Meeting the New Ozone Standard: Opportunities & Challenges

Dave Shaw

N Y DEC

Topics

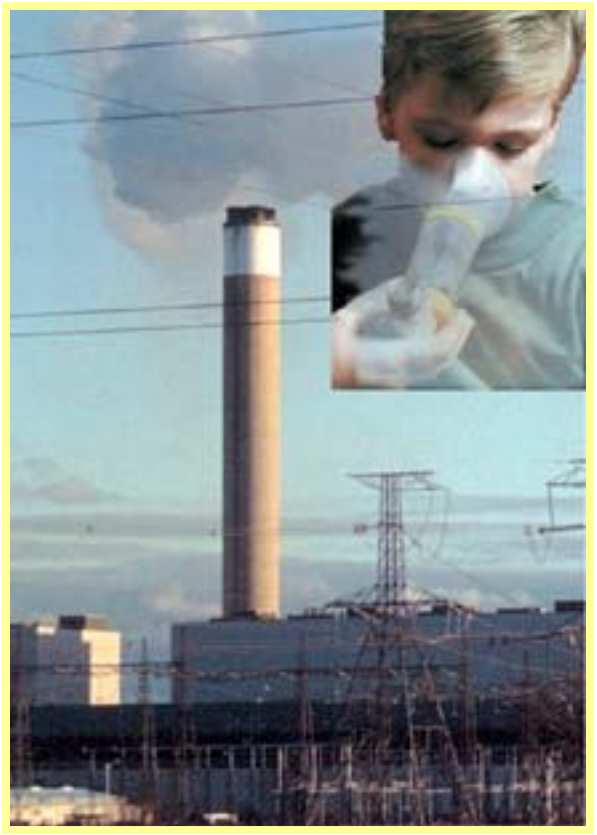
- History of Reducing Ozone Precursors
  - Successful programs
  - Air quality improvements
- Air quality challenges
  - Regional transport of pollutants
  - Climate and air quality interaction
  - New ozone standard
    - Communicating the change
    - Reducing emissions
- Planning for the future
  - Guidance and collaboration

Background

- OTC has been coordinating regional planning and control measure development since the early 1990's
- States submitted plans (SIPs) for 2005 attainment with the old ozone standard that actually worked !!!
  - More later
- SIPs for attaining the new, tougher ozone standard by 2010 are finalized and submittal
  - Things look very promising !!!

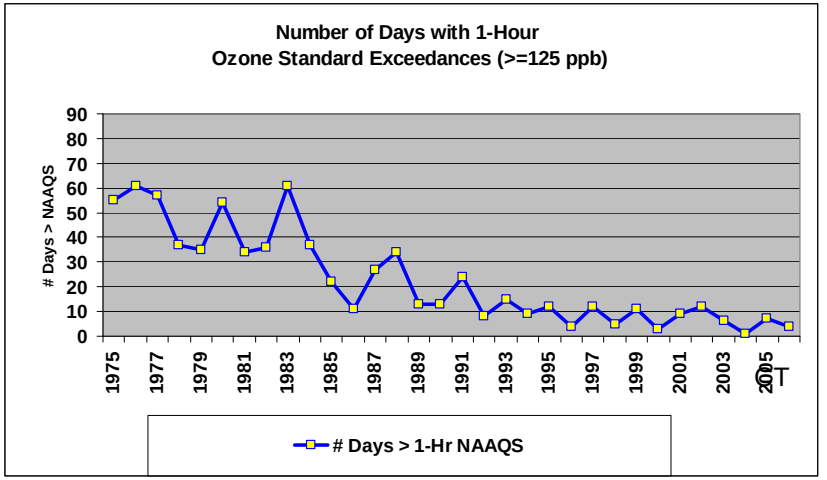
Regional Control Programs

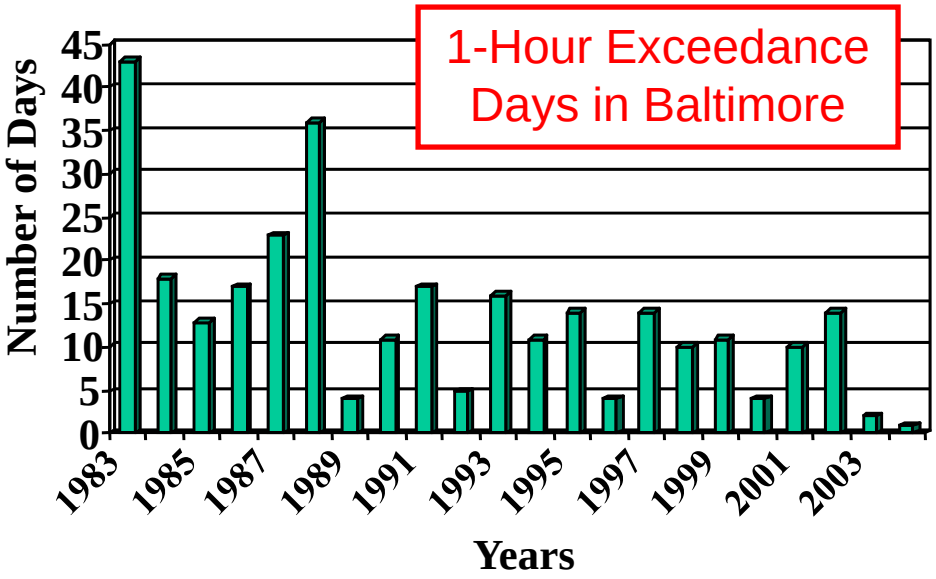
- Early years
  - Mobile sources/LEV
- 1990s
  - Power Plants/Electric Generating Units (EGUs)
    - NOx Budget Program
    - OTAG and the NOx SIP Call
    - State “Multi-P” Programs
- More recently …
  - Area sources
    - Paints
    - Consumer products
    - Gas cans
    - More …
- Critical role of national rules



Meeting the 1-Hour Standard in 2005

- A huge challenge
  - Many thought 2005 attainment would be impossible
- Who made it?
  - Washington
  - Philadelphia
  - Boston
  - Baltimore

