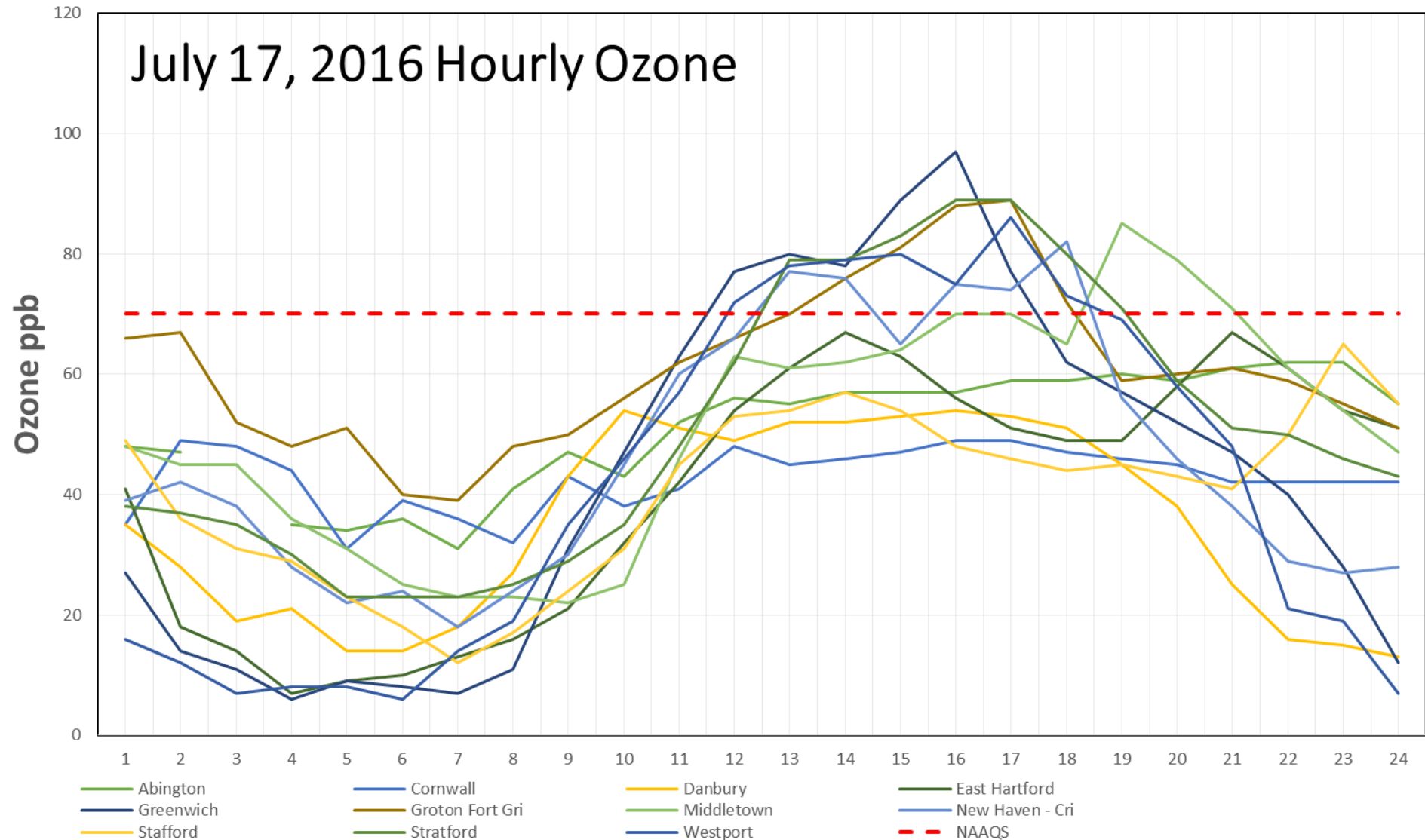
# CT Ozone Monitors July 16, 2016

Only Groton caught the LIS plume after 6:00pm and it was just enough for an exceedance.



