2007
AQI Forecasting

Jeanne Worthen
Michael Geigert

SIPRAC Meeting

May 10, 2007

May 1st 2007 – Ozone Forecasting Begins

- 1-hour ozone forecast issued for regulated community with emergency engines
  - Phone recording: (860)424-4167, dial 1 for 1-hour forecast
  - Email list serve
  - Web Page: www.ct.gov/dep/aqi

New DEP Website

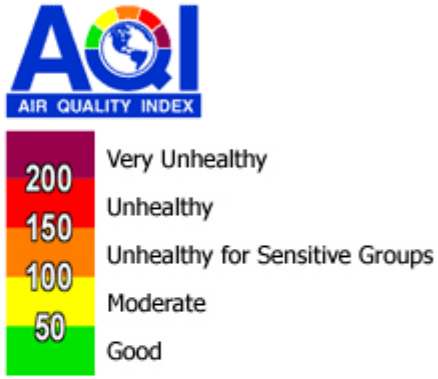
Forecast on Web

Air Quality Index (AQI)

The U. S. Environmental Protection Agency (EPA) has provided a scale called the Air Quality Index (AQI) for rating air quality. This scale is based on the National Ambient Air Quality Standards (NAAQS). The AQI is not routinely updated on weekends and during holiday periods. On those days, please call the **Air Quality Index Hotline at (800) 249-1234 or (860) 424-4167** for the most current air quality information.

Tuesday, May 08, 2007

Yesterday's Air Quality	**Good**
Today's Air Quality	**Good**
Tomorrow's Forecasted Air Quality	**Good**



Annual summary of 8-hour and 1-hour ozone daily maximums

Tips for ozone action days

One-hour Ozone Forecast **(for Regulated Community)**

Health Effects Statements

Cautionary Statements

Predicted Daily AQI Maximums for **Tuesday, May 08, 2007** as of 2 p.m. (NA = Not Available)			
Town	Fine Particles ($PM_{2.5}$)	Ozone (O_3)	Sulfur Dioxide (SO_2)

Forecast on Web

Daily One-Hour Ozone Forecast

The one-hour forecast for Wednesday, May 09, 2007 is Good

Under regulations administered by the Bureau of Air Management, the regulated community (i.e., industry) uses the one-hour forecast to determine whether they may operate **emergency engines** (usually diesel powered generators) for routine, scheduled testing or maintenance. If a one-hour ozone forecast contains the index label *moderate to unhealthful*, *unhealthful*, or *very unhealthful*, then the regulated community is restricted from operating engines except in cases where an actual **emergency** exists. The owner or operator of an emergency engine or other combustion source is also subject to any additional limitations set forth in an applicable permit, general permit registration or state order.

The restriction on emergency engines ensures lower emissions of Nitrogen Oxides (NOx) (which contributes to the development of ozone) on high ozone days.

Under section 22a-174-22(a)(2) of the Regulations of Connecticut State Agencies, **"emergency engine"** means a stationary reciprocating engine or a turbine engine which is used as a means of providing mechanical or electrical power only during periods of testing and scheduled maintenance or during either an emergency or in accordance with a contract intended to ensure an adequate supply of electricity for use within the state of Connecticut during the loss of electrical power derived from nuclear facilities. The term [emergency engine] does not include an engine for which the owner or operator of such

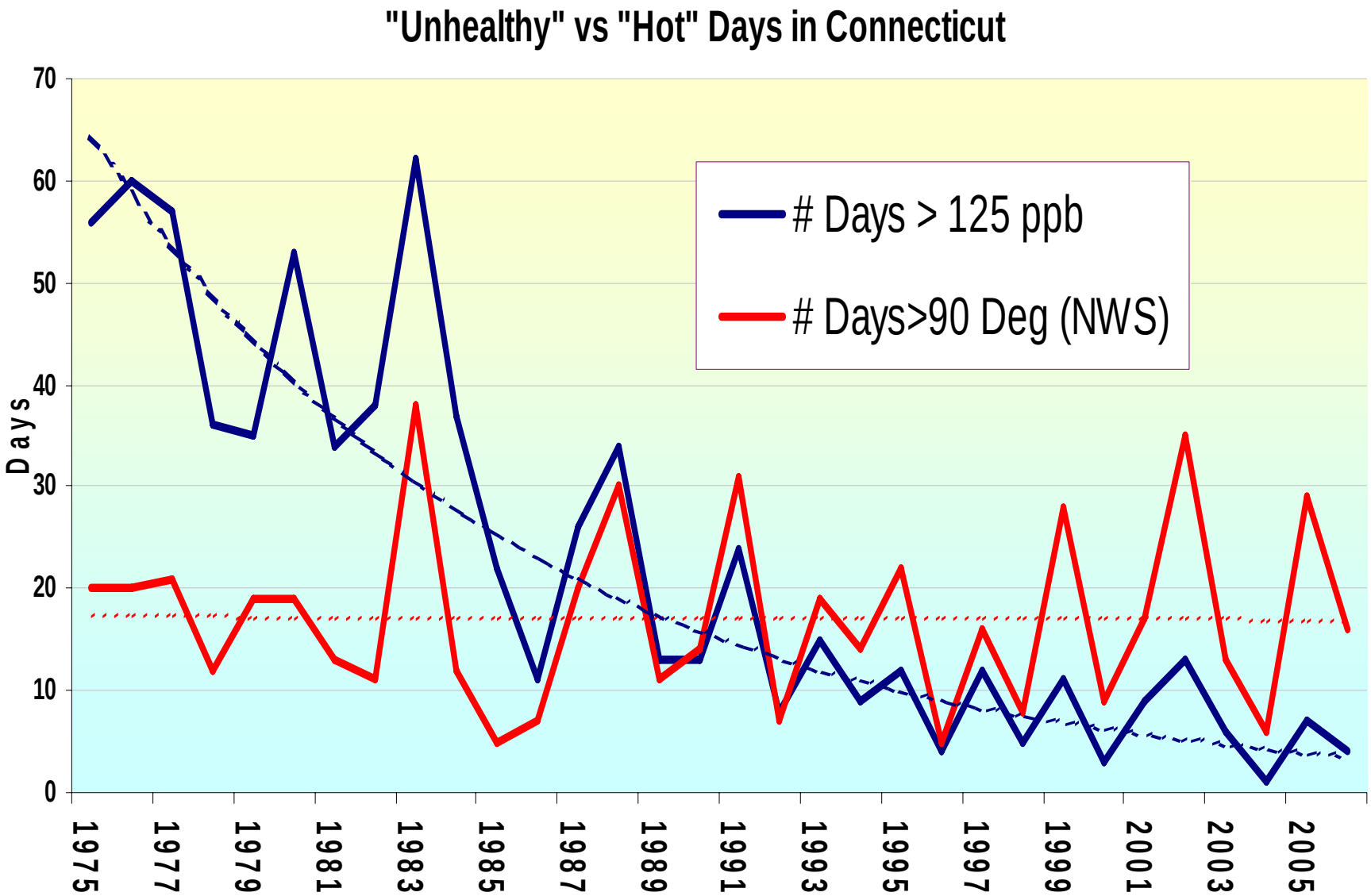
8-hour ozone forecast

- 8-hour ozone forecast issued for peaking units pursuant to NOx trading orders
  - Phone recording: (860)424-4167, dial 2 for 8-hour forecast
  - Email list serve
  - Web Page: at current time, not posted on web

2006 was a cleaner summer than 2005…

4 1-hour Exceedances

13 8-hour Exceedances


"Unhealthy" vs "Hot" Days in Connecticut
Days > 125 ppb
Days>90 Deg (NWS)
Days
70
60
50
40
30
20
10
0
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005

Forecasted 1-hour Average Days "Unhealthful"

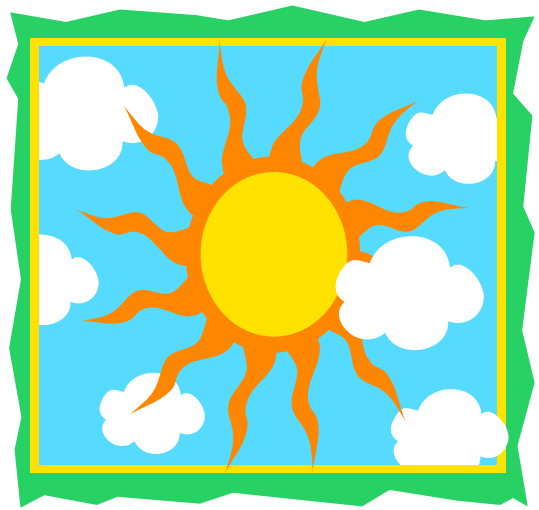
- June 18
- July 17, 18
- Aug 1, 2, 3

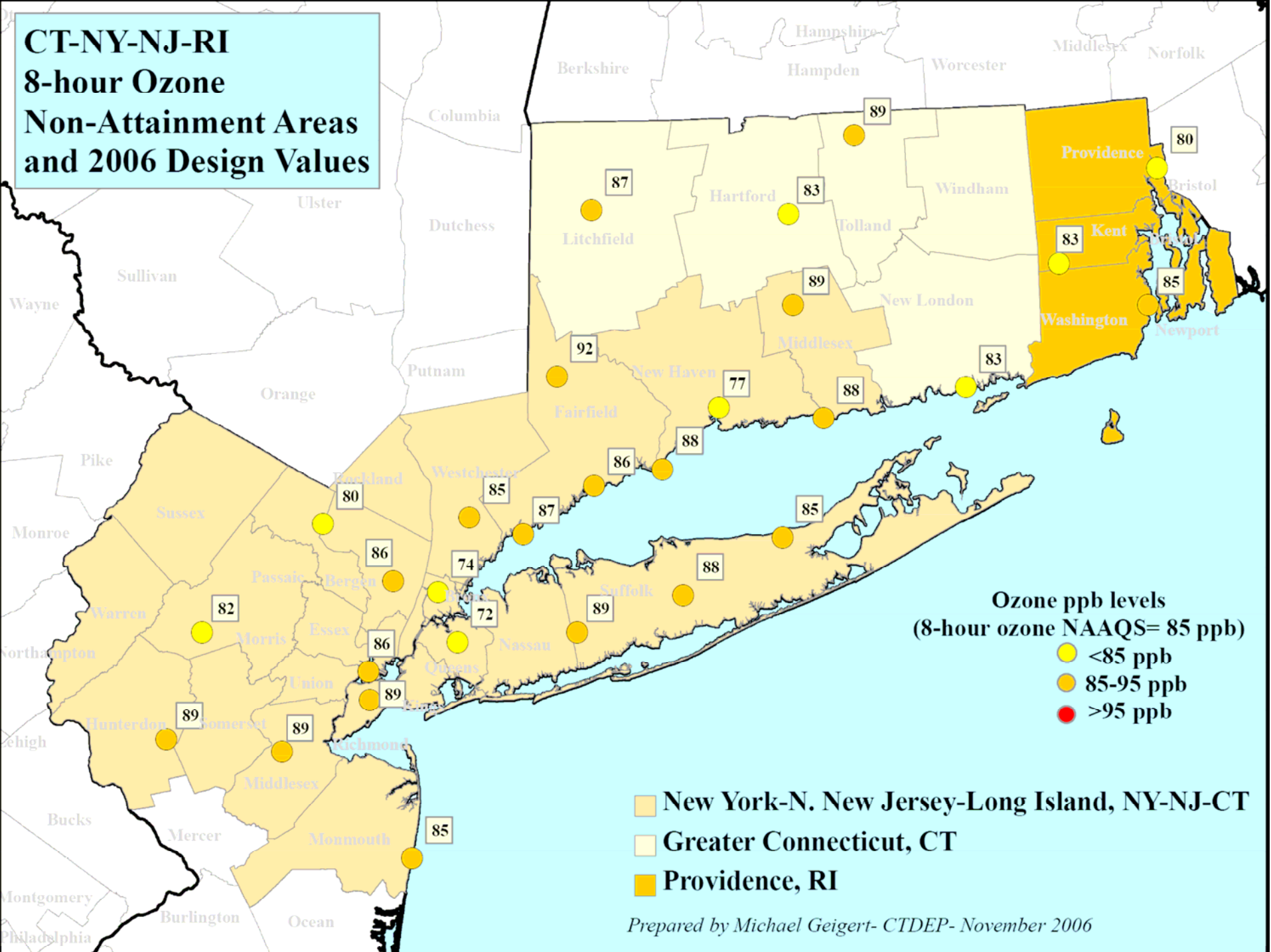
Actual 1-hour Average Days "Unhealthful"

- June 18
- July 17, 18
- August 1

8-hour Exceedances

- May 29
- June 18, 19, 22
- July 2, 10, 17, 18, 26
- August 1, 2, 3, 7




CT-NY-NJ-RI
8-hour Ozone
Non-Attainment Areas
and 2006 Design Values
Ozone ppb levels
(8-hour ozone NAAQS= 85 ppb)
<85 ppb
85-95 ppb
>95 ppb
New York-N. New Jersey-Long Island, NY-NJ-CT
Greater Connecticut, CT
Providence, RI
Prepared by Michael Geigert- CTDEP- November 2006
Berkshire
Hampshire
Hampden
Worcester
Middlesex
Norfolk
Columbia
Ulster
Dutchess
Sullivan
Wayne
Orange
Putnam
Pike
Monroe
Sussex
Warren
Northampton
Lehigh
Bucks
Mercer
Montgomery
Burlington
Ocean
Philadelphia
Rockland
Westchester
Passaic
Bergen
Morris
Essex
Union
Hunterdon
Somerset
Middlesex
Monmouth
Bronx
Queens
Nassau
Suffolk
Richmond
Kings
Litchfield
Hartford
Tolland
Windham
Fairfield
New Haven
Middlesex
New London
Providence
Bristol
Kent
Washington
Newport
89
87
83
89
80
83
85
92
77
88
83
88
86
85
87
85
80
86
74
88
82
72
89
86
89
89
89
85