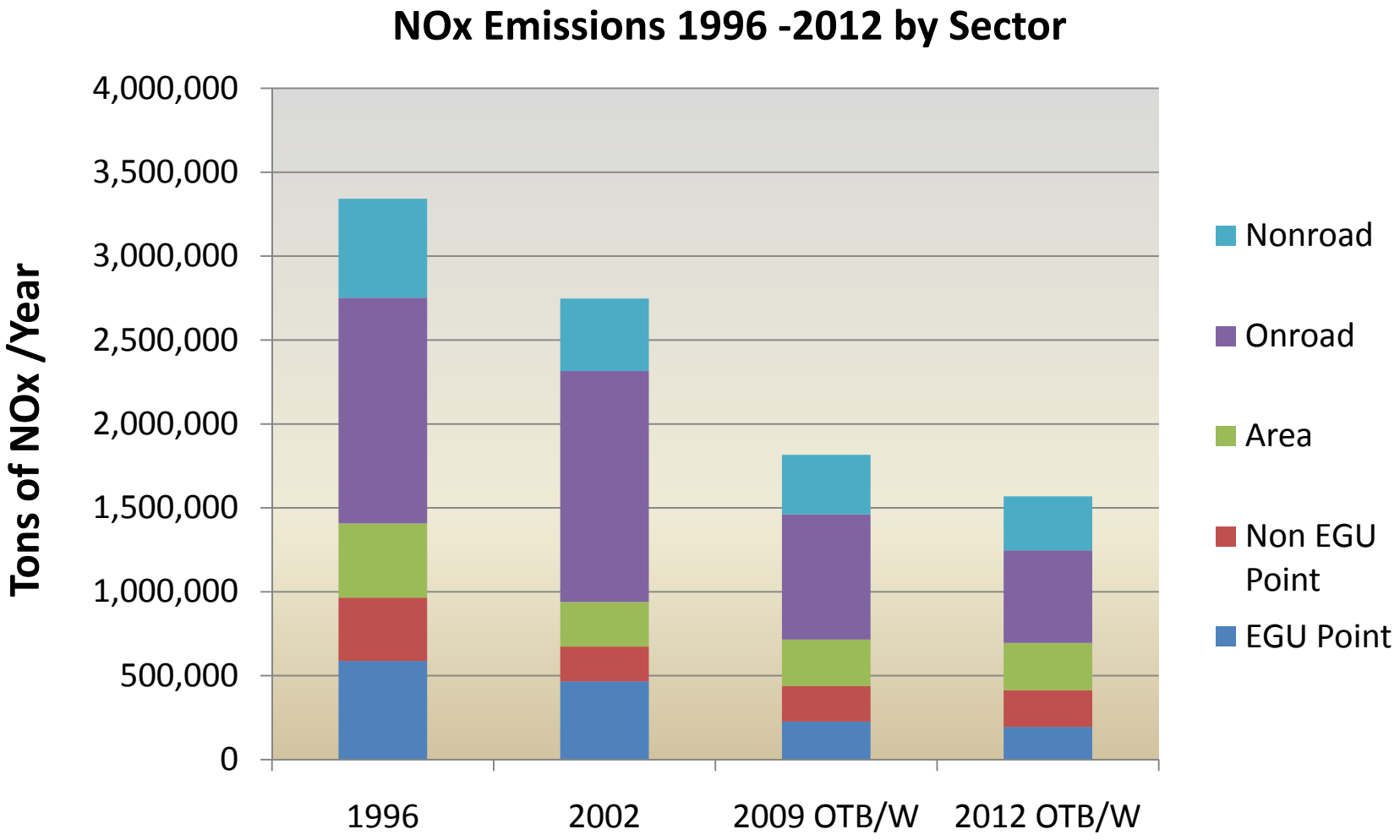




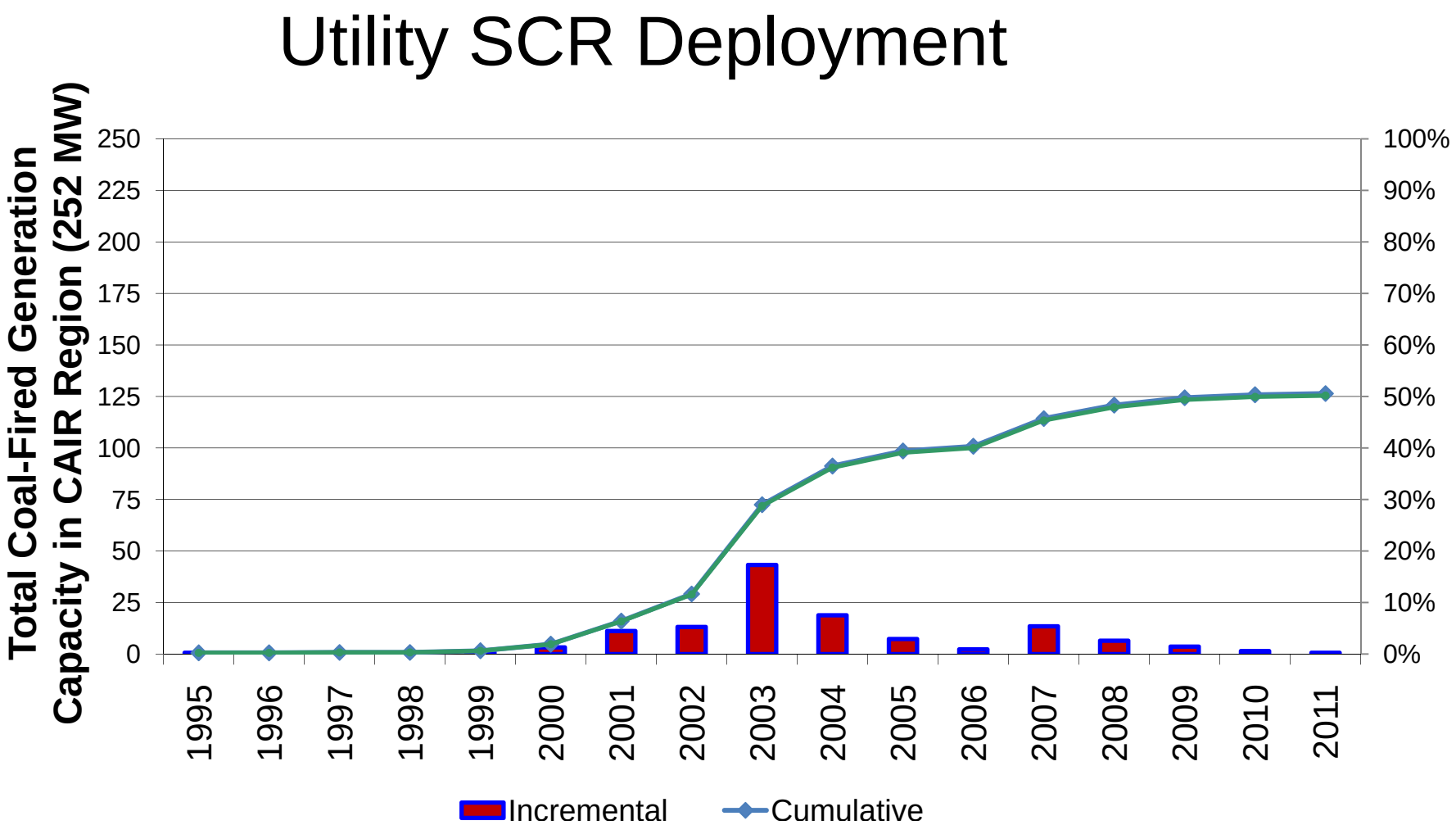
Control Programs for 2010 Attainment

- Old and new control programs both contribute considerably towards 2010 attainment
- Older programs - “On The Books” or “On The Way”
  - State and federal mobile source controls, earlier NOx controls at EGUs, NOx and VOC RACT, earlier efforts on consumer products, coatings, gas cans, other area sources, etc., etc., etc.
- More recent programs
  - State Multi-P EGU control programs and CAIR
  - 2nd ,sometimes 3rd ratcheting down of consumer products, coatings and gas can controls
  - Industrial, commercial and institutional (ICI) boilers, asphalt, cement and glass manufacturing
  - Paving and other amended VOC rules.
  - Non-traditional efforts like the High Electricity Demand Day (HEDD) Program and voluntary local efforts

NOx Emission Trends Across the OTR



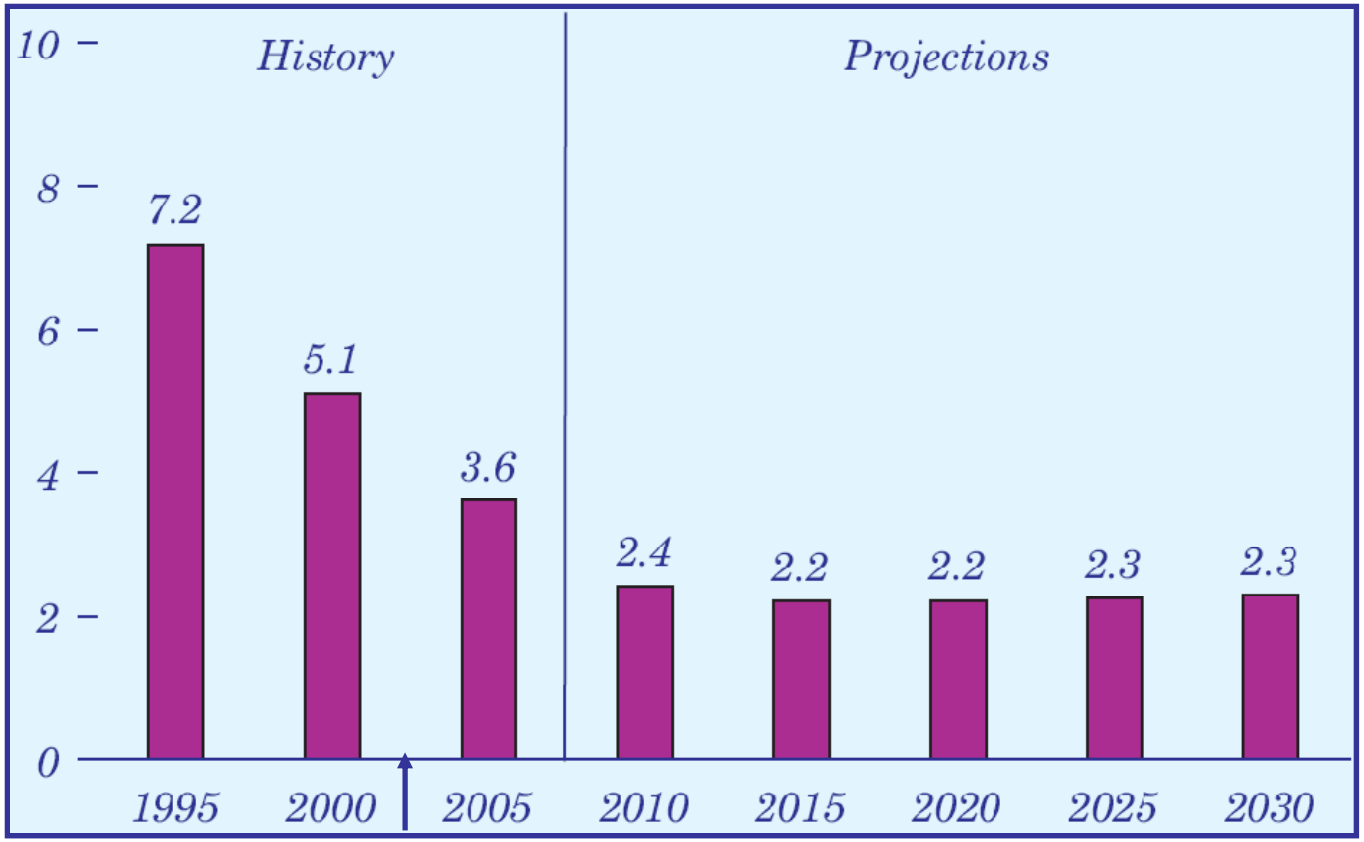
SCR Units Installations (1995-2008)