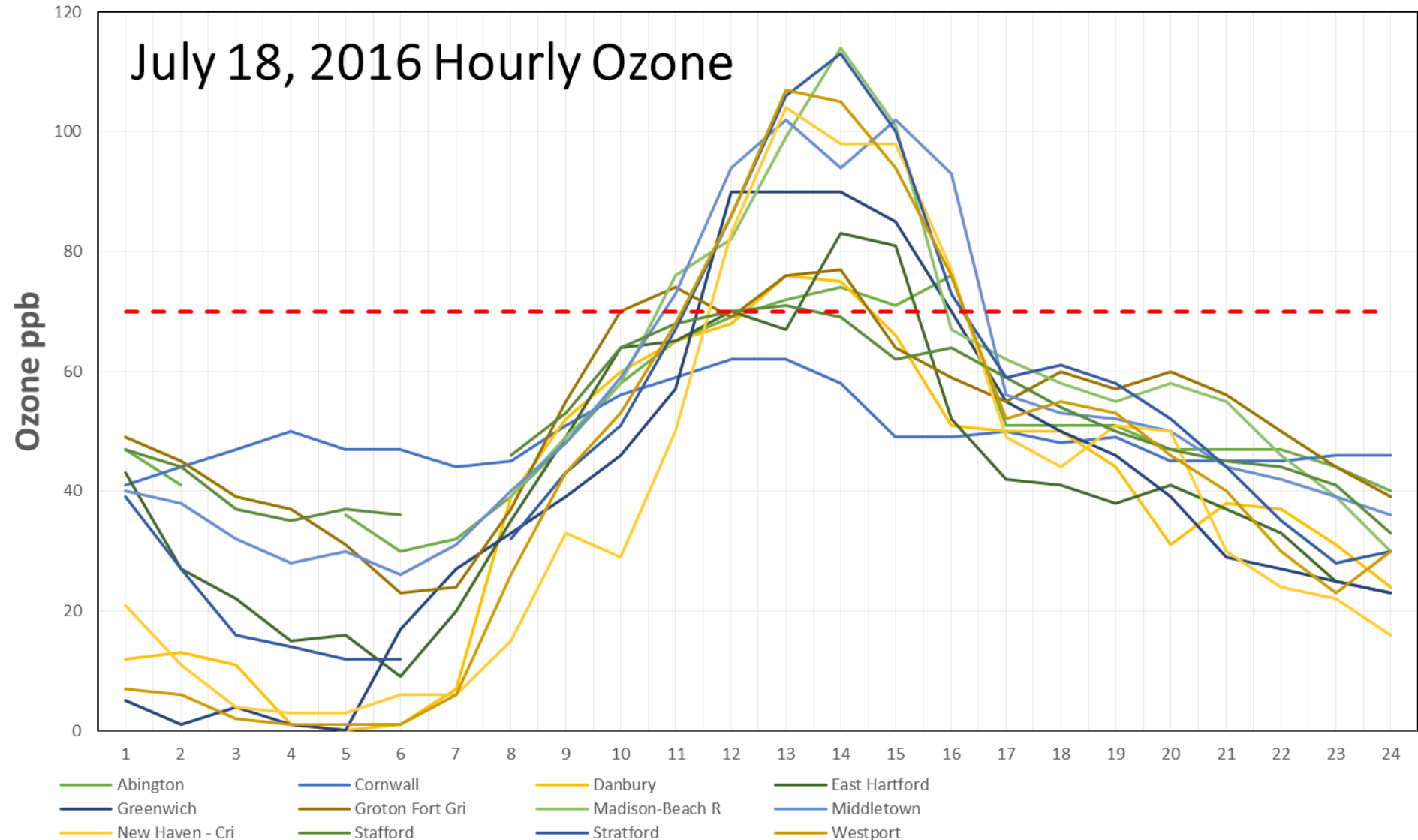
# CT Ozone Monitors July 17, 2016

CT coastal sites had USG ozone levels from 11:00 am to 7:00 pm with Greenwich peaking at 97 ppb. Middletown attempted a late day rally, but the ozone plume quickly dissipated after sunset.