August 1-3, 2006 Connecticut Coastal Ozone Event

August 2, 2006

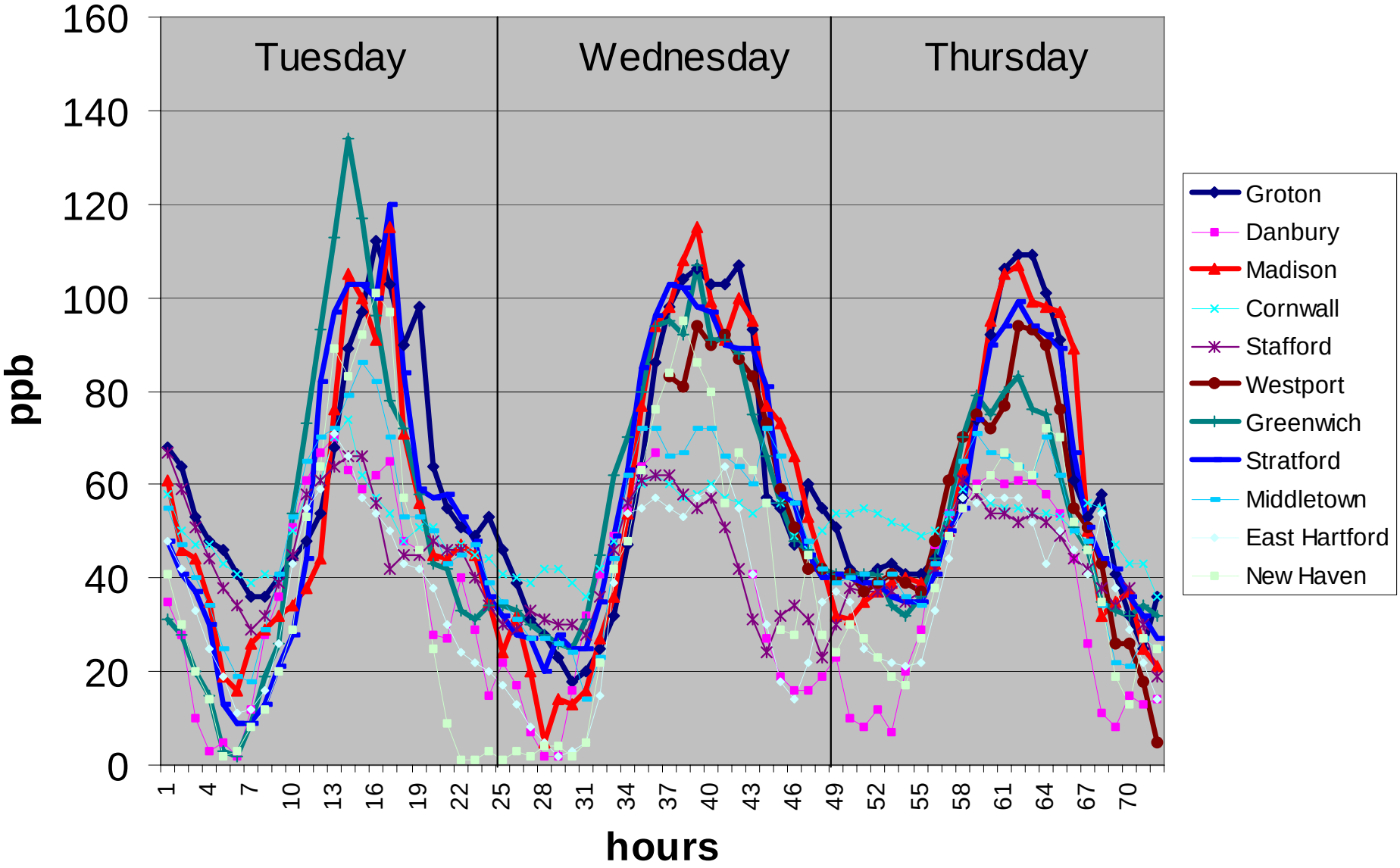
Ozone Monitoring
Sites in Connecticut

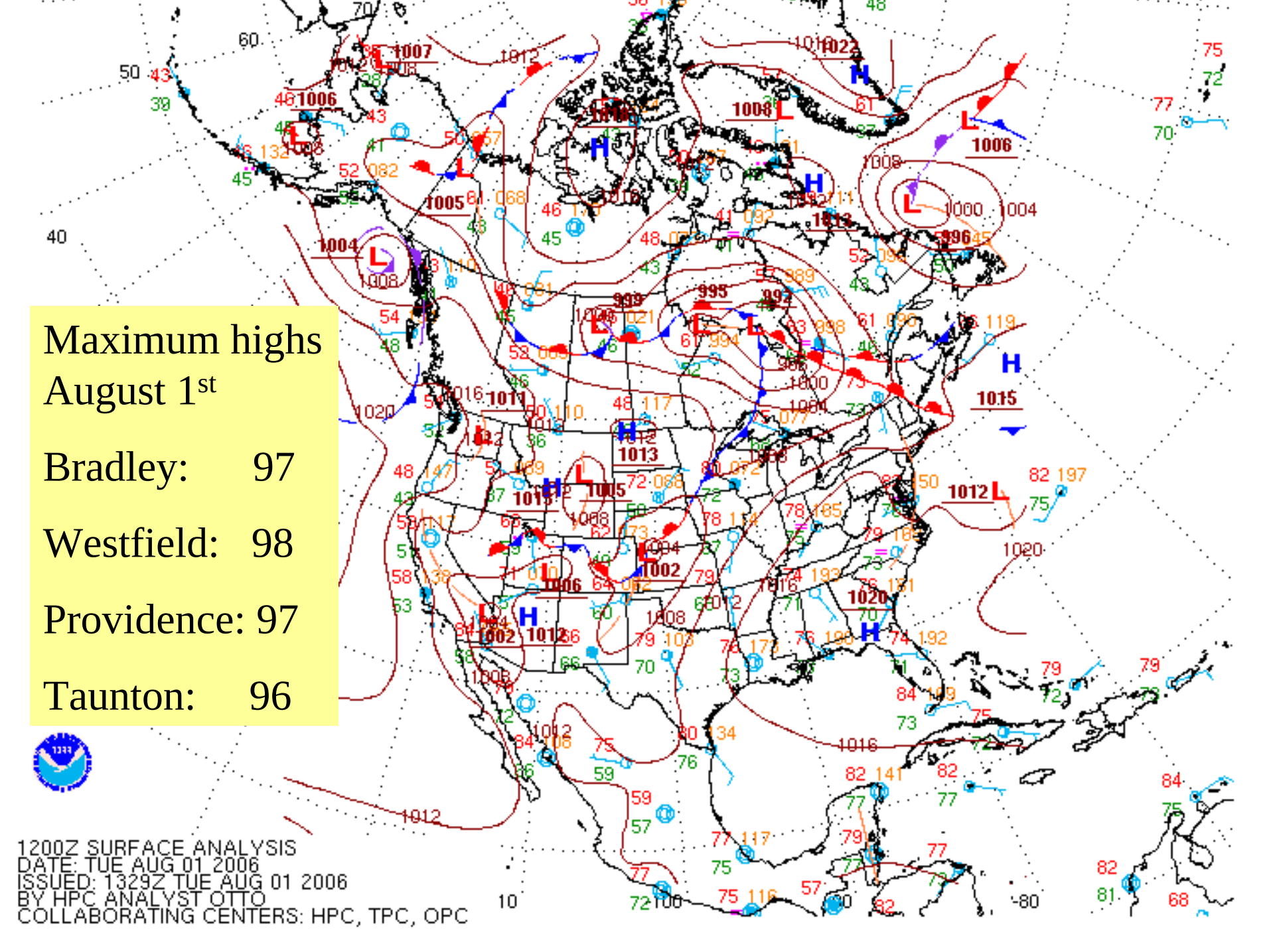
8-hr Ozone Maximums (ppb)

	August 1, 2006	August 2, 2006	August 3, 2006
Groton	90	100	102
Danbury	62	51	58
Madison	82	100	95
Cornwall	60	58	55
Stafford	57	57	54
Westport	--	87	80
Greenwich	97	92	75
Stratford	93	95	87
Middletown	72	68	65
East Hartford	56	56	53
New Haven	79	75	63

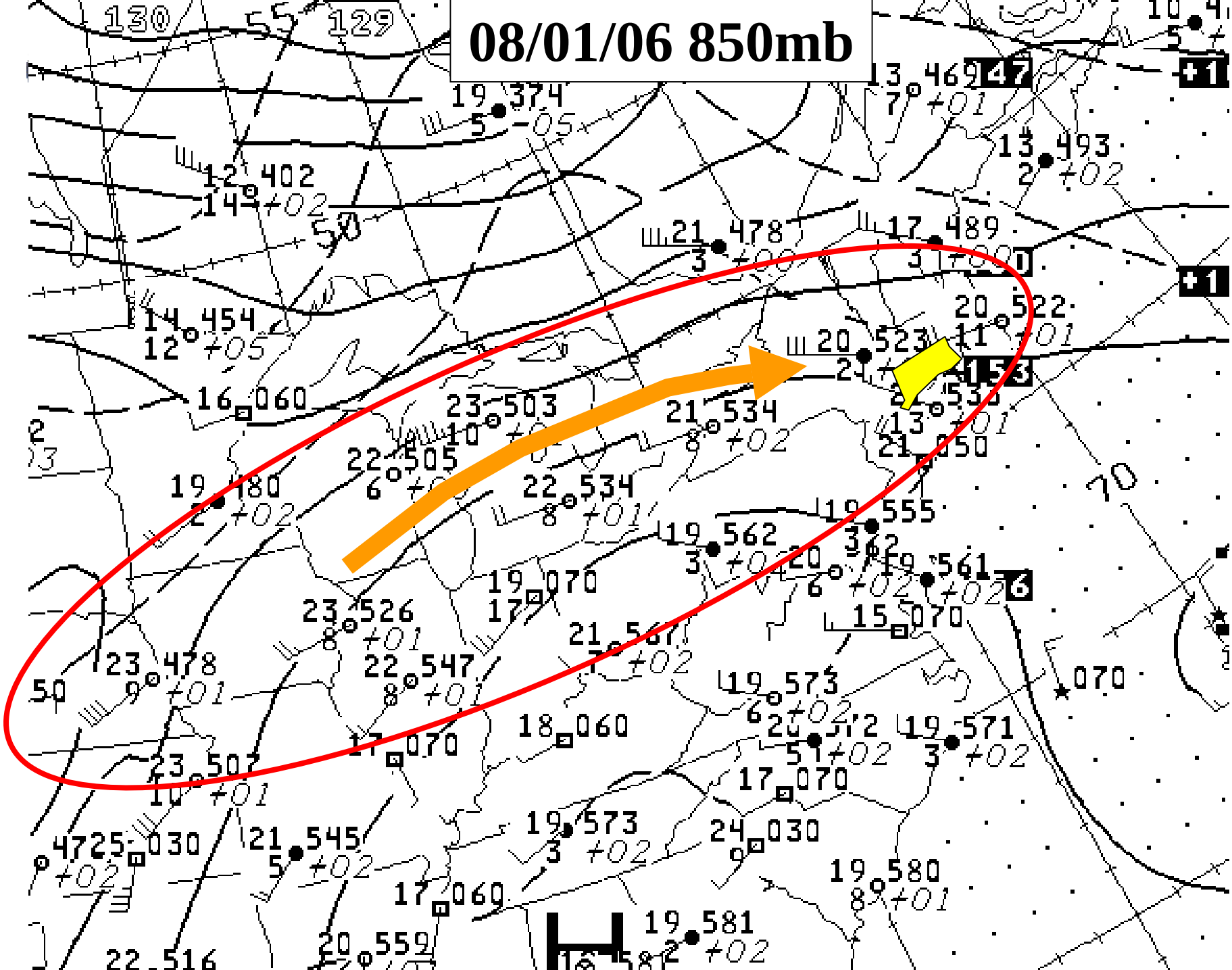
8-hour ozone exceedances only reported at the coastal locations, despite the major heat-wave experienced in the interior of Connecticut.

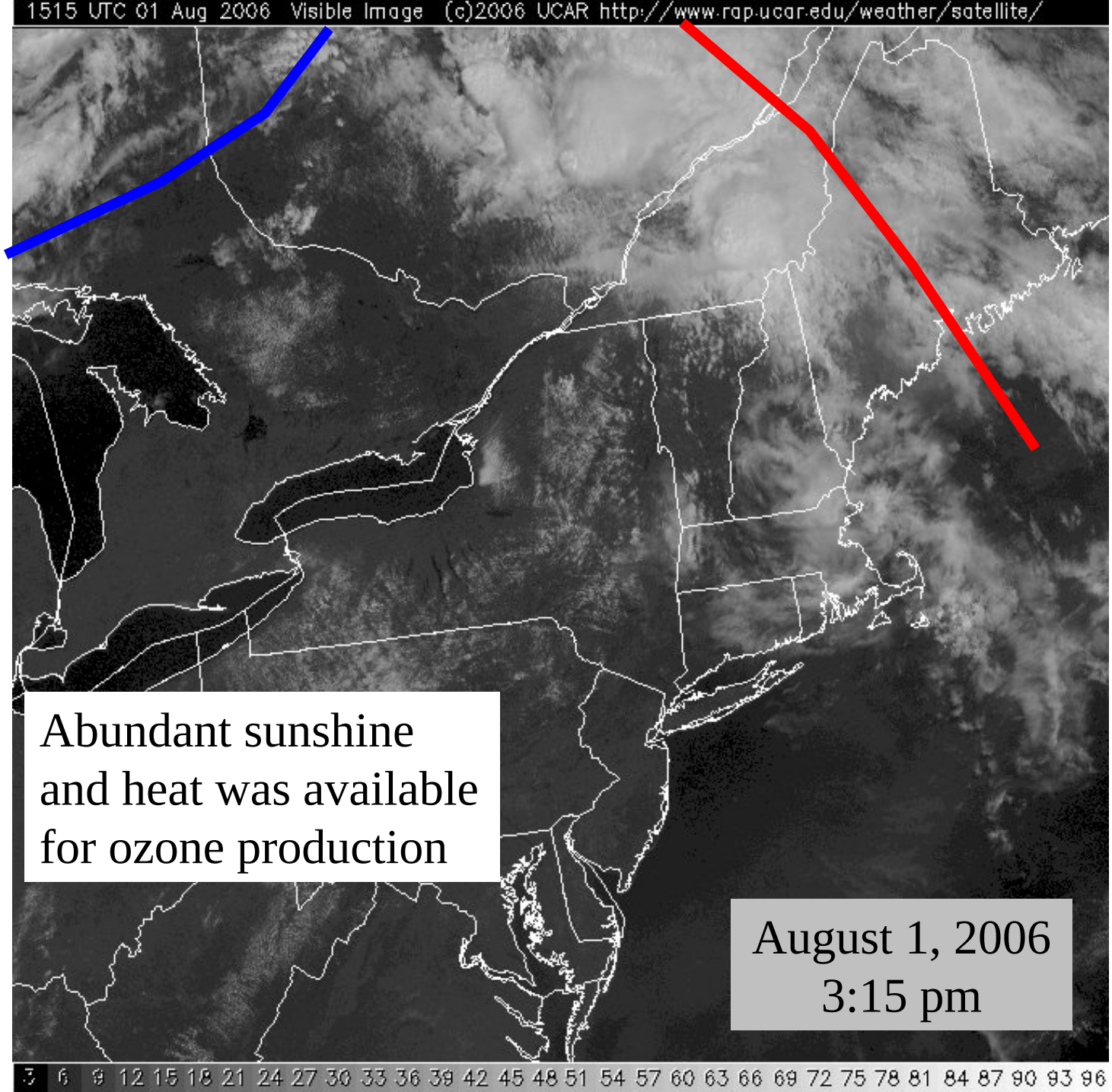
Hourly Ozone August 1-3, 2006
Connecticut Sites