Data courtesy of The Institute of Clean Air Companies (ICAC).

EGU NO_x Emissions Over Time

U.S. Nitrogen oxides (NO_x) emissions from electricity generation, 1995-2030 (million short tons)



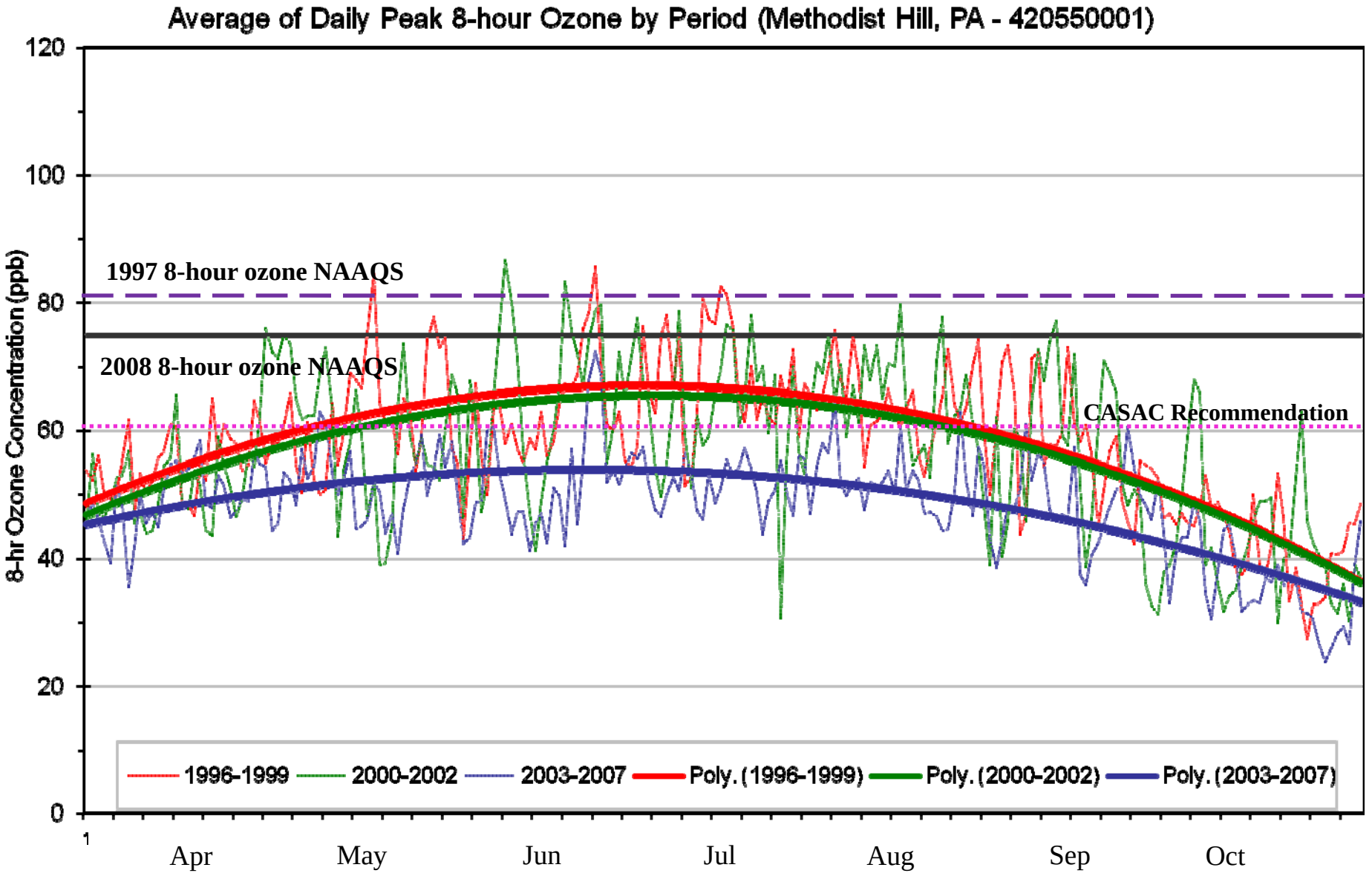
RAPID decline in NOx emissions after Phase II of NO_x Controls. It coincides with a SHARP decrease in ground-level ozone across the eastern U.S. during 2003-2007.

Figure extracted from the "Annual Energy Outlook 2007 with Projections to 2030" report.
Additional information can be found at Energy Information Administration (EIA) website.

Air Quality Challenges for States

- Regional Transport
  - Ozone is still a regional issue
  - Critical need for more aggressive controls to reduce transport under new standard
- Intersection between climate change and ozone: dealing with the “climate penalty”
  - Means having to do more to get to same amount of air quality improvement as compared to past
- New NAAQS for Ozone
  - How and where to get additional emissions reductions in the OTR
  - States’ ability to address some source sectors, e.g., mobile, very limited

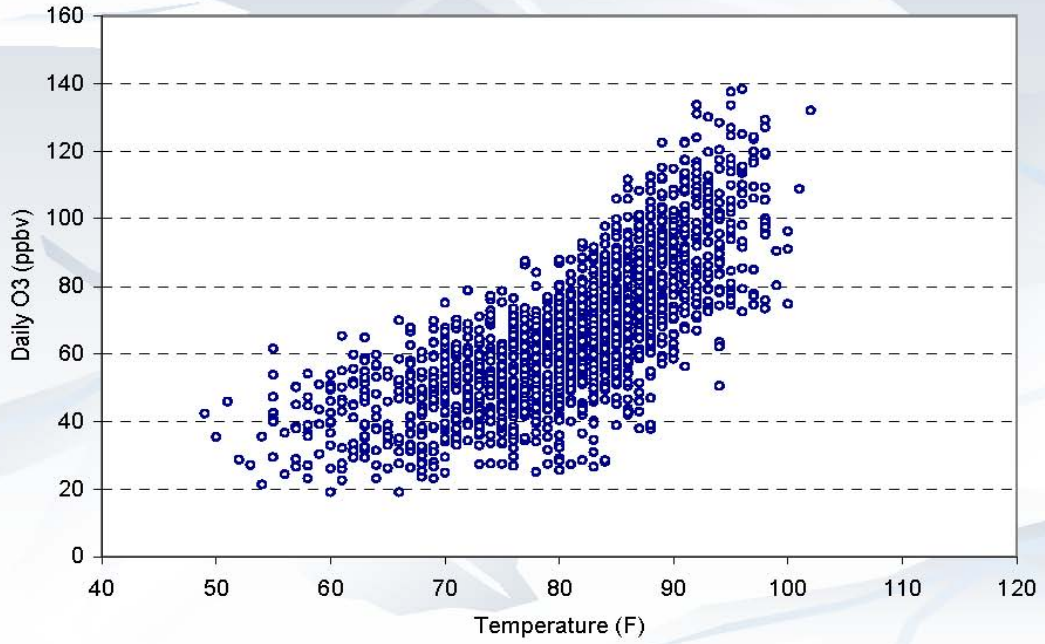
Elevated Reservoir Effect from Transport (1996-2007)



Slide Courtesy of MDE. Note: 2006 & 2007 data are preliminary.