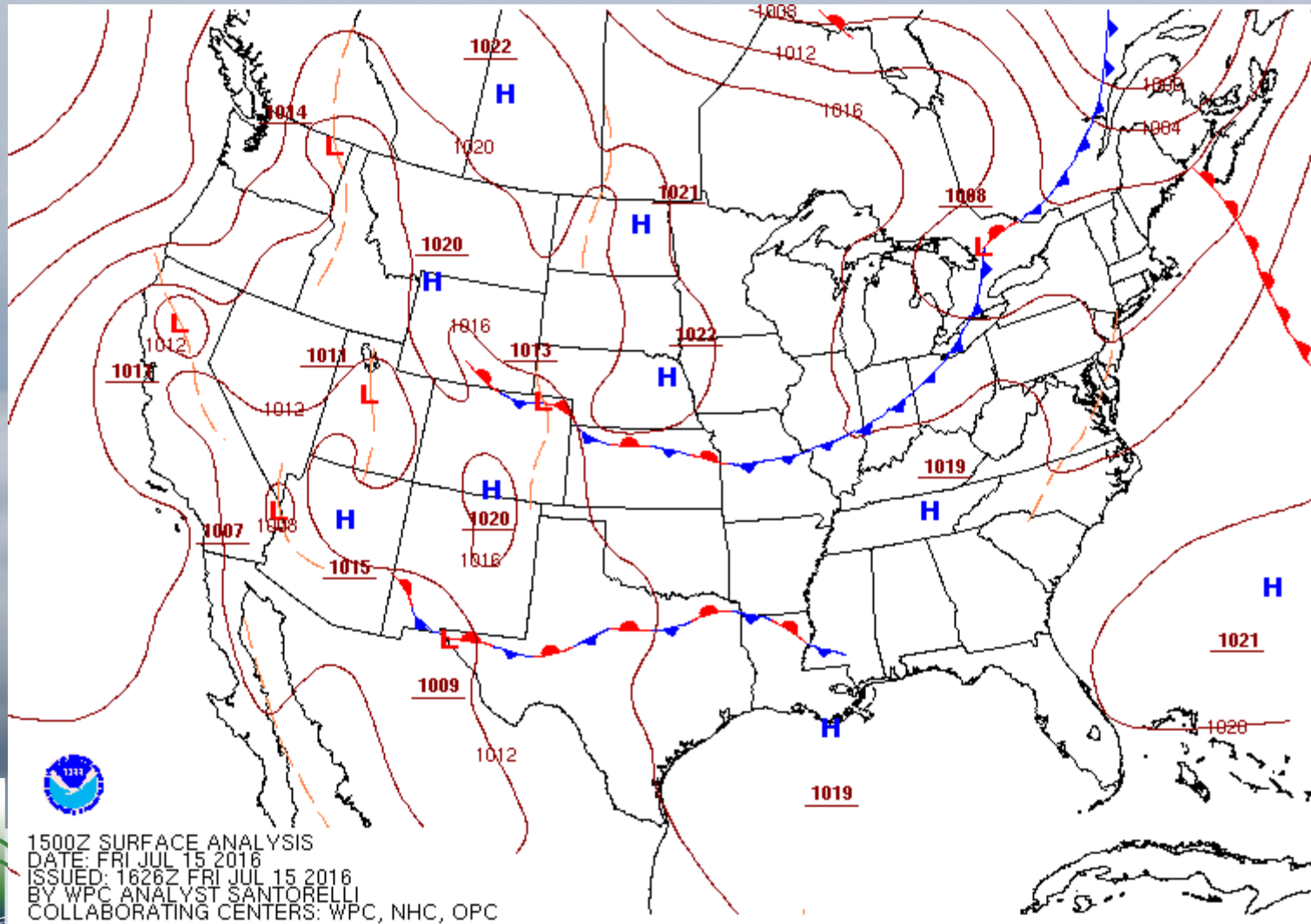
# CT Ozone Monitors July 18, 2016

Most CT sites had USG ozone levels from 11:00 am to 4:00 pm with Madison peaking at 114 ppb. The inland monitors only briefly reached USG and Cornwall stayed moderate.



# July 15-18, 2016 Surface Analysis (5:00am -11:00pm)

- Cold front approached from west and gets hung up along the Connecticut coast, allowing ozone from LIS to affect mainly the coastal monitors. On Monday, a warm front breaks through and brings a broad southwest transport up the I-95 corridor.