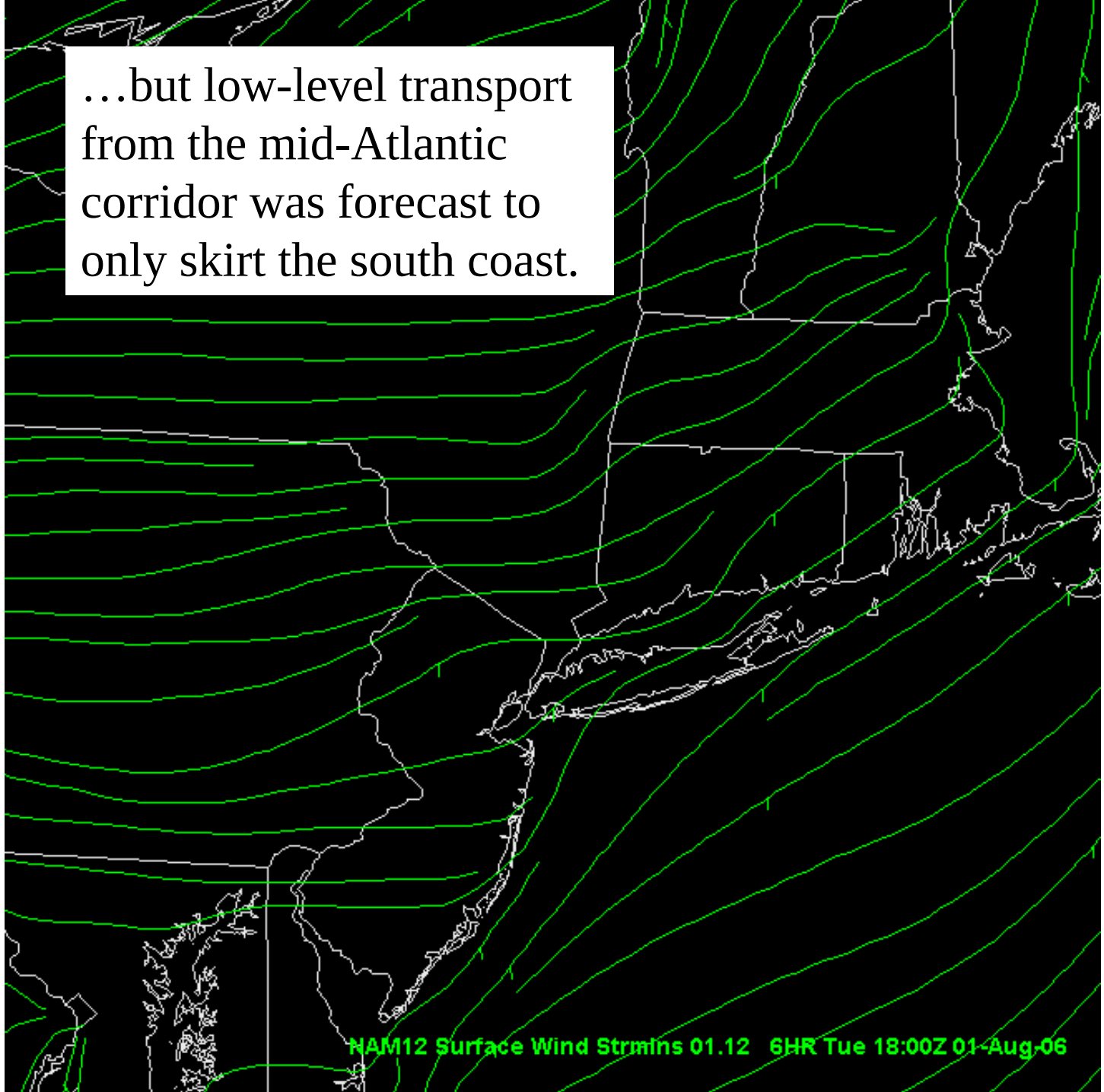



Maximum highs
August 1st
Bradley: 97
Westfield: 98
Providence: 97
Taunton: 96
1200Z SURFACE ANALYSIS
DATE: TUE AUG 01 2006
ISSUED: 1329Z TUE AUG 01 2006
BY HPC ANALYST OTTO
COLLABORATING CENTERS: HPC, TPC, OPC

08/01/06 850mb



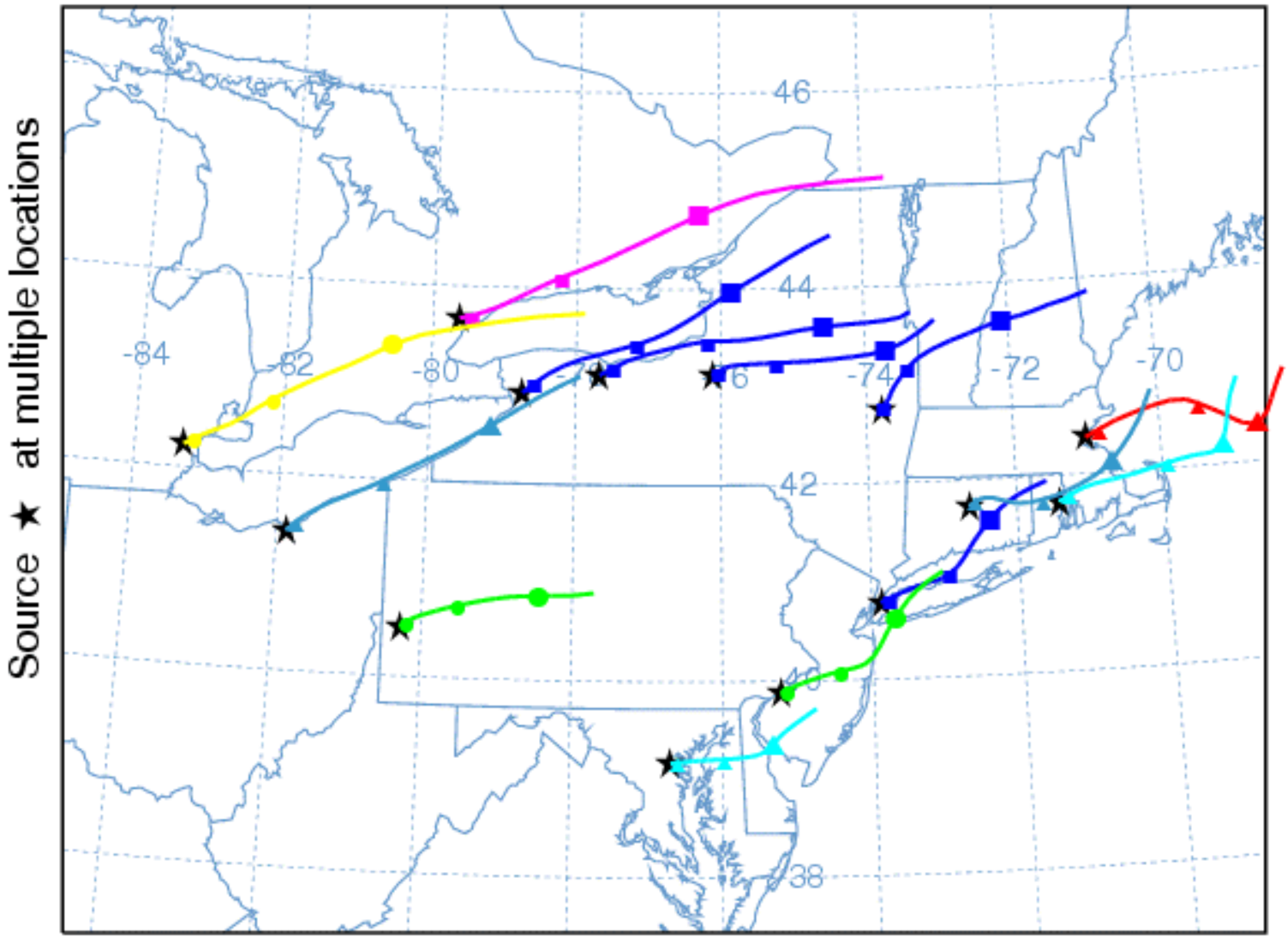

1515 UTC 01 Aug 2006 Visible Image (c)2006 UCAR http://www.rap.ucar.edu/weather/satellite/
Abundant sunshine and heat was available for ozone production
August 1, 2006
3:15 pm
3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78 81 84 87 90 93 96

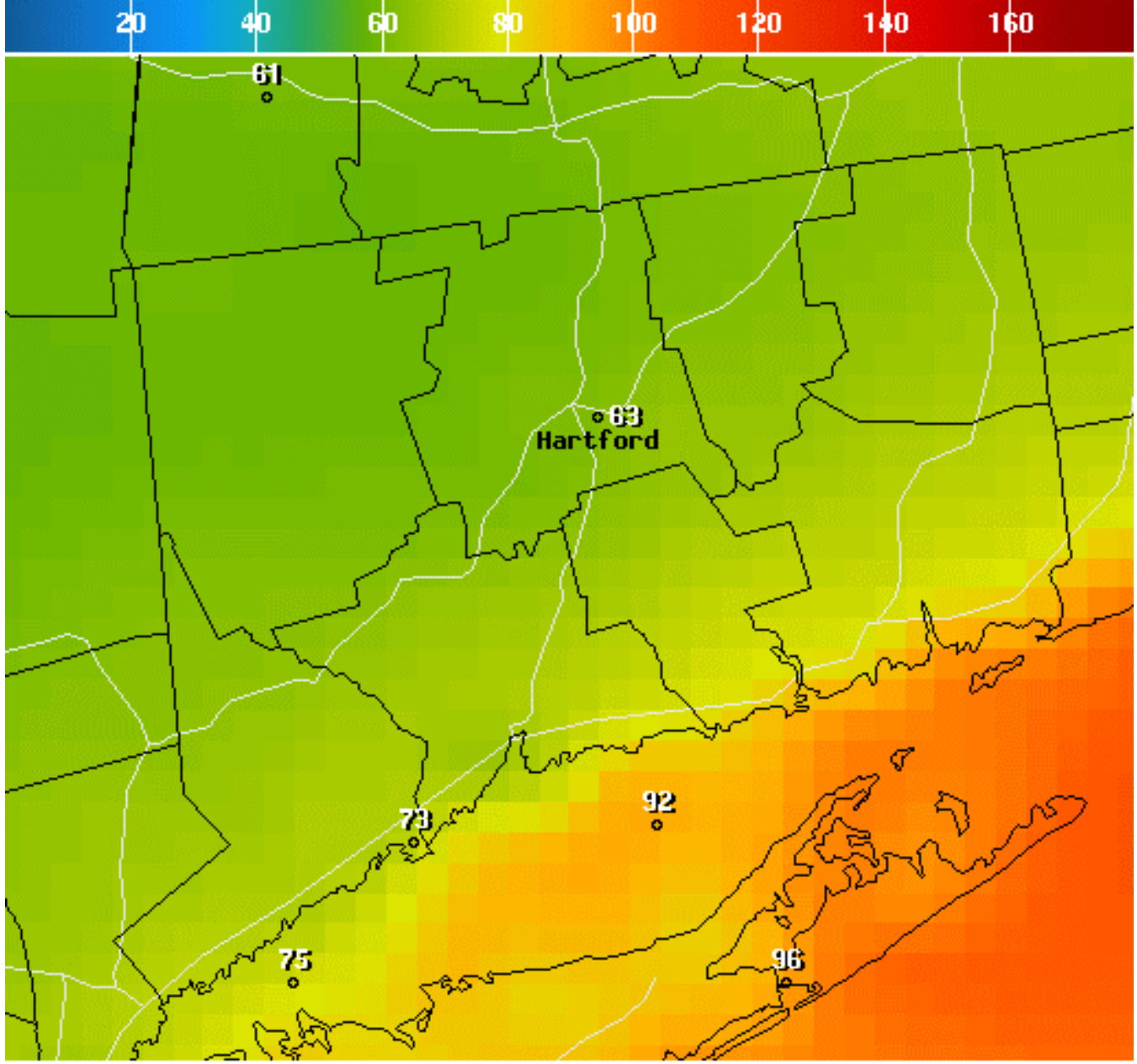

…but low-level transport from the mid-Atlantic corridor was forecast to only skirt the south coast.
NAM12 Surface Wind Strmlns 01.12 6HR Tue 18:00Z 01-Aug-06

NOAA HYSPLIT MODEL source 10 m AGL

Forward trajectories starting at 11 UTC 01 Aug 06

12 UTC 31 Jul NAM Forecast Initialization





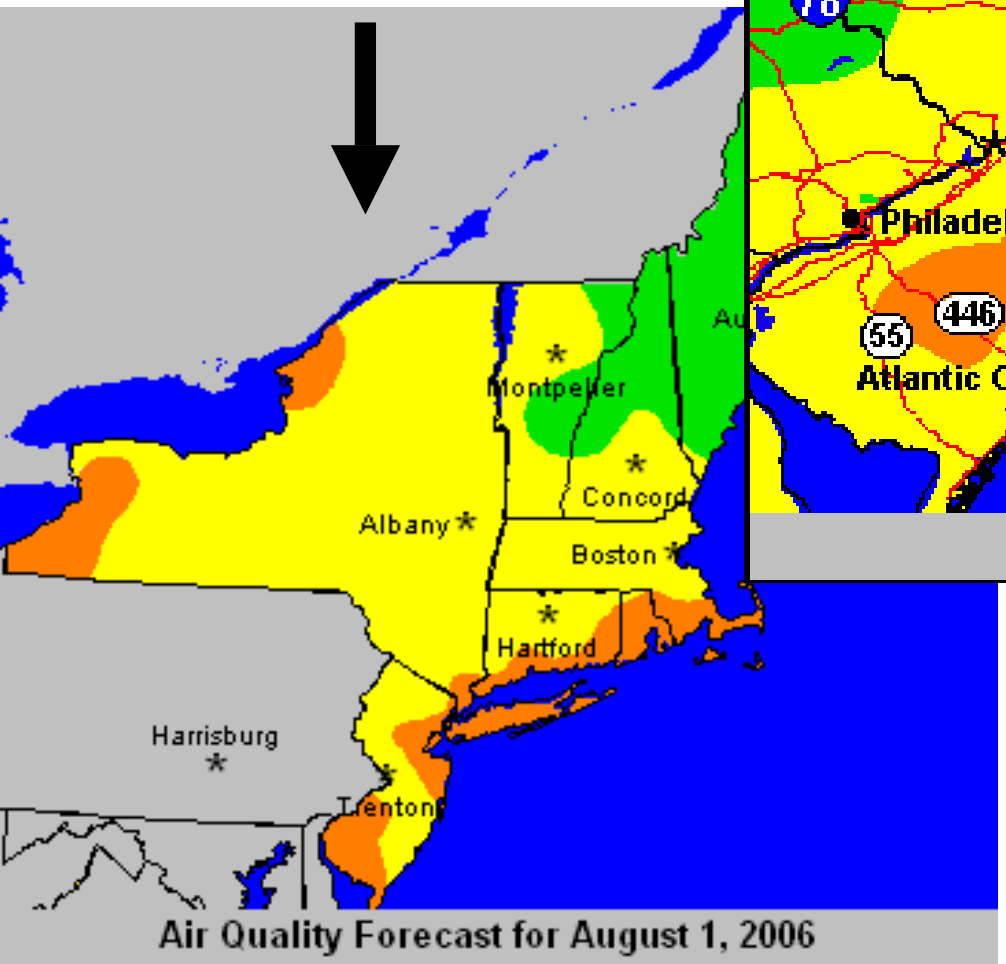
8Hr Avg Ozone Concentration(PPB) Ending Tue Aug 01 2006 8PM EDT