Temperature and Air Quality

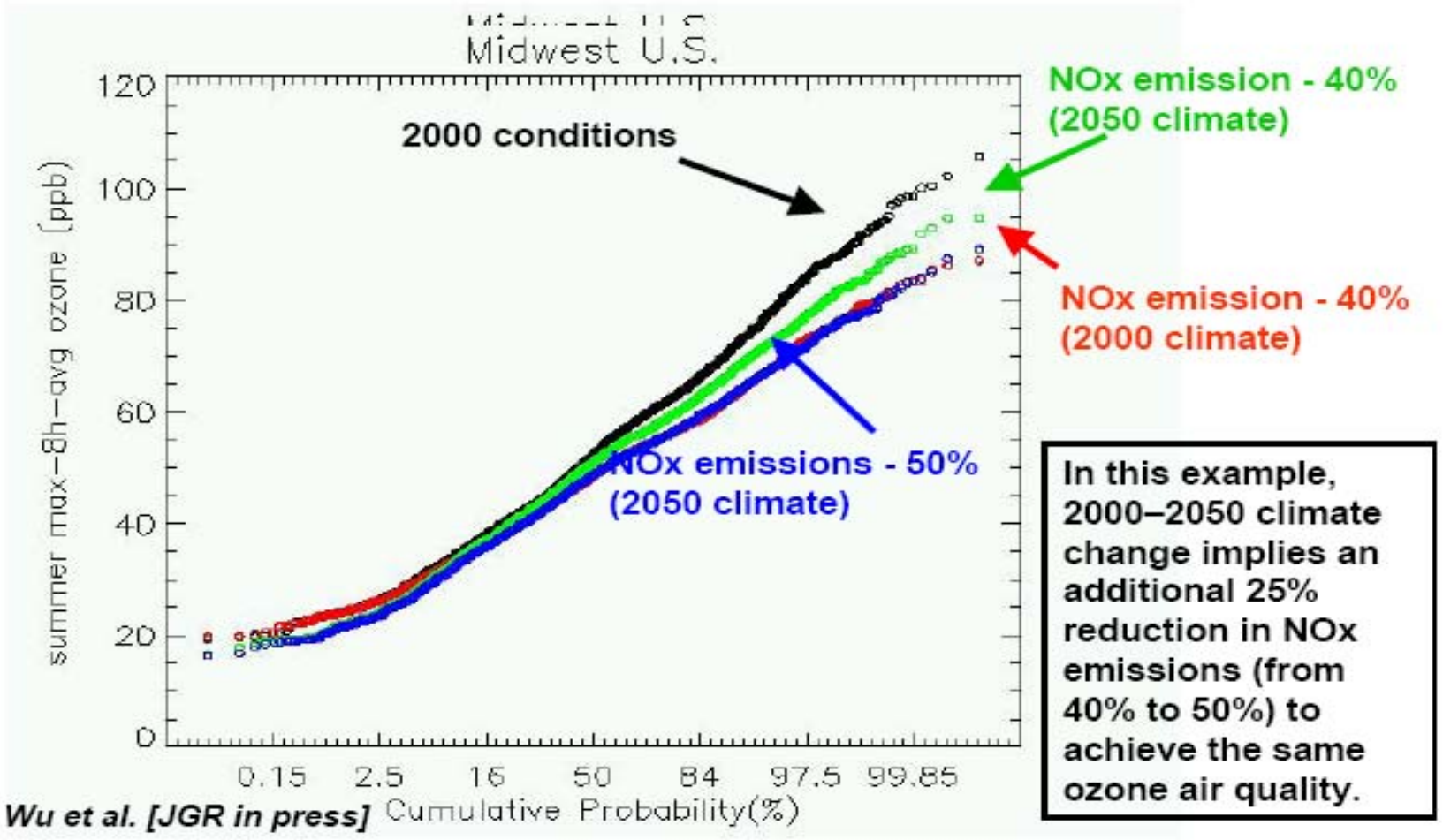
Ozone is higher at high temperatures



Maximum surface temperature at BWI versus peak 8-hr ozone concentrations in the Baltimore non-attainment area for the period May-September, 1994-2004 (Piety, 2007).

Temperature and Air Quality

CLIMATE CHANGE PENALTY: MEETING A GIVEN AIR QUALITY GOAL WILL REQUIRE GREATER EMISSION REDUCTIONS IN FUTURE CLIMATE



Wu et al. [JGR in press]

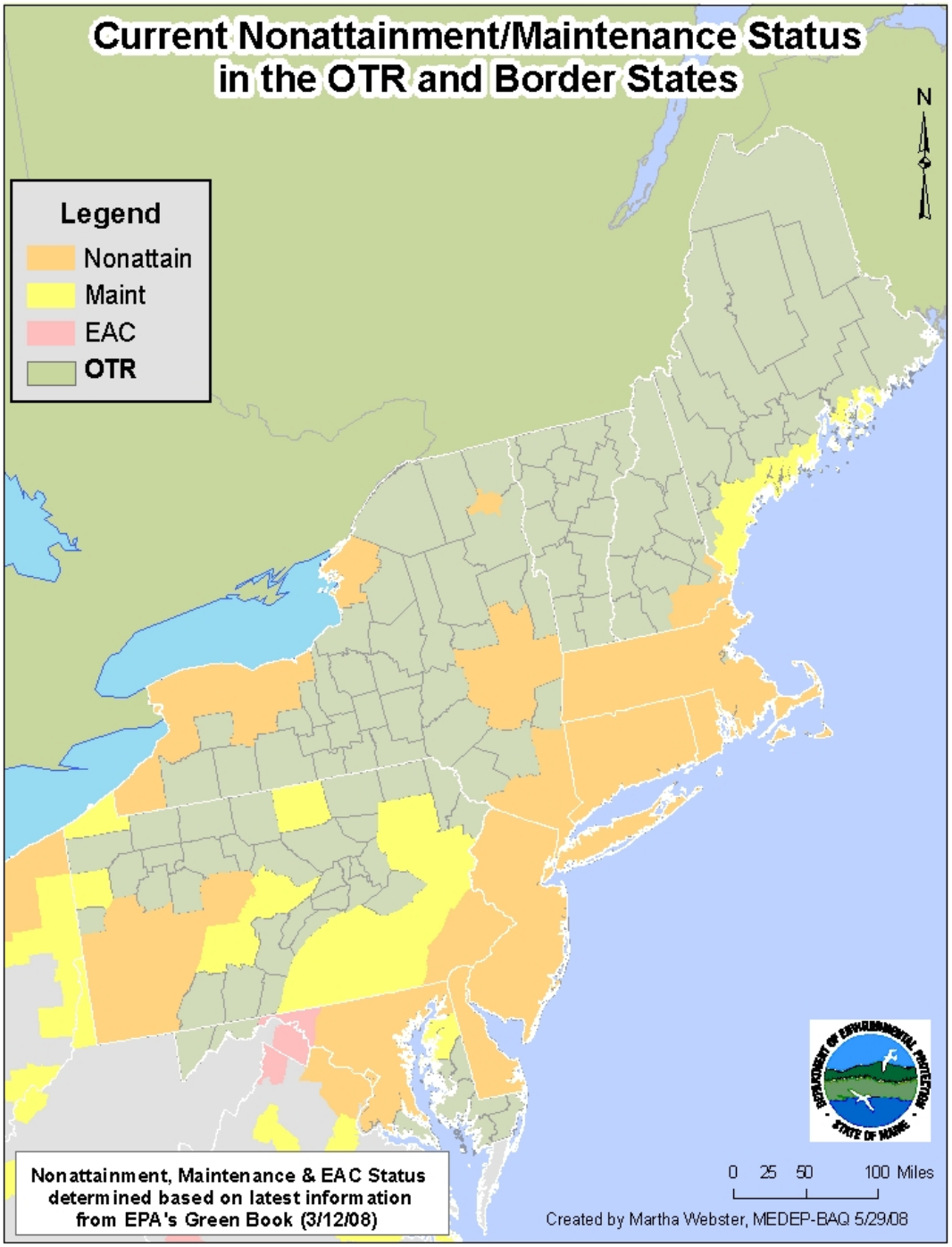
In this example, 2000–2050 climate change implies an additional 25% reduction in NOx emissions (from 40% to 50%) to achieve the same ozone air quality.