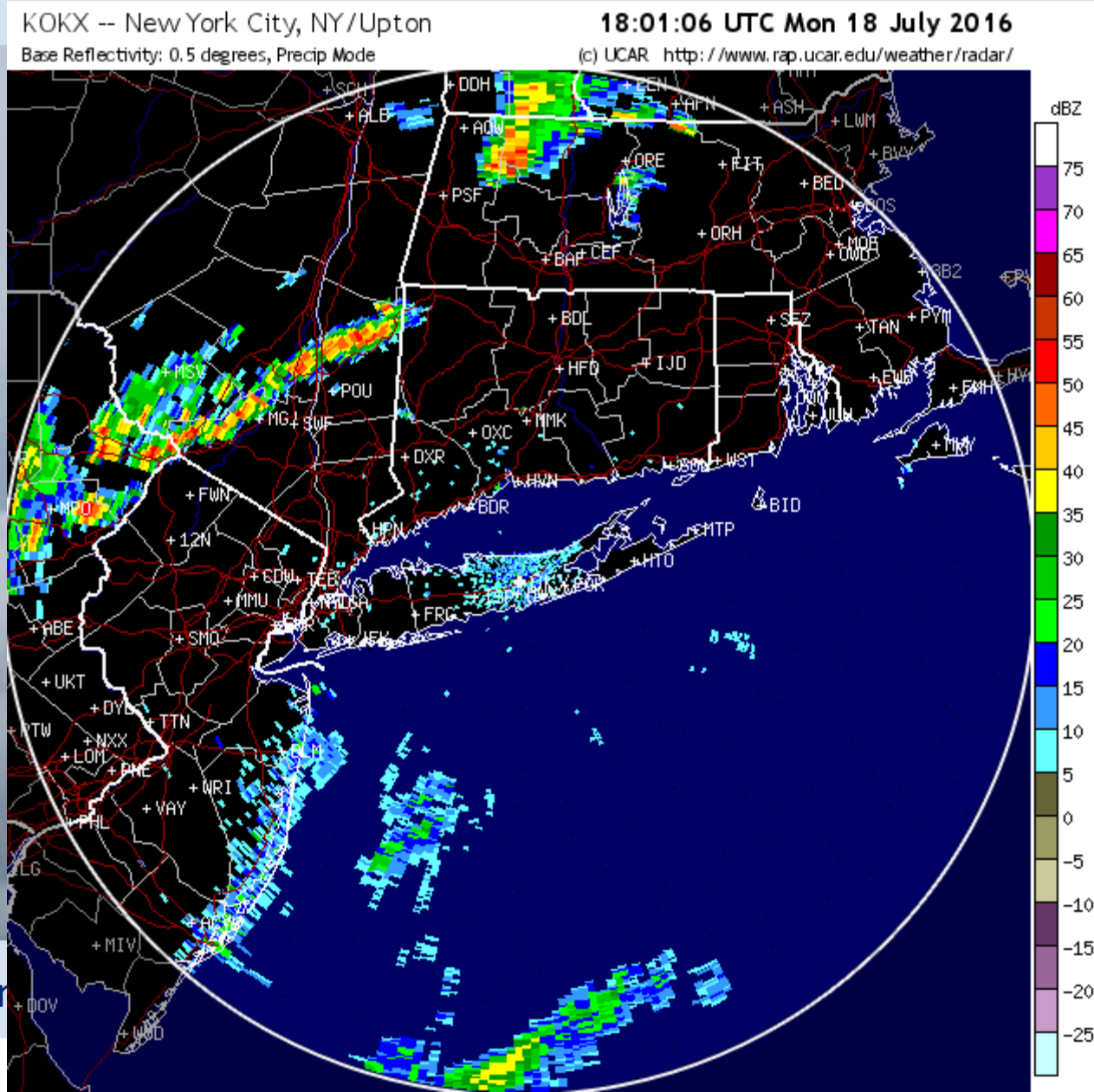


Friday July 15, 2016



# July 18, 2016 Radar Animation

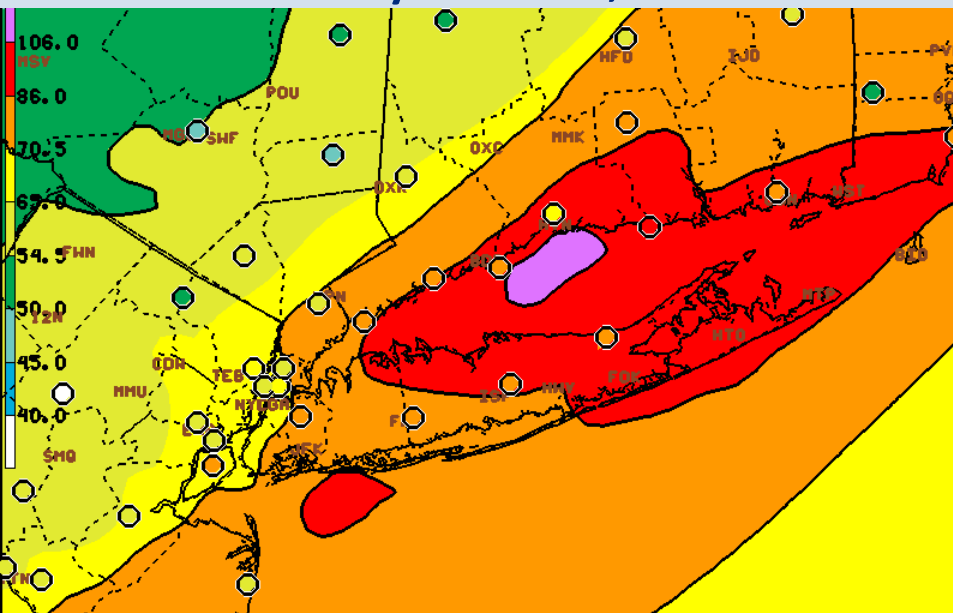
- Thunderstorms move through the I-95 corridor after 4:00 pm, but ozone levels