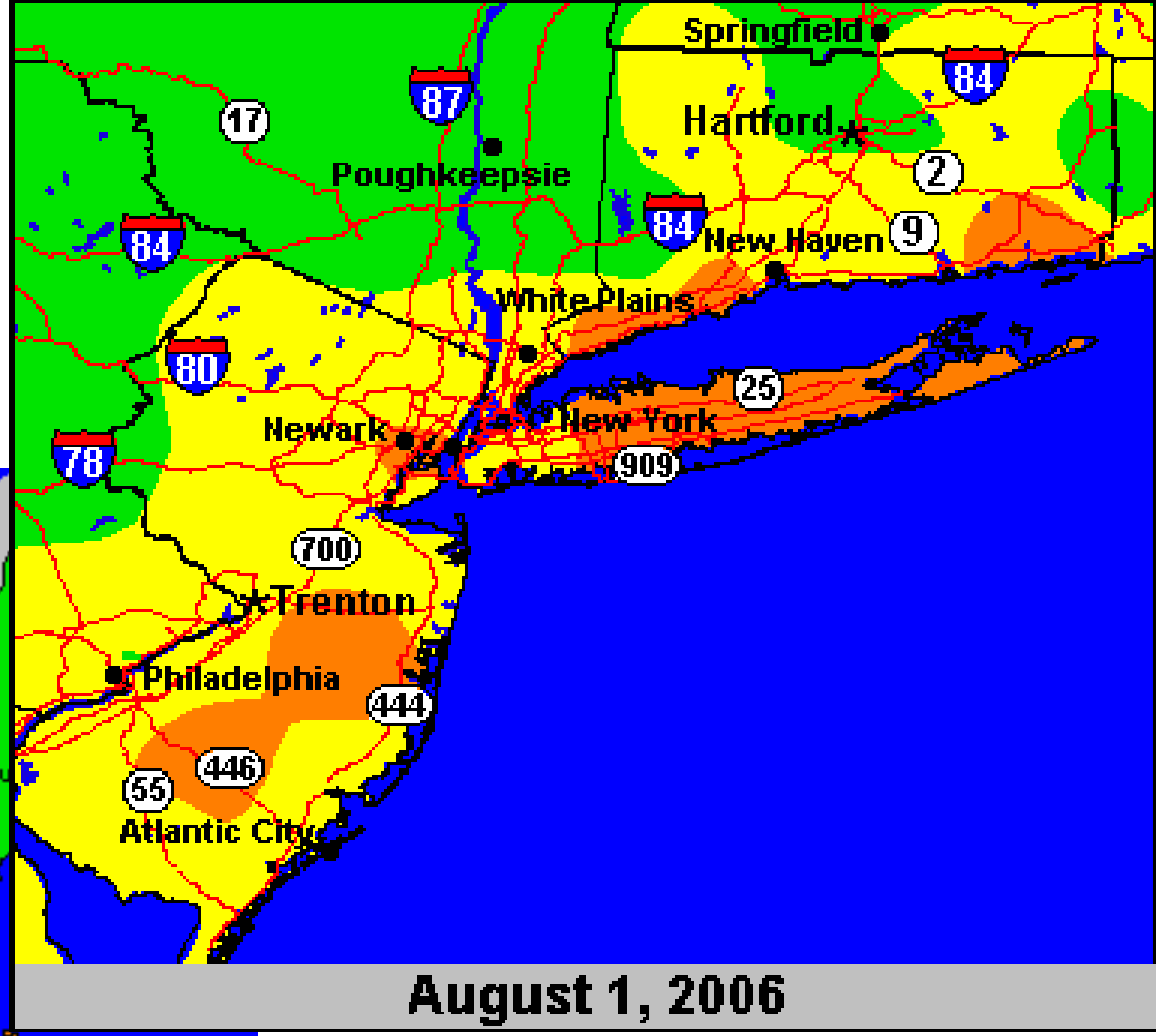
(Wed Aug 02 2006 00Z)

National Digital Guidance Database

06z model run Graphic created-Aug 01 7:27AM EDT

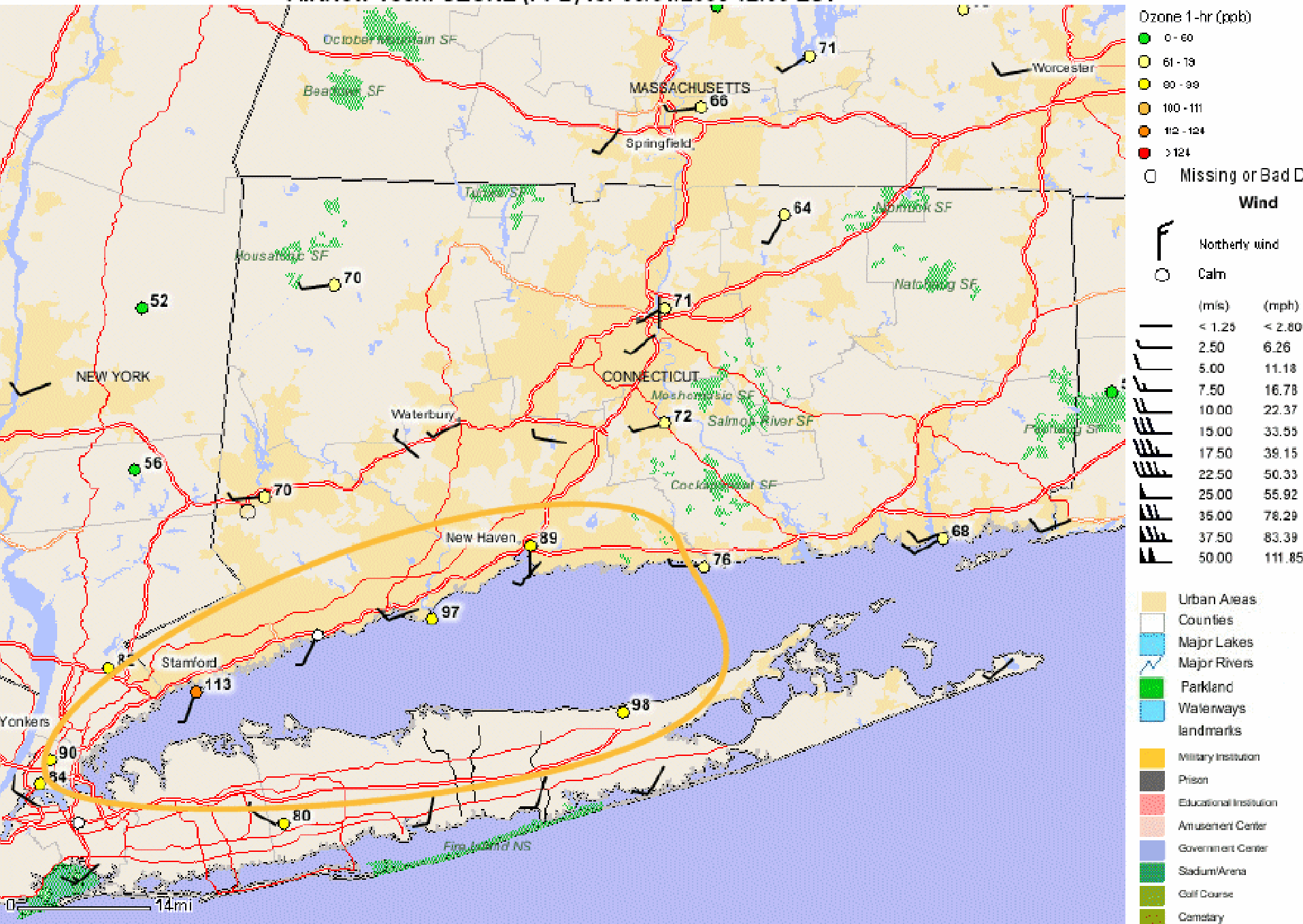
AQI Forecast Made by Local Agencies Using Model Guidance