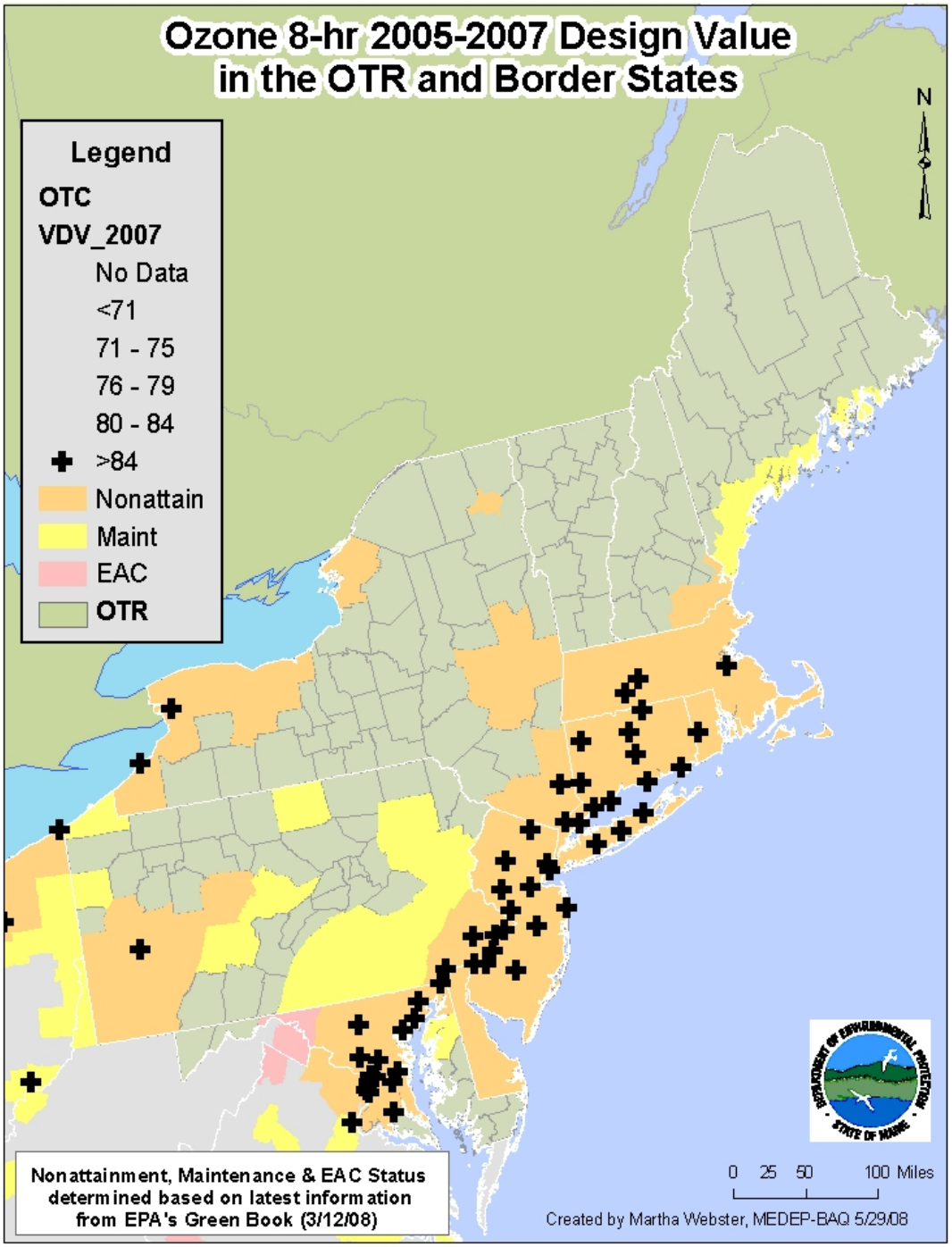
New National Ozone Standard

- Recent studies show significant health impacts at lower ambient concentrations of ozone
- EPA strengthened the 8-hour primary ozone standard to 0.075 ppm (previously 0.08 ppm)
- Secondary standard same as primary
- Will effect many new locations
  - Presents new challenges in new areas
  - Requires another round of attainment planning

CASAC Recommendation

- Scientists advised EPA set ozone NAAQS at a level between 0.060 – 0.070 ppm
- Many OTC states pushed for the ozone NAAQS to be set in accordance with the CASAC recommendation
- EPA's decision foregoes substantial health benefits
  - A recent study co-funded by OTC and NESCAUM show between $300 M - $1.4 B in potential health benefits from a 0.070 ppm ozone NAAQS


Current Nonattainment/Maintenance Status
in the OTR and Border States
N
Legend
Nonattain
Maint
EAC
OTR
Nonattainment, Maintenance & EAC Status
determined based on latest information
from EPA's Green Book (3/12/08)
0 25 50 100 Miles
Created by Martha Webster, MEDEP-BAQ 5/29/08