never elevated in NY and NJ.



Cor

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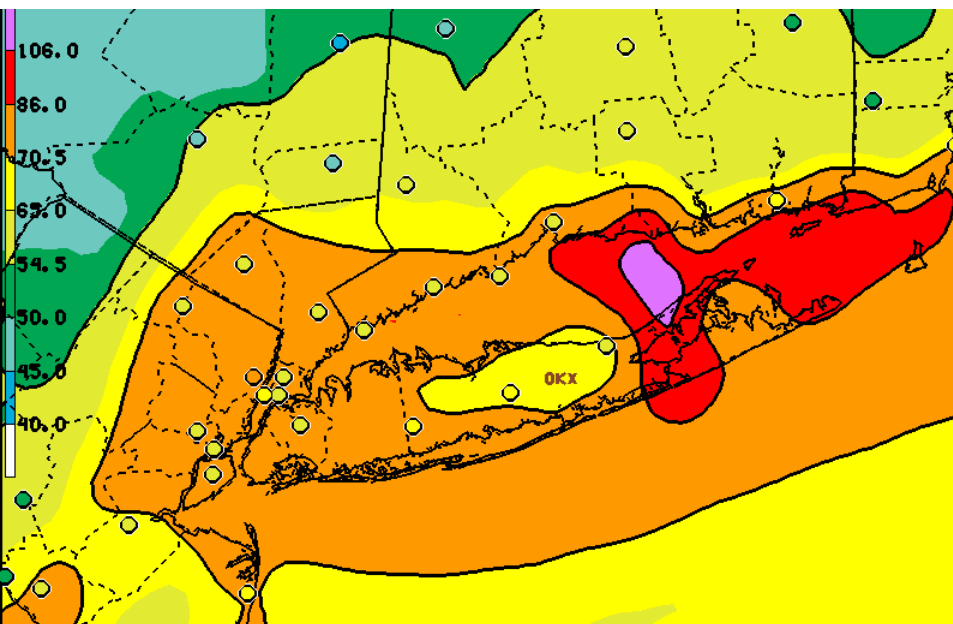
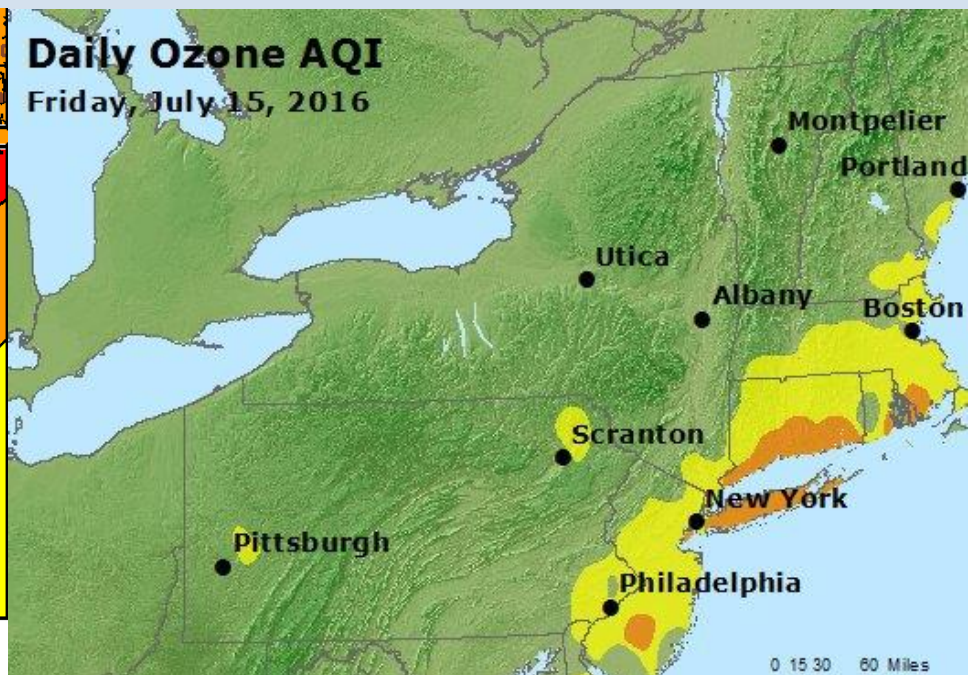
# July 15-16, 2016 NOAA Model Performance