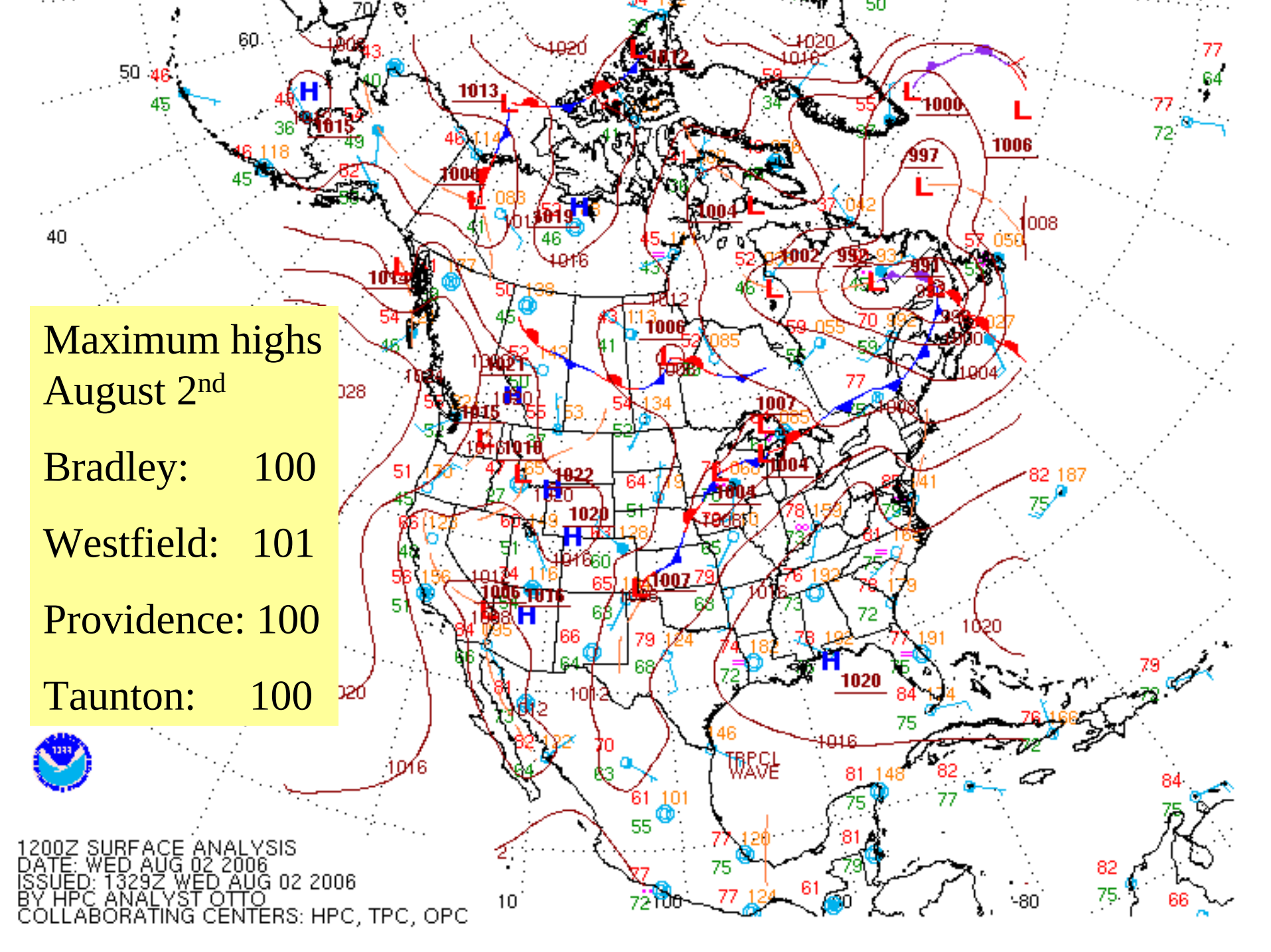


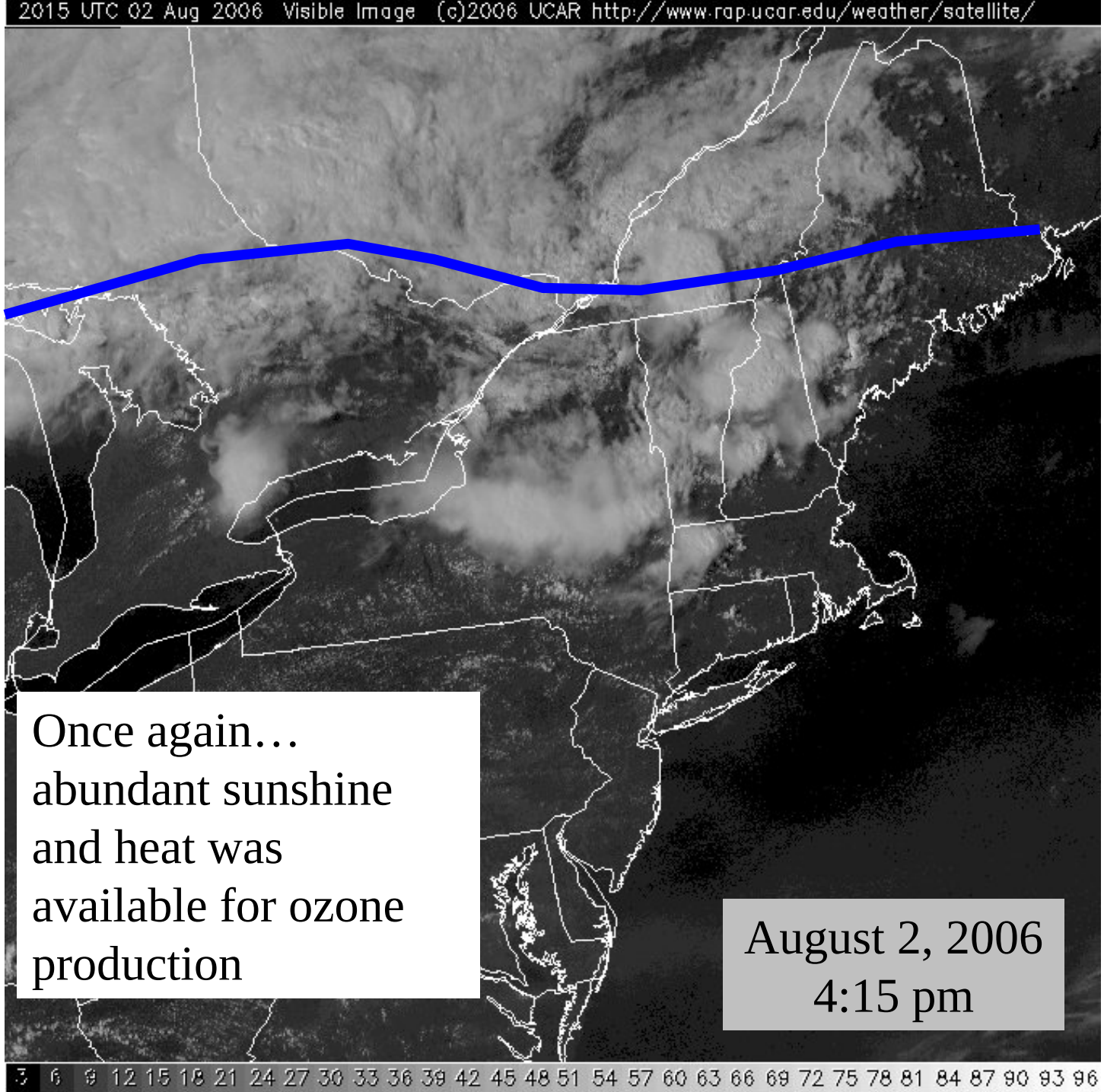


NOAA model missed SW CT, but accurately forecast Long Island

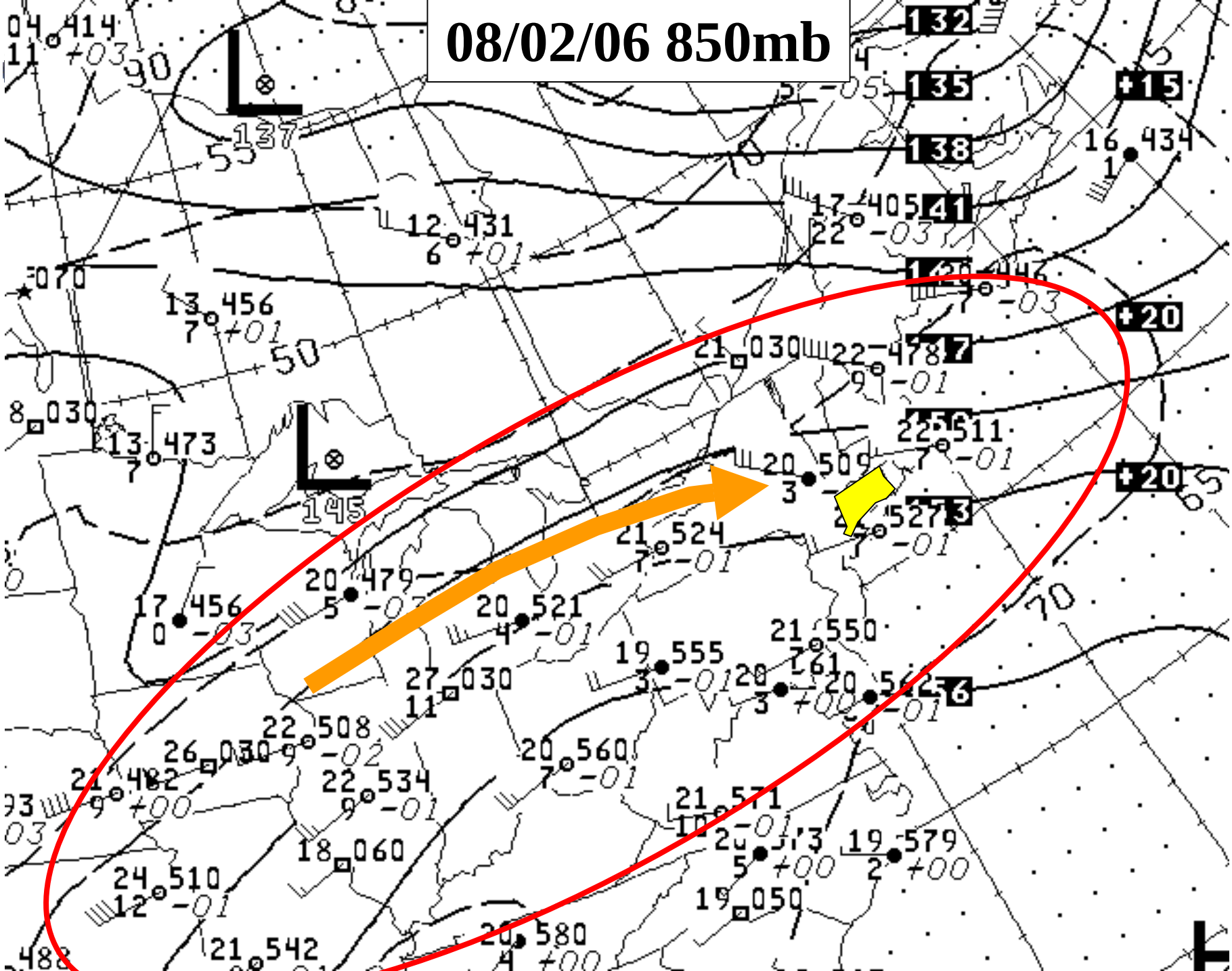
AIRNow-Tech: OZONE (PPB) for 08/01/2006 12:00 EST




Maximum highs
August 2nd
Bradley: 100
Westfield: 101
Providence: 100
Taunton: 100
1200Z SURFACE ANALYSIS
DATE: WED AUG 02 2006
ISSUED: 1329Z WED AUG 02 2006
BY HPC ANALYST OTTO
COLLABORATING CENTERS: HPC, TPC, OPC
TRPCL WAVE


2015 UTC 02 Aug 2006 Visible Image (c)2006 UCAR http://www.rap.ucar.edu/weather/satellite/
Once again… abundant sunshine and heat was available for ozone production
August 2, 2006
4:15 pm
3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78 81 84 87 90 93 96

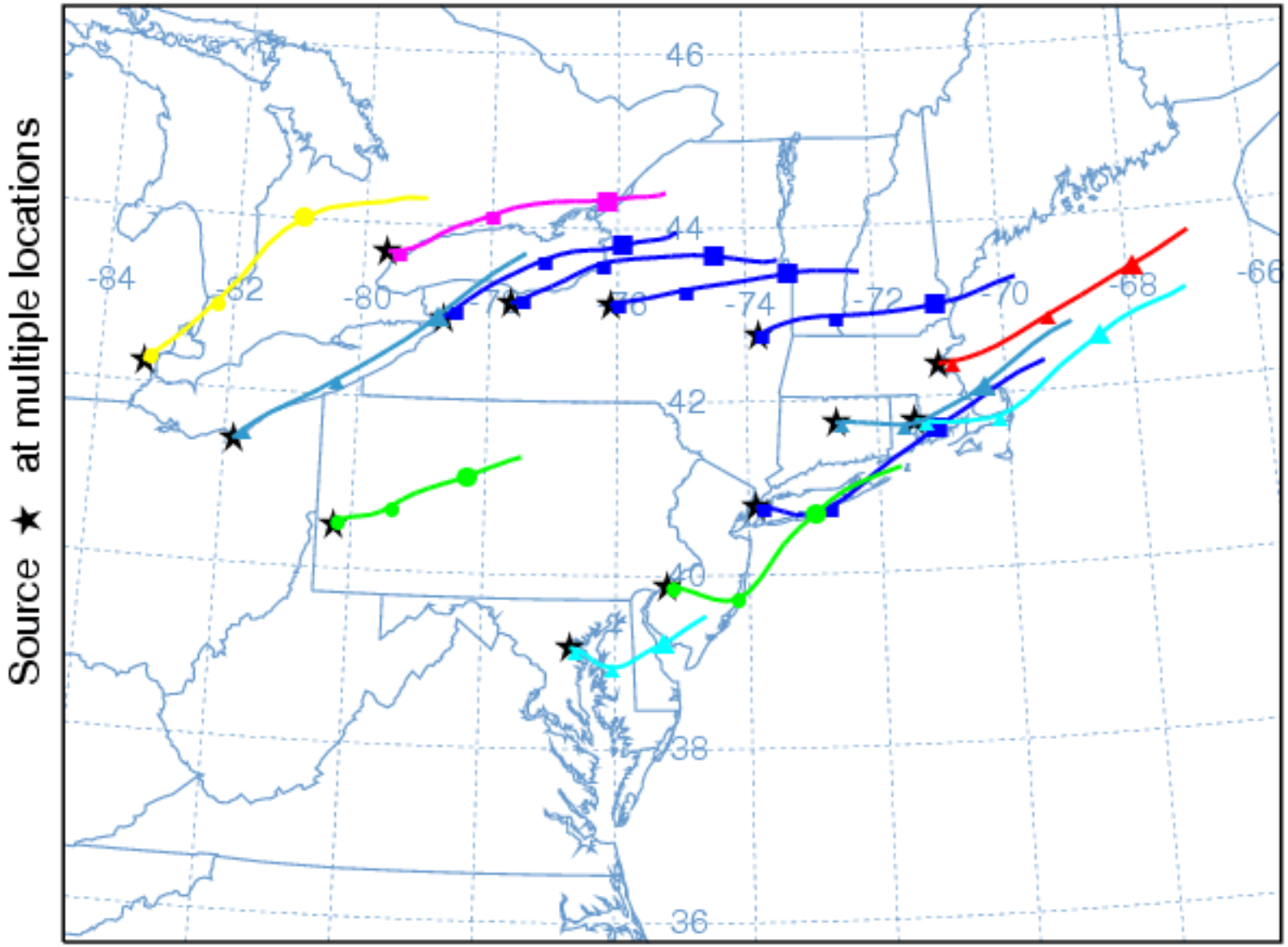
08/02/06 850mb

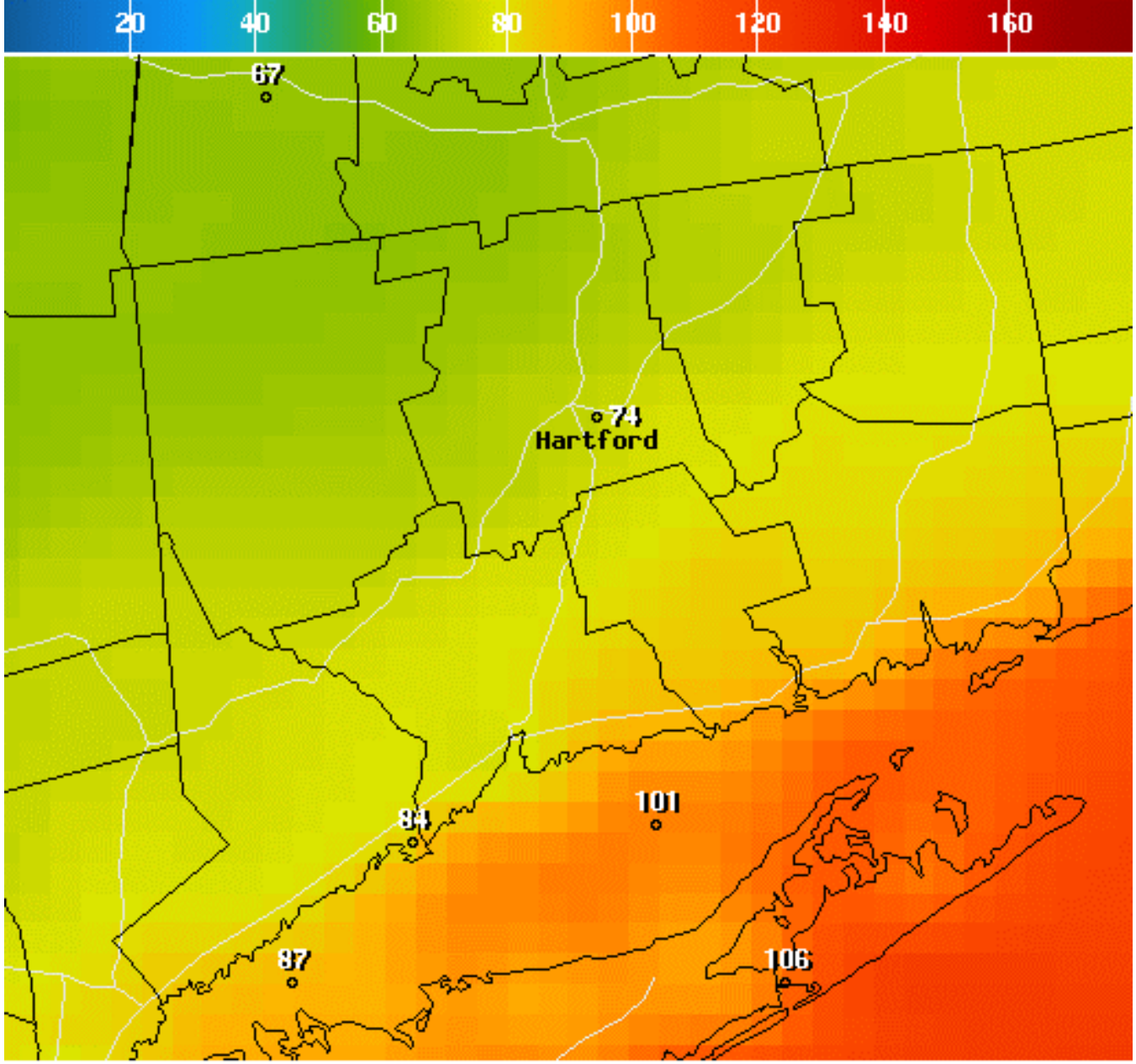


NOAA HYSPLIT MODEL source 10 m AGL

Forward trajectories starting at 11 UTC 02 Aug 06

06 UTC 02 Aug NAM Forecast Initialization





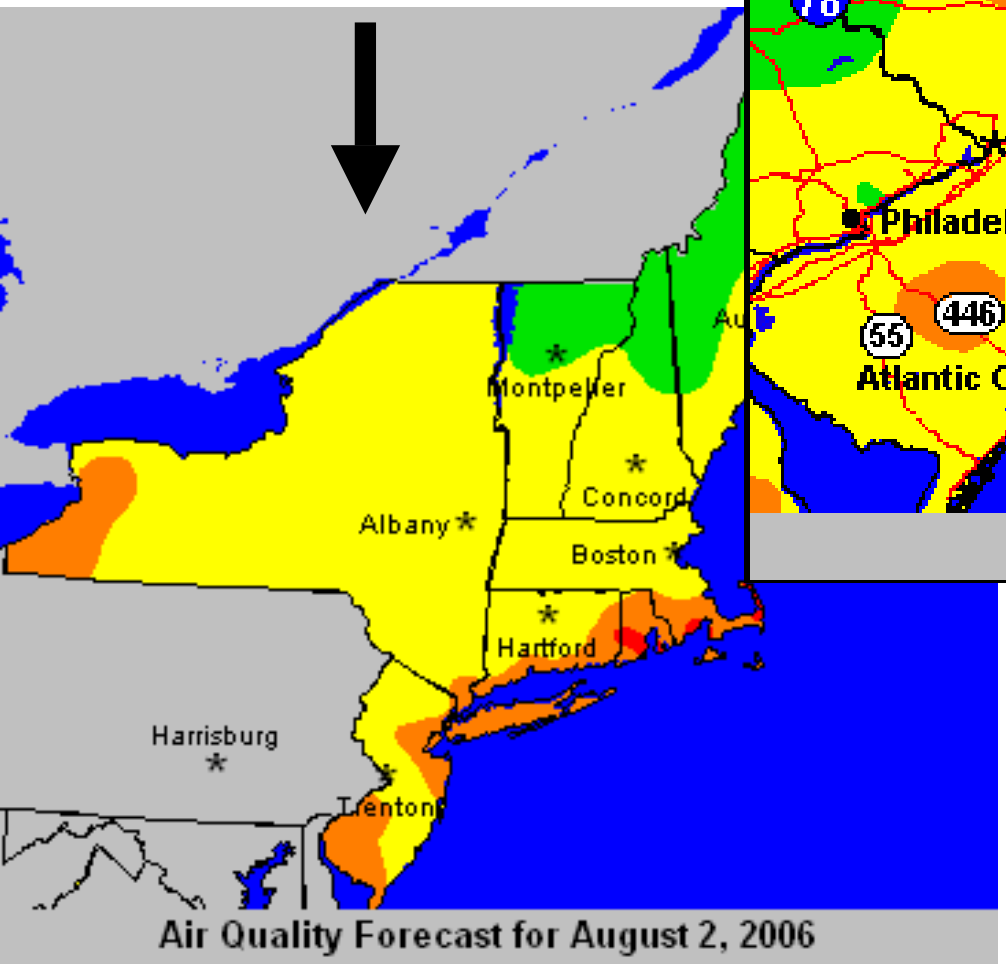
8Hr Avg Ozone Concentration(PPB) Ending Wed Aug 02 2006 8PM EDT