Ozone 8-hr 2005-2007 Design Value
in the OTR and Border States
Legend
OTC
VDV_2007
No Data
<71
71 - 75
76 - 79
80 - 84
>84
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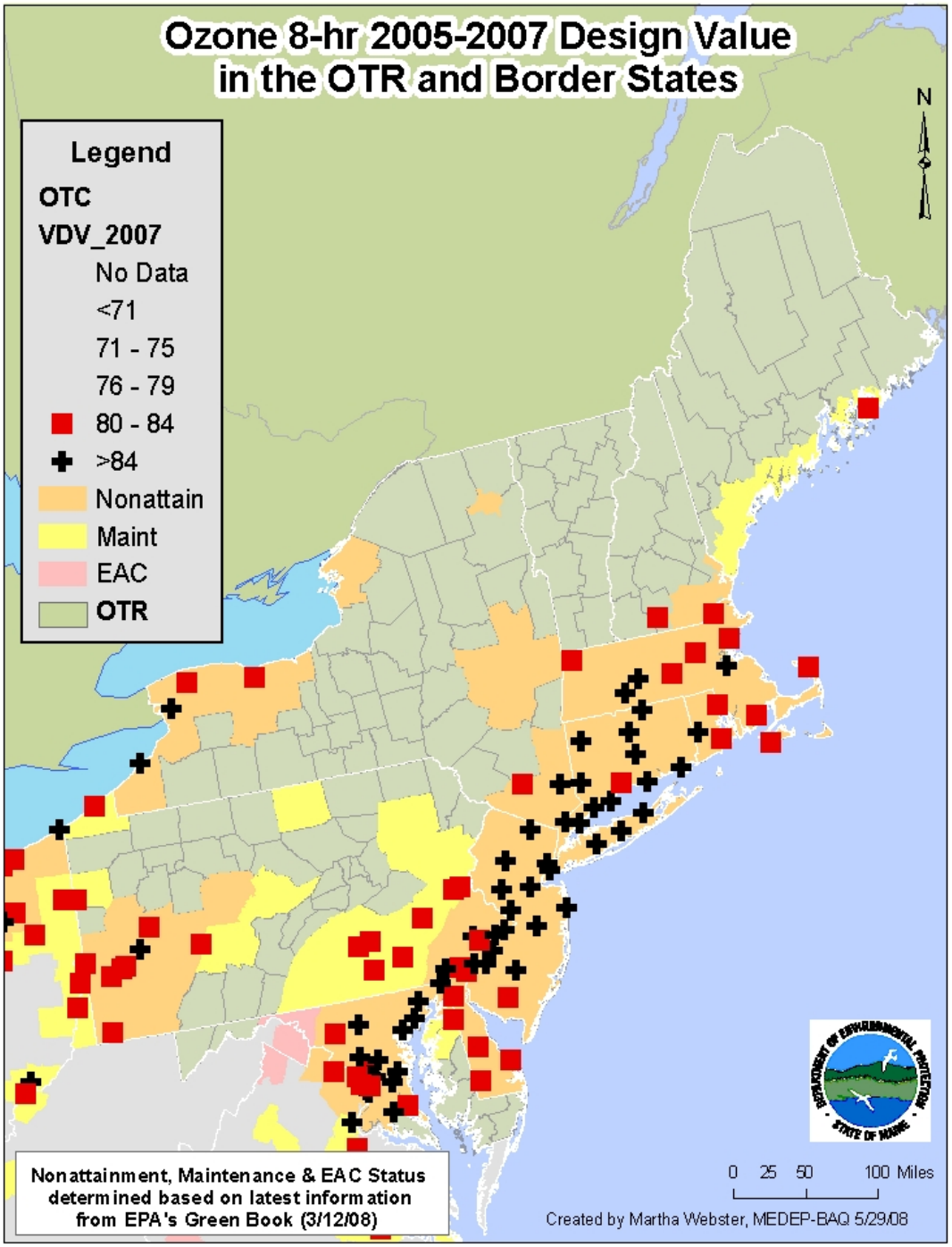
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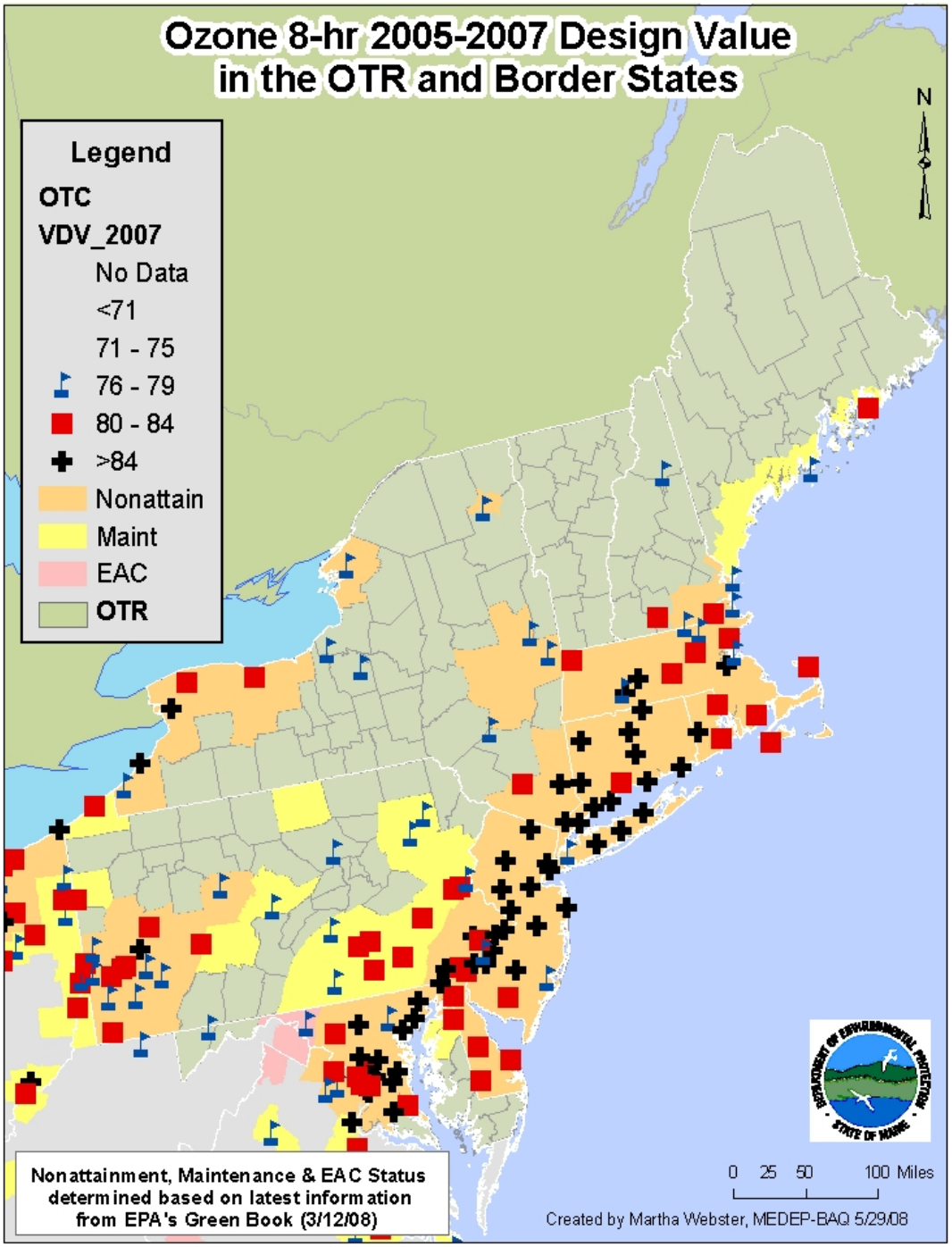