PROD DAY1 OZMX08 0 20160715 06Z CYC-

## Daily Ozone AQI

Friday, July 15, 2016



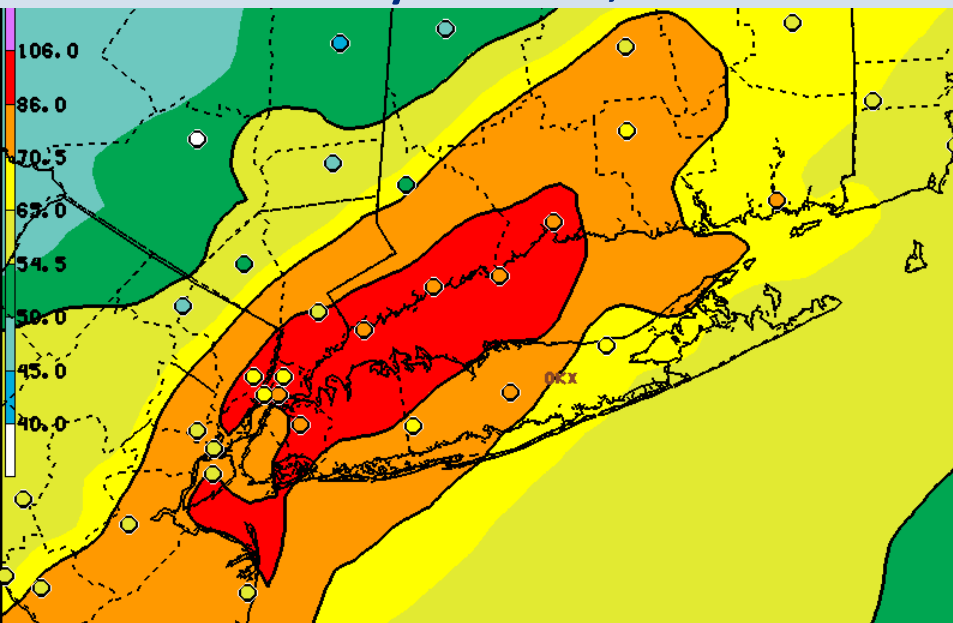
PROD DAY1 OZMX08 0 20160716 06Z CYC-

## Daily Ozone AQI

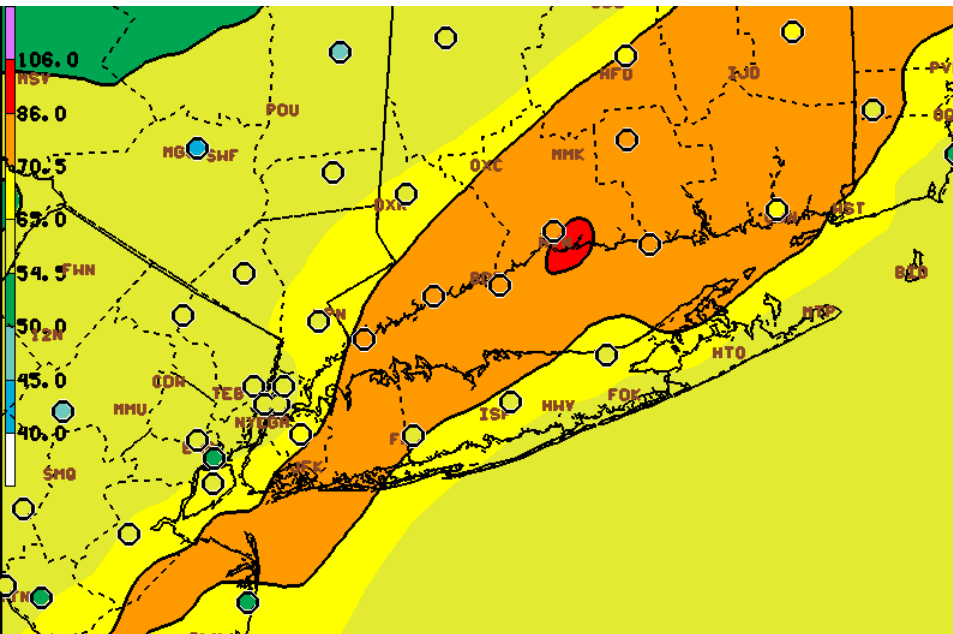
Saturday, July 16, 2016



# July 17-18, 2016 NOAA Model Performance



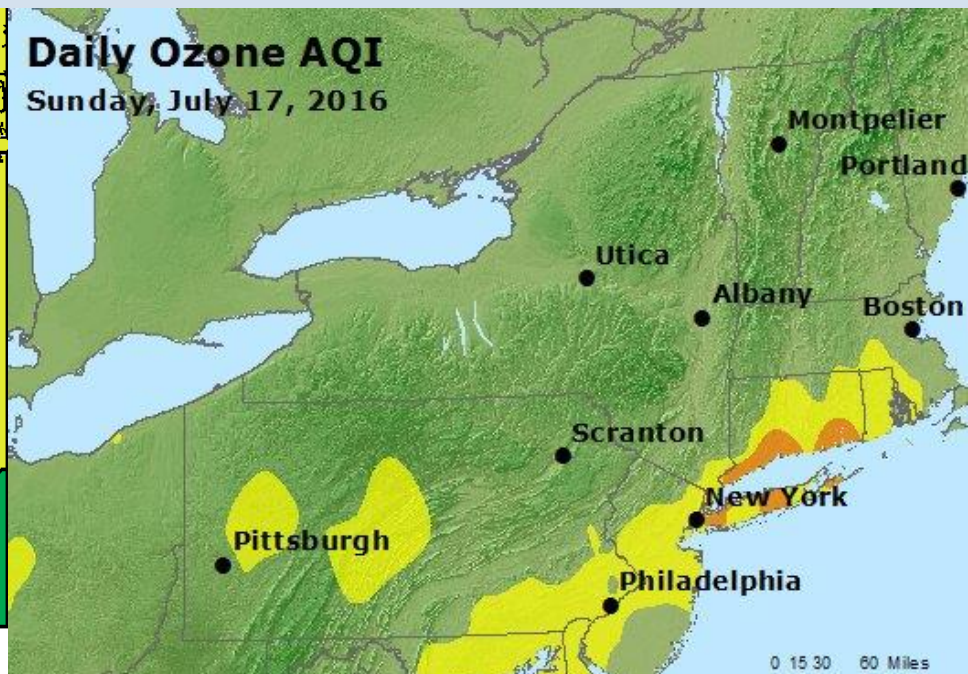
PROD DAY1 OZHX08 0 20160717 06Z CYC-



PROD DAY1 OZHX08 0 20160718 06Z CYC-

## Daily Ozone AQI

Sunday, July 17, 2016



## Daily Ozone AQI

Monday, July 18, 2016



# Conclusion

- 4 day USG event for Connecticut;
- Cold front approached and got hung up over CT on Sunday, allowing for ozone to accumulate over LIS.
- Warm front broke through on Monday allowing for west to southwest transport flow to CT coastal monitors, while monitors in NJ and NY stayed below USG, possibly due to low level mixing of maritime air.
- Strong cold front passed through on Tuesday, putting an end to the ozone episode for Connecticut.
- NOAA model is still over predicting (10 ppb+) when LIS plume is showing code red. It is much closer at lower levels (USG).