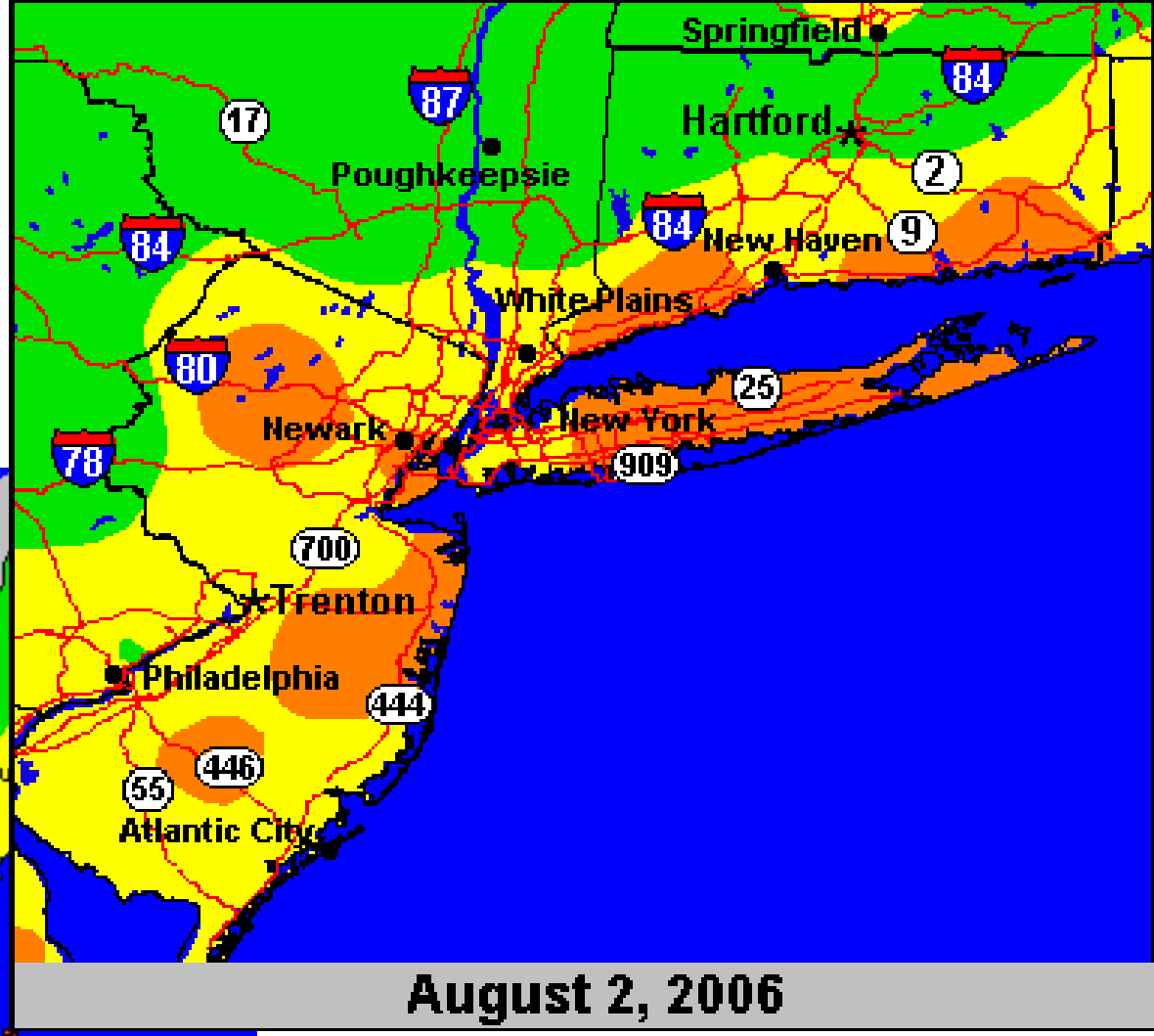
(Thu Aug 03 2006 00Z)

National Digital Guidance Database

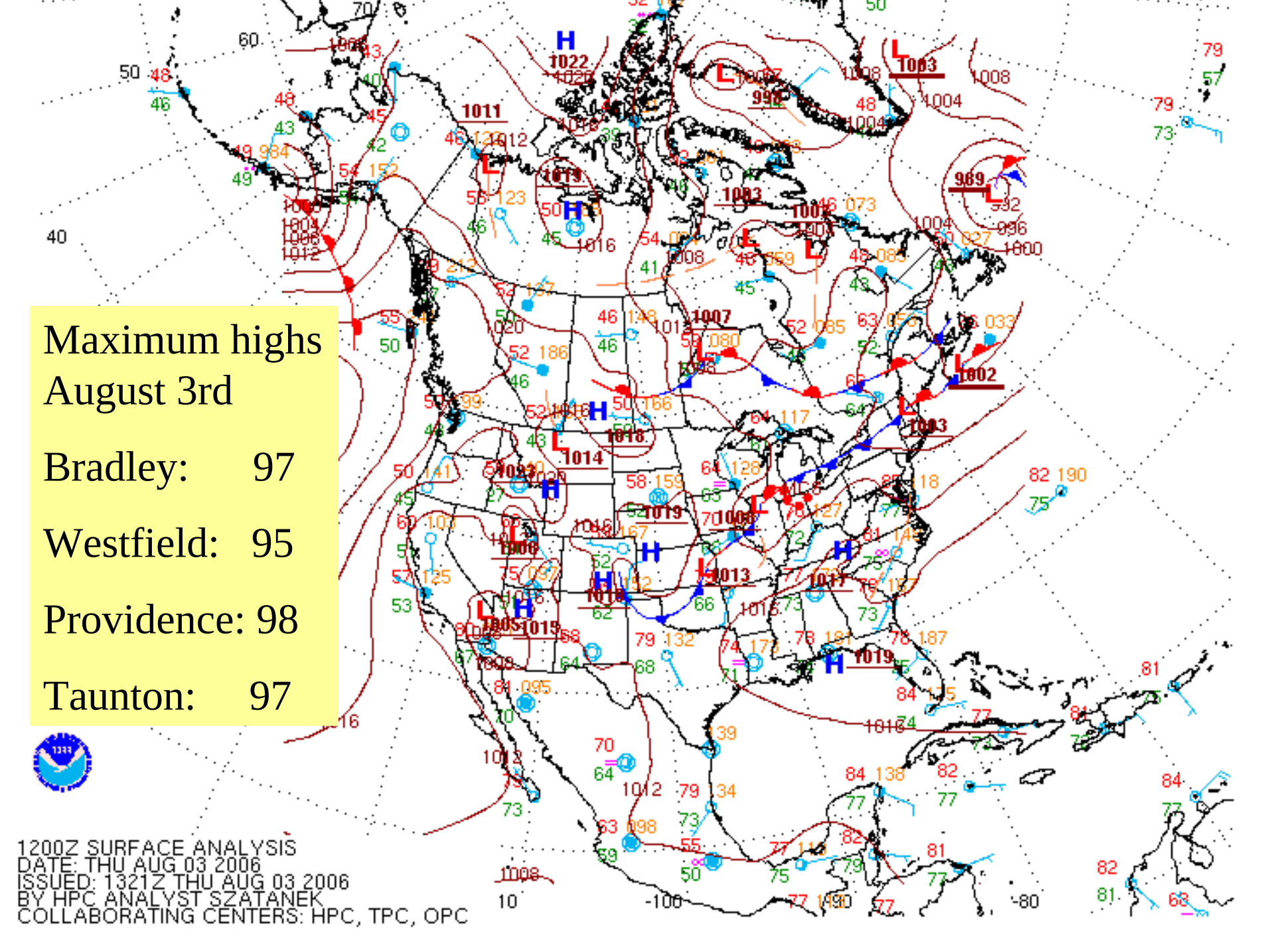
06z model run Graphic created-Aug 02 7:27AM EDT