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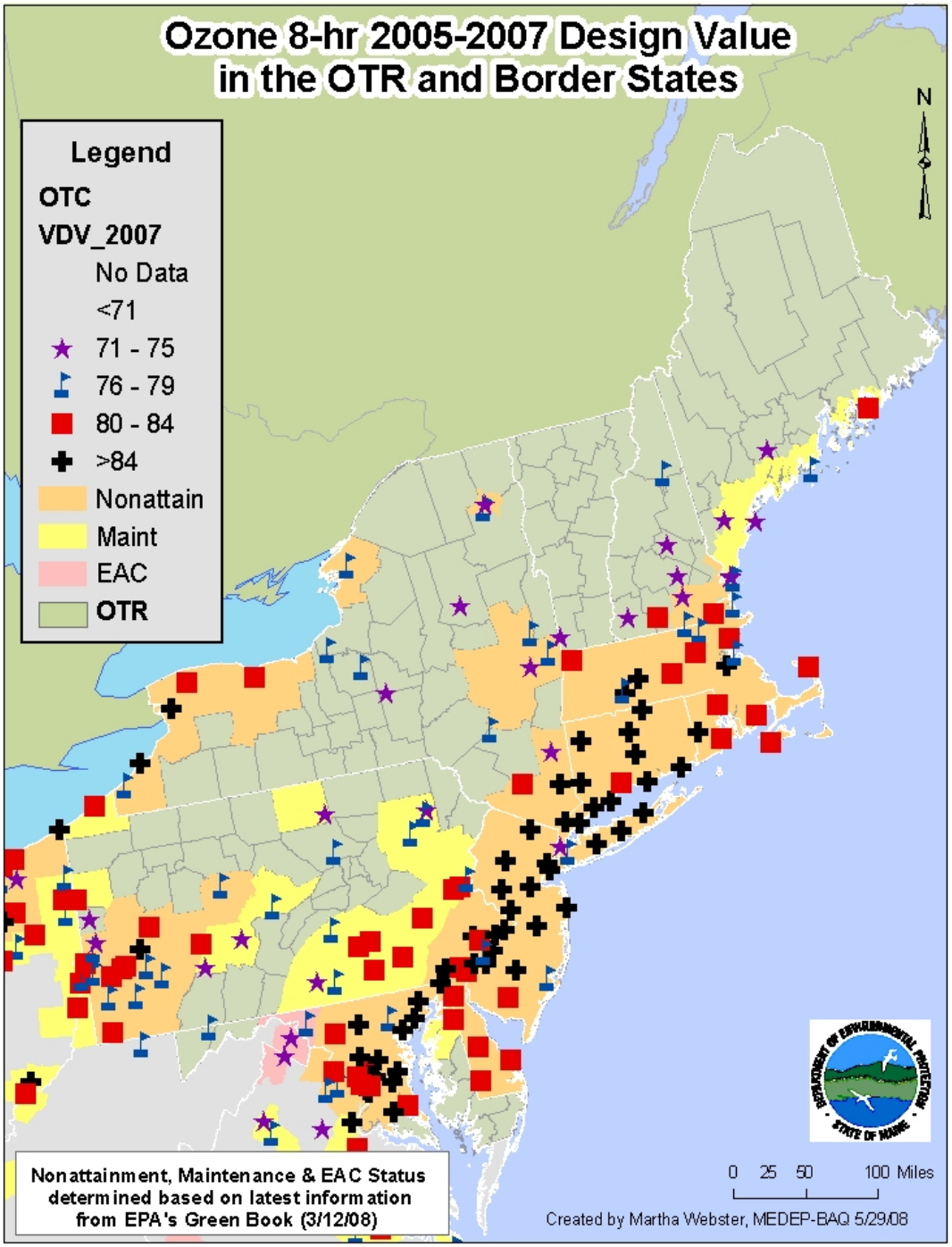
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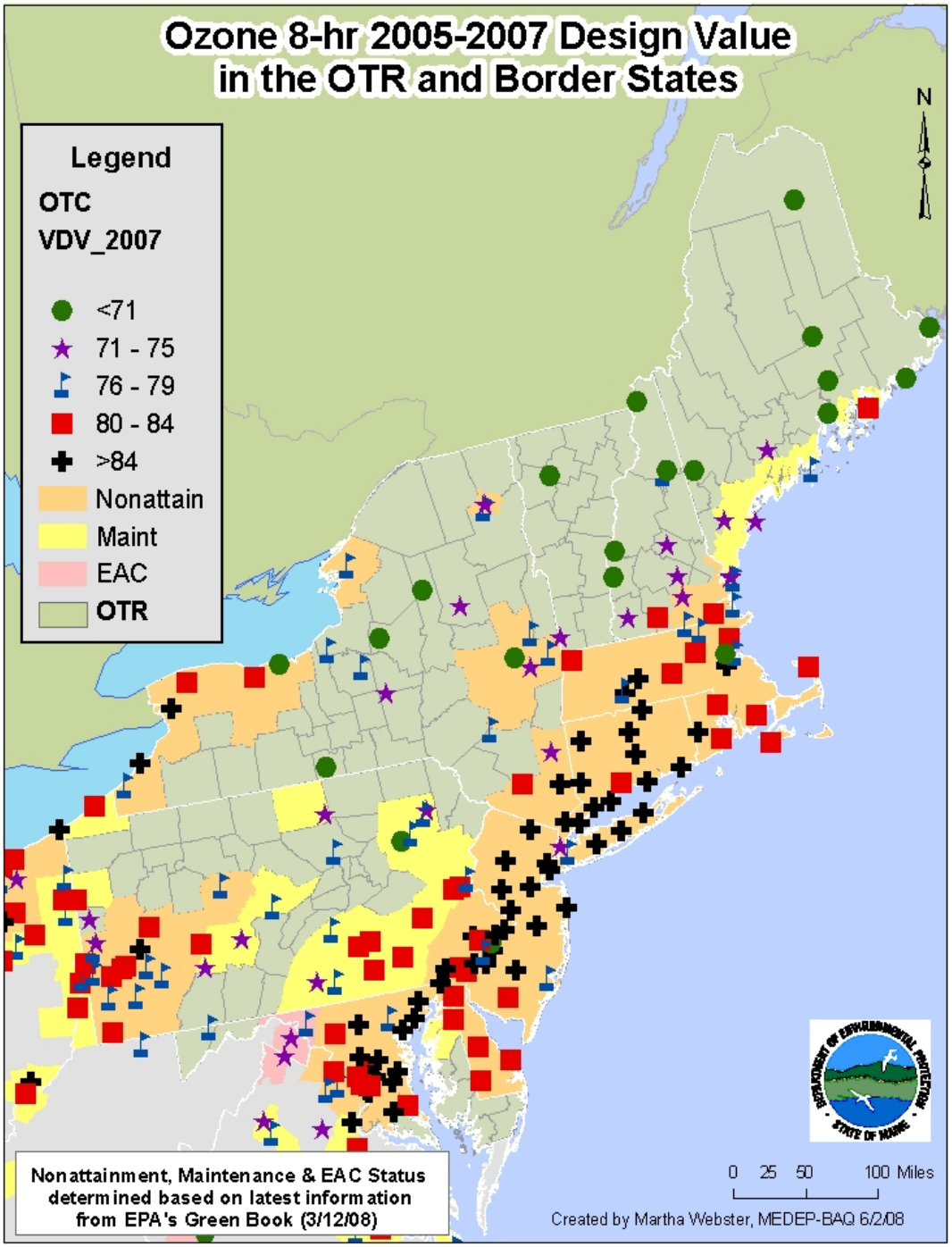
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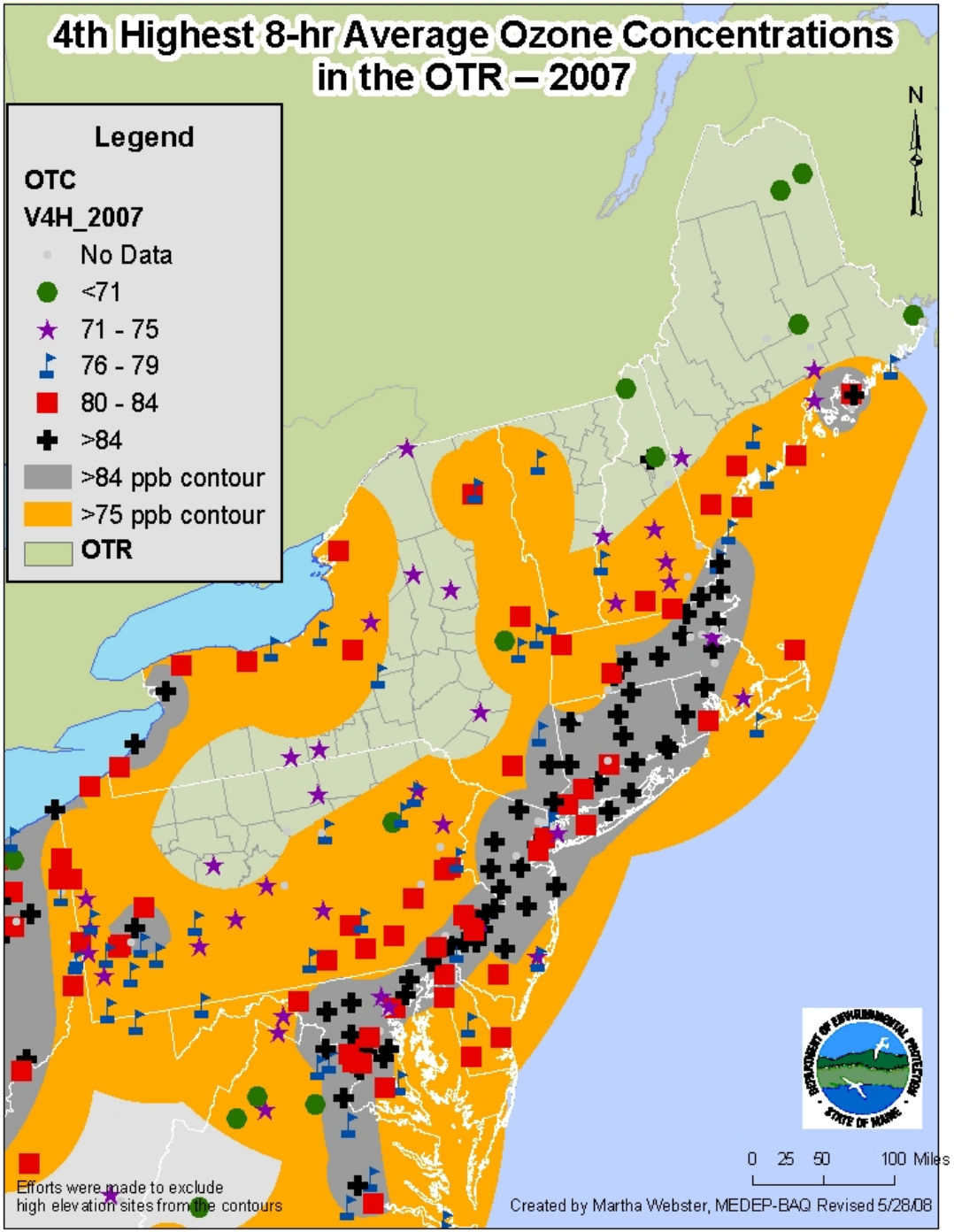
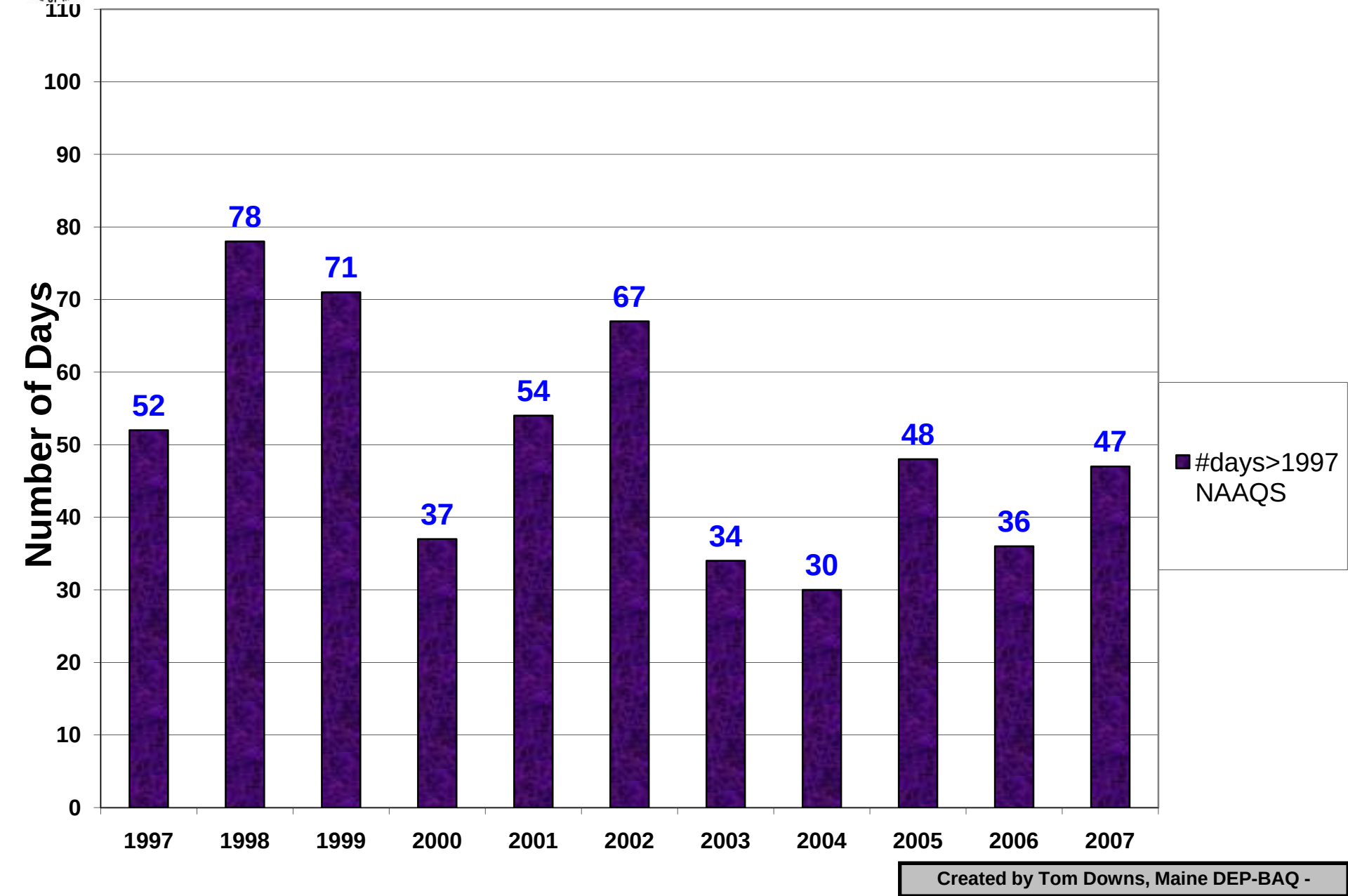