AQI Forecast Made by Local Agencies Using Model Guidance

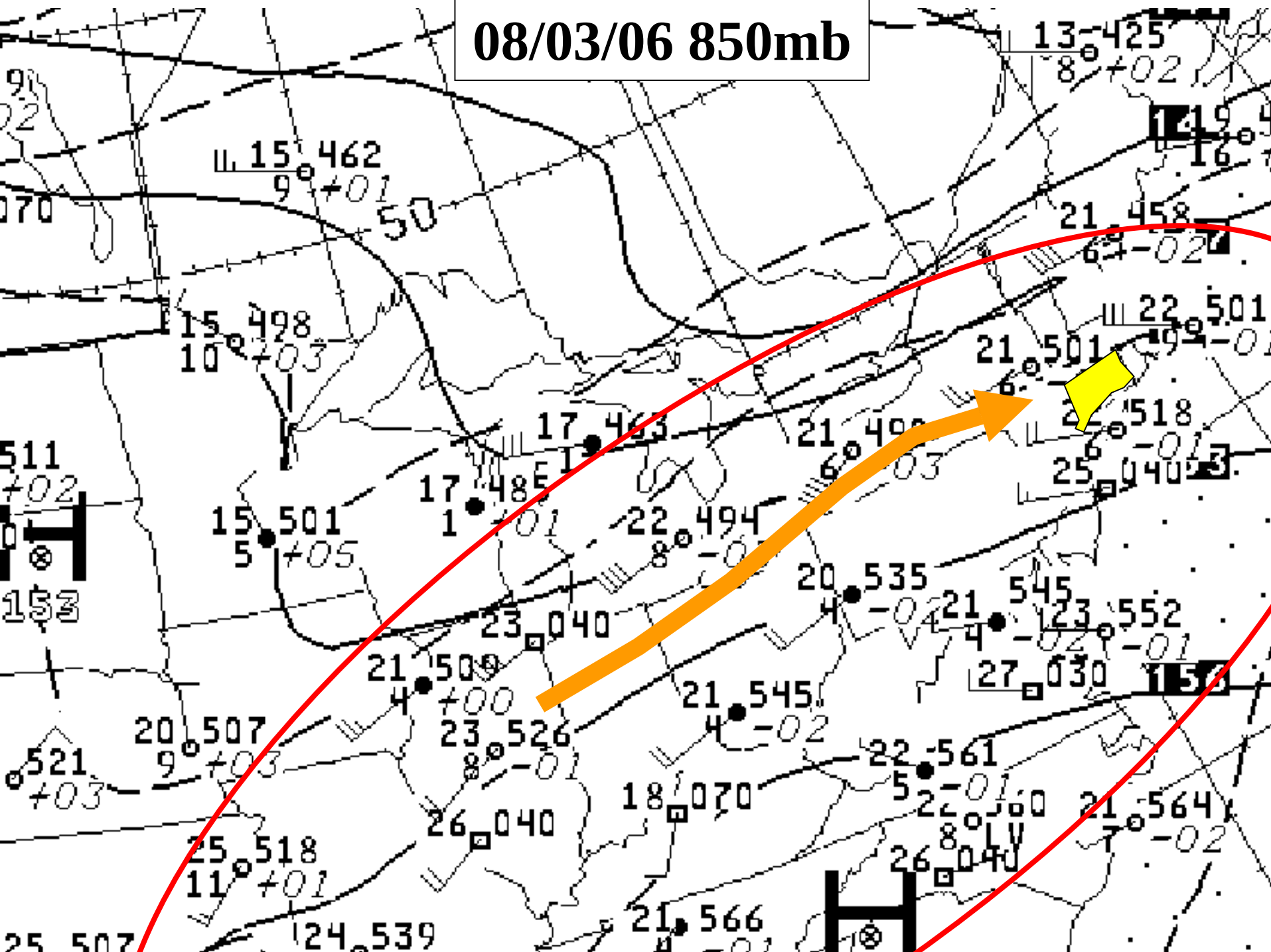


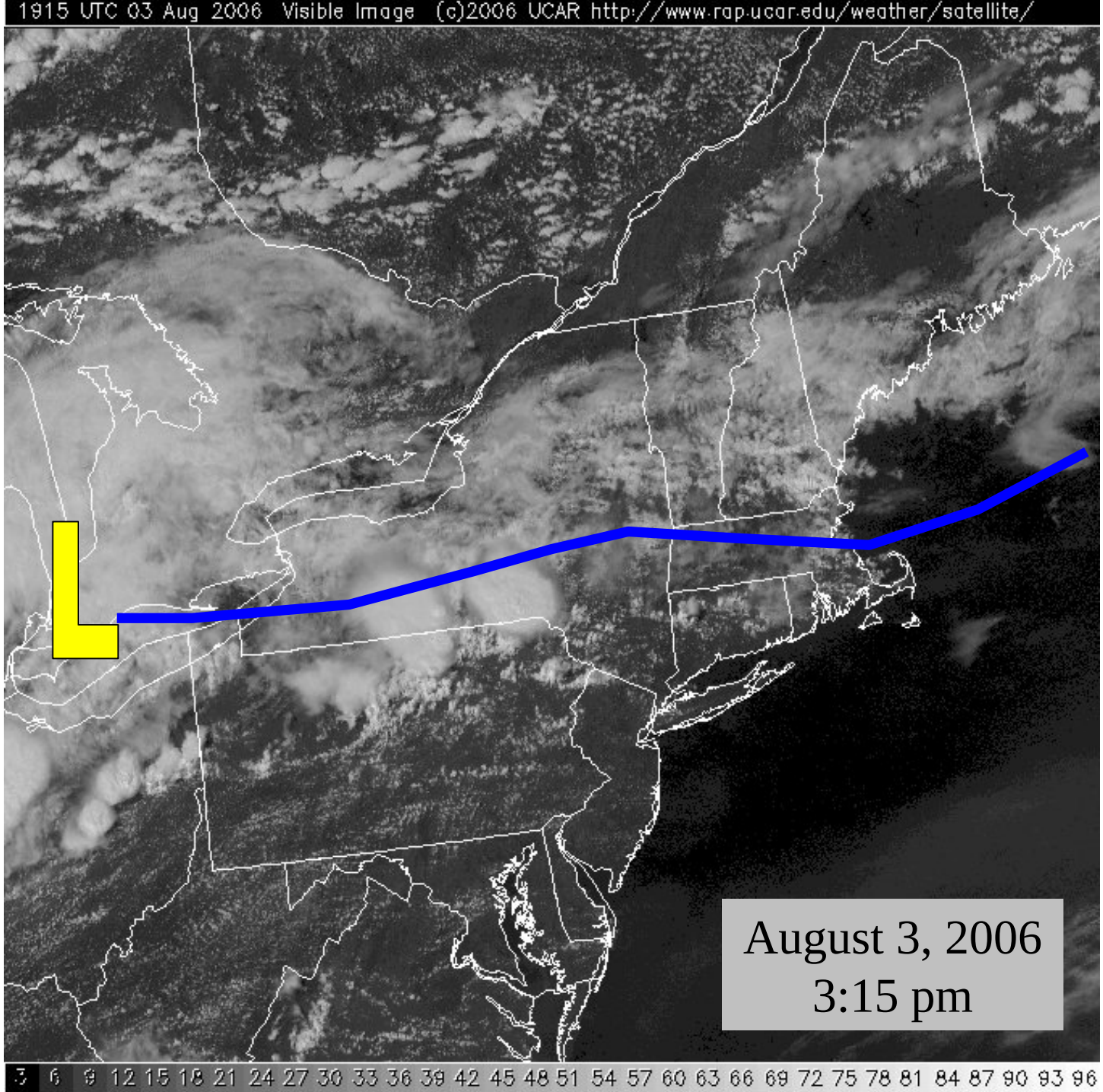


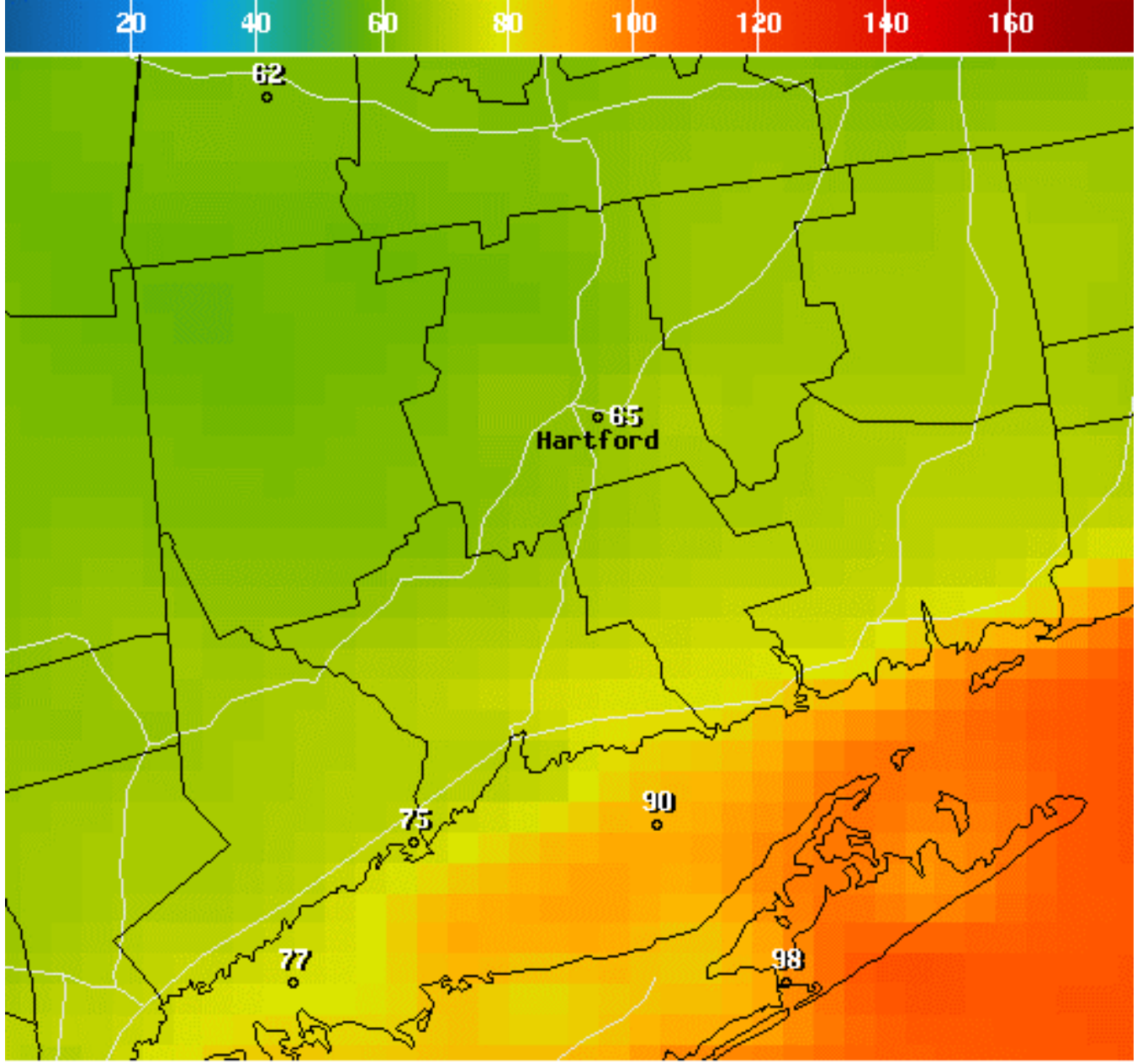
NOAA model had good coverage, but slightly under predicted SW CT


Maximum highs
August 3rd
Bradley: 97
Westfield: 95
Providence: 98
Taunton: 97
1200Z SURFACE ANALYSIS
DATE: THU AUG 03 2006
ISSUED: 1321Z THU AUG 03 2006
BY HPC ANALYST SZATANEK
COLLABORATING CENTERS: HPC, TPC, OPC

08/03/06 850mb




1915 UTC 03 Aug 2006 Visible Image (c)2006 UCAR http://www.rap.ucar.edu/weather/satellite/
L
August 3, 2006
3:15 pm
3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78 81 84 87 90 93 96



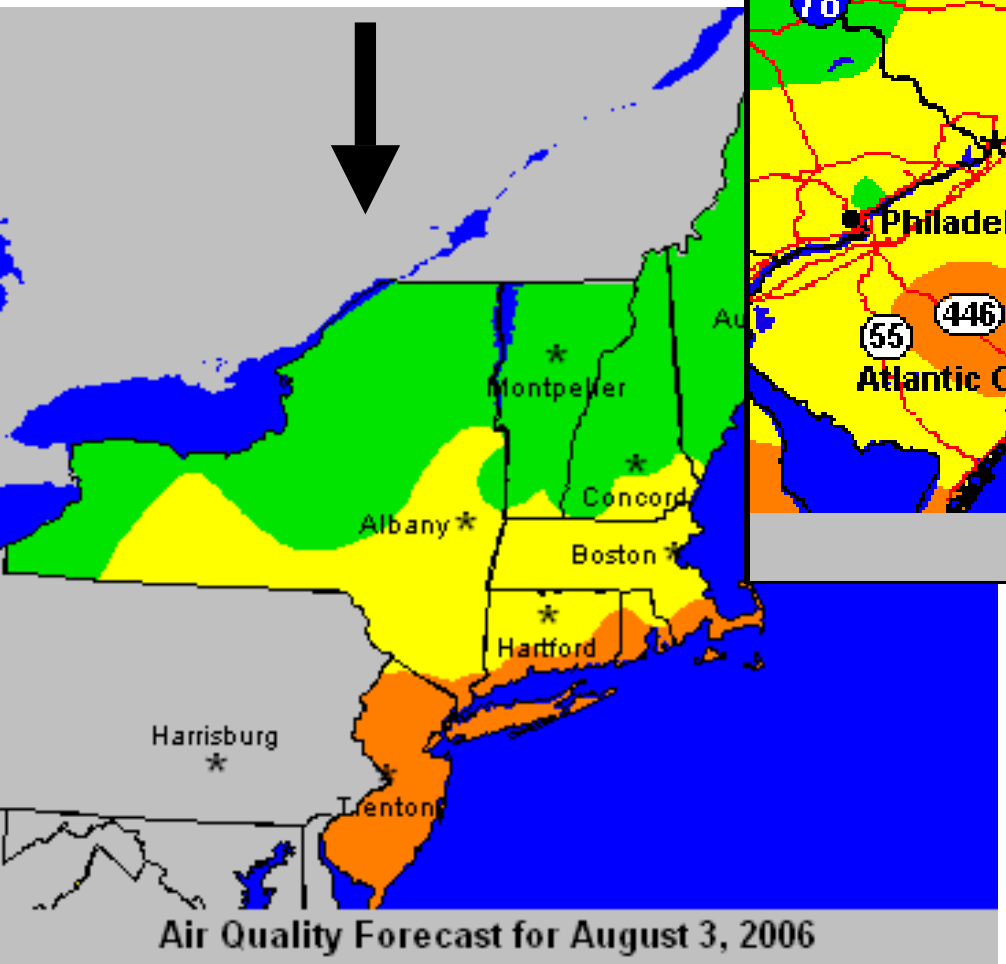
8Hr Avg Ozone Concentration(PPB) Ending Thu Aug 03 2006 7PM EDT

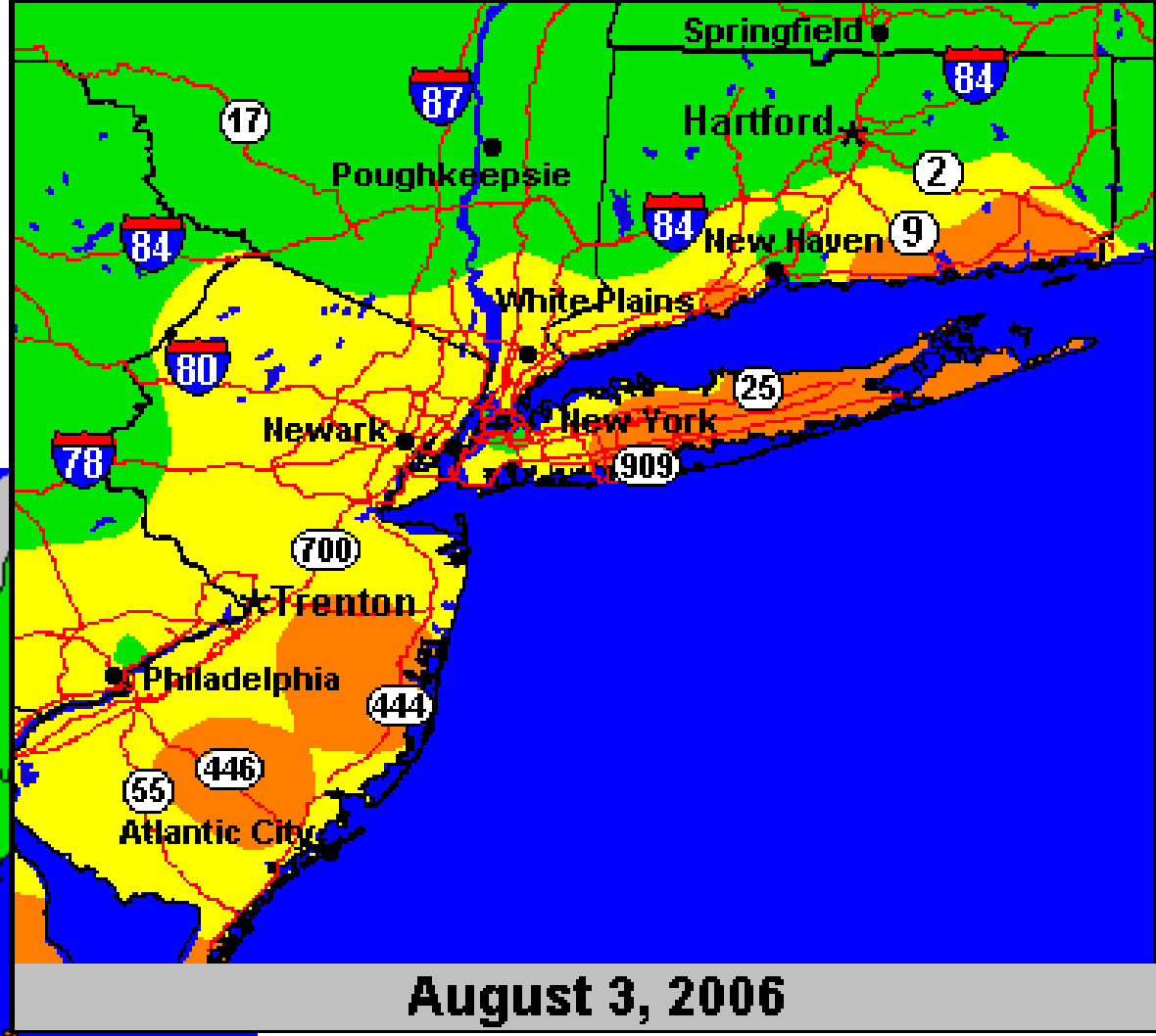
(Thu Aug 03 2006 23Z)

National Digital Guidance Database

06z model run Graphic created-Aug 03 7:28AM EDT

AQI Forecast Made by Local Agencies Using Model Guidance

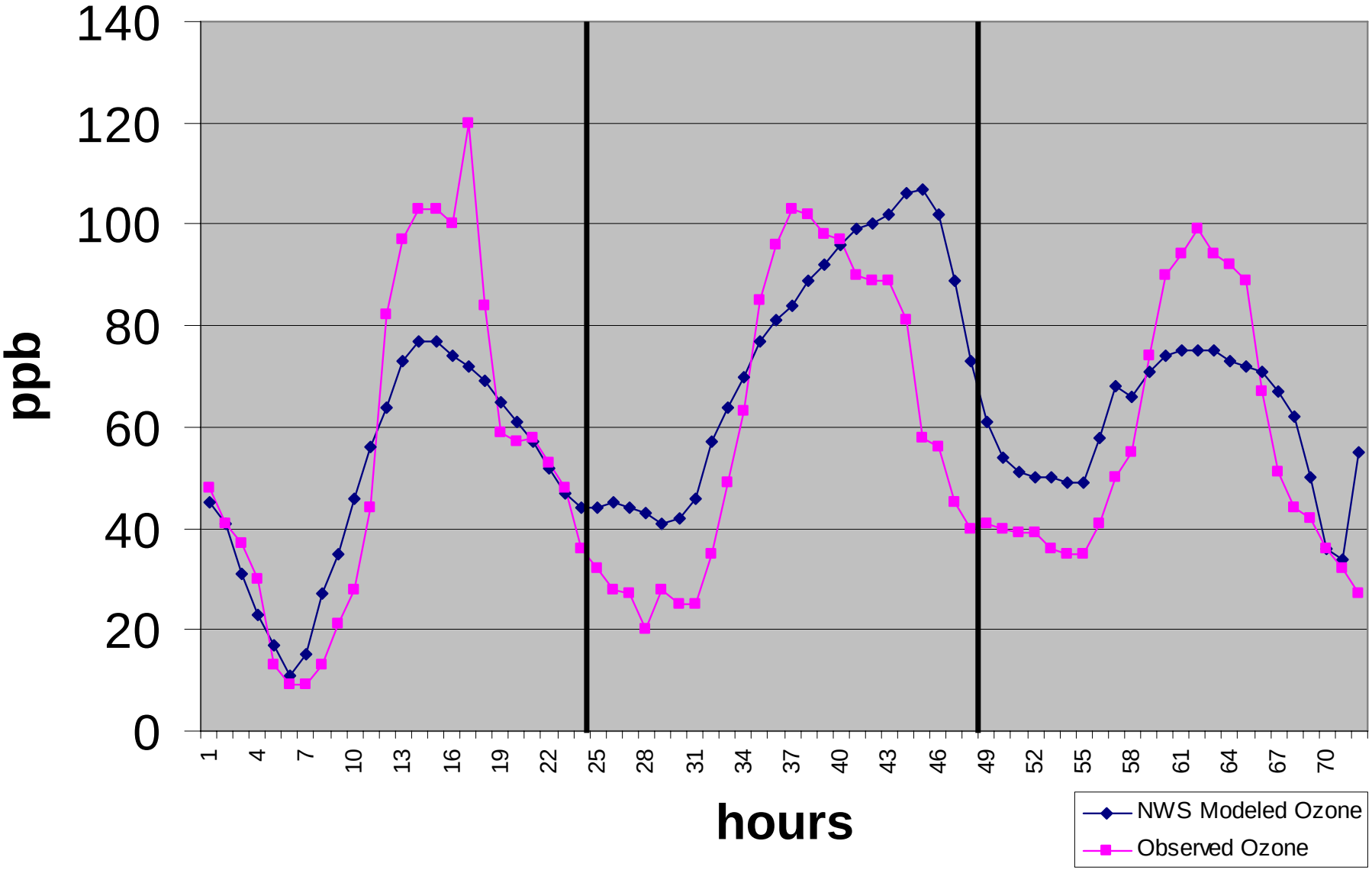




NOAA model missed SW again and under predicted Groton monitor

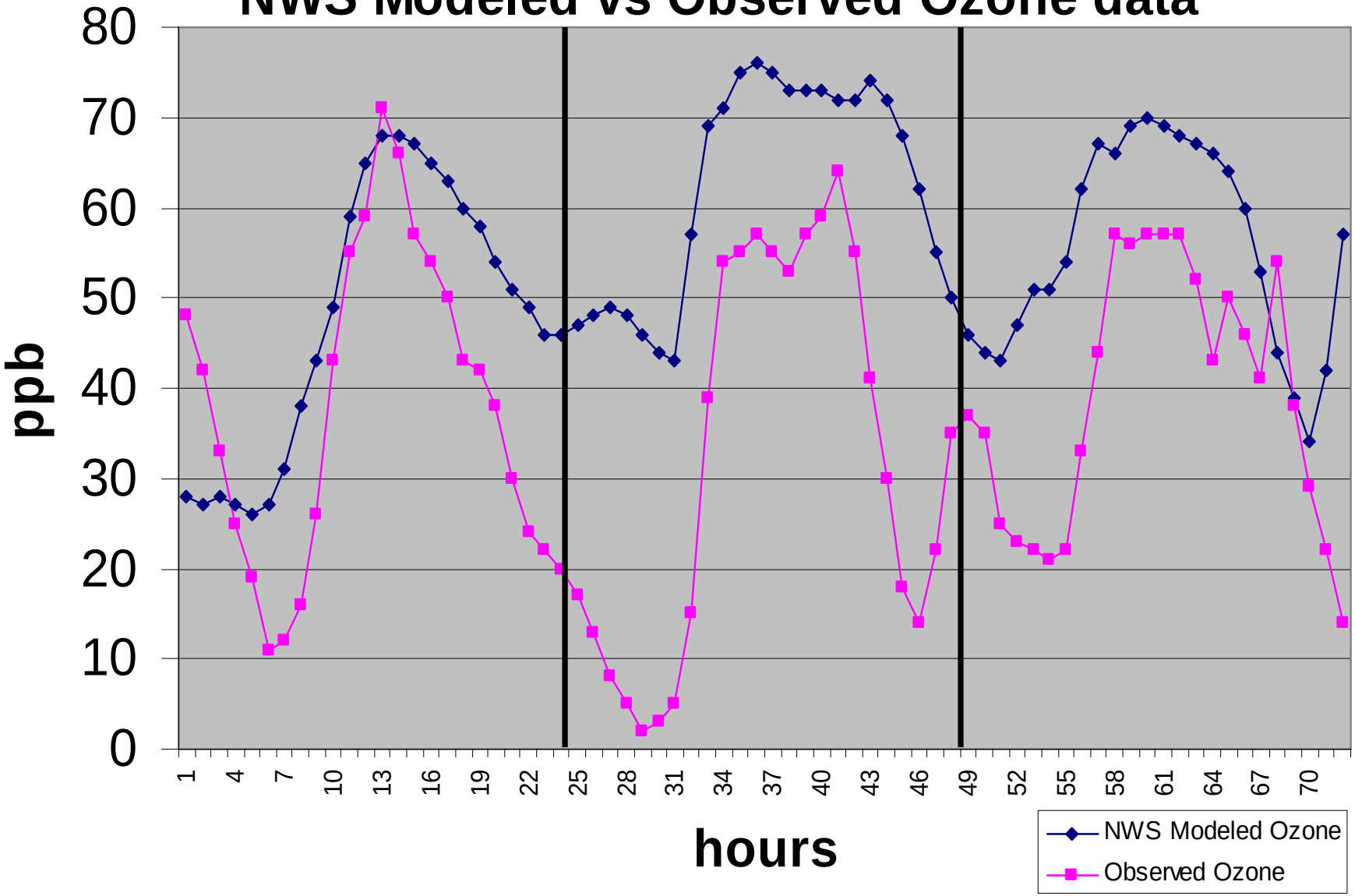
Stratford CT August 1-3, 2006

NWS Modeled vs Observed Ozone Data



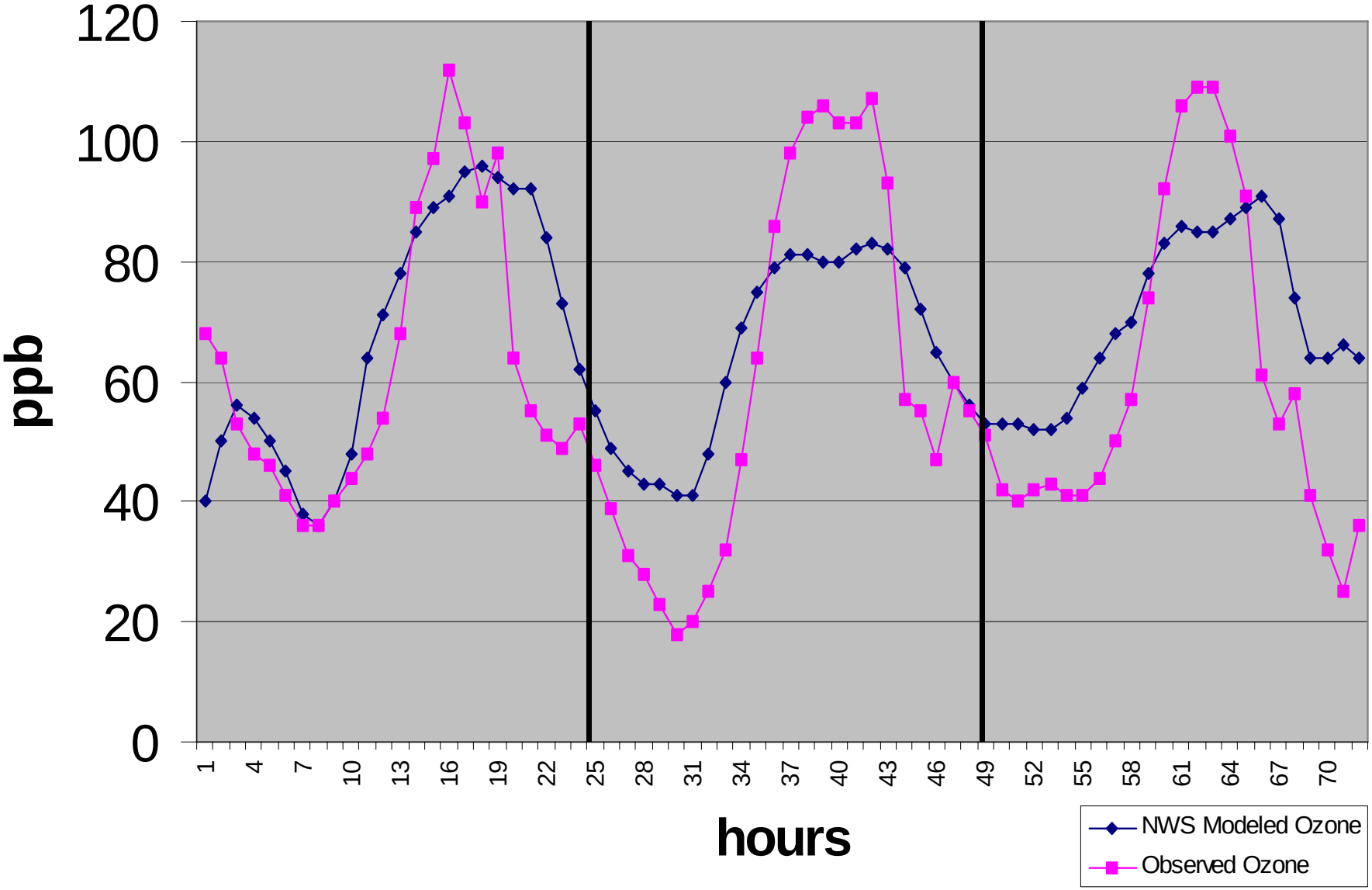
Hartford, CT August 1-3, 2006

NWS Modeled vs Observed Ozone data

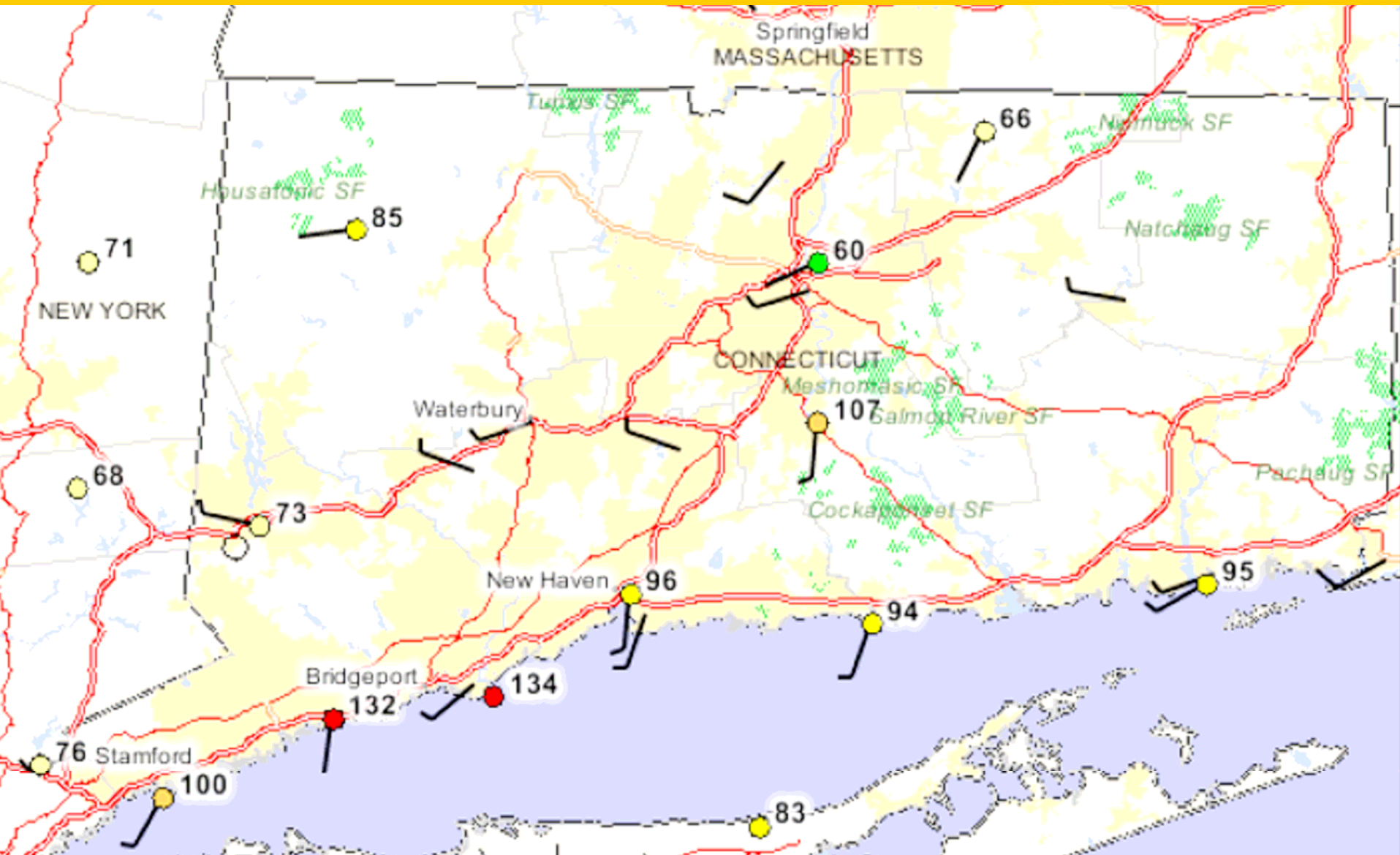


Groton CT, August 1-3, 2006

NWS Modeled vs Observed Ozone Data



Model Performance for the 13 Ozone Exceedance Days for Connecticut (2006)



13 Days Ozone Levels USG or Above in CT

2006	MAQSIP/ NOAA Ozone Model Comparision		
Date	**Obs Maximum AQI**	**MAQSIP Max AQI**	**NOAA Max AQI**
May 29			
June 18			
June 19			
June 22			
July 2			
July 10			
July 17			
July 18			
July 26			
Aug 1			
Aug 2			
Aug 3			
Aug 7			

Summary Table for Connecticut
USG or Greater Exceedance Days

Observed Exceedances = 13 days	MAQSIP	NOAA
Predicted Exceedances	11	8
% Accuracy (USG days)	84.6%	61.5%
False Alarm Days	11	3

Questions/Concerns

List serve or other questions can be directed to

jeanne.worthen@po.state.ct.us
(860)424-3505
Or
michael.geigert@po.state.ct.us