4th Highest 8-hr Average Ozone Concentrations in the OTR – 2007
Legend
OTC
V4H_2007
No Data
<71
71 - 75
76 - 79
80 - 84
>84
>84 ppb contour
>75 ppb contour
OTR
N
0 25 50 100 Miles
Efforts were made to exclude high elevation sites from the contours
Created by Martha Webster, MEDEP-BAQ Revised 5/28/08

Air Quality Index Revised

- AQI informs public about daily air pollution levels
- Adjusted by EPA to reflect change in ozone standard
- Lowers “trigger” for unhealthy air alerts
- Expect increased number of warnings even if no change in air quality this summer compared to last

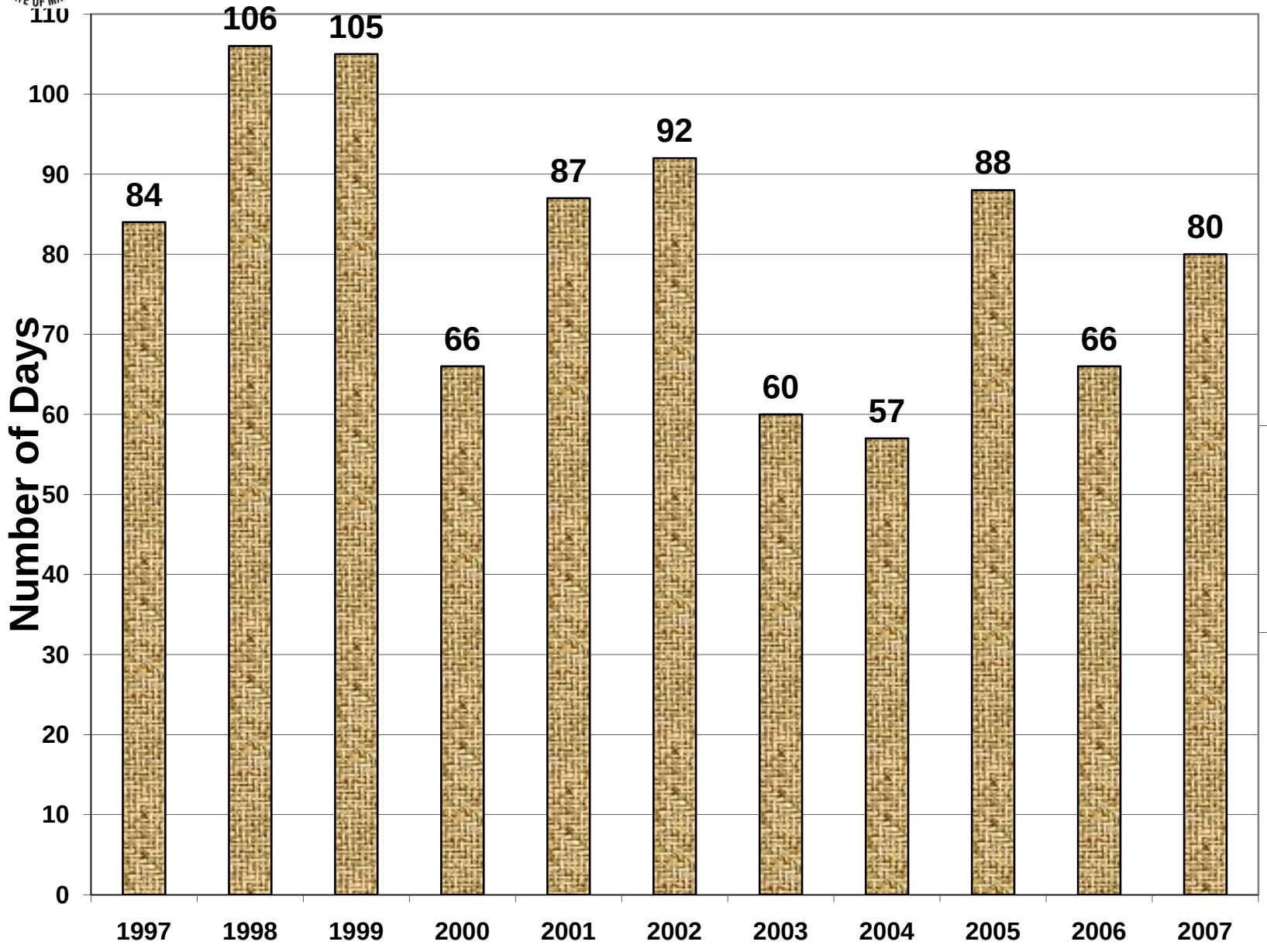
Category	AQI Value	1997 8-hour (ppm)	2008 8-hour (ppm)
Good	0-50	0.000-0.064	0.000-0.059
Moderate	51-100	0.065-0.084	0.060-0.075
Unhealthy for Sensitive Groups	101-150	0.085-0.104	0.076-0.095
Unhealthy	151-200	0.105-0.124	0.096-0.115
Very Unhealthy	201-300	0.125-0.374	0.116-0.374
Hazardous	301-400	No Change	No Change
	401-500	No Change	No Change

Annual Days in the OTR Over 1997 8-hour Ozone NAAQS



Created by Tom Downs, Maine DEP-BAQ -

Annual Days in the OTR Over 2008 8-hour Ozone NAAQS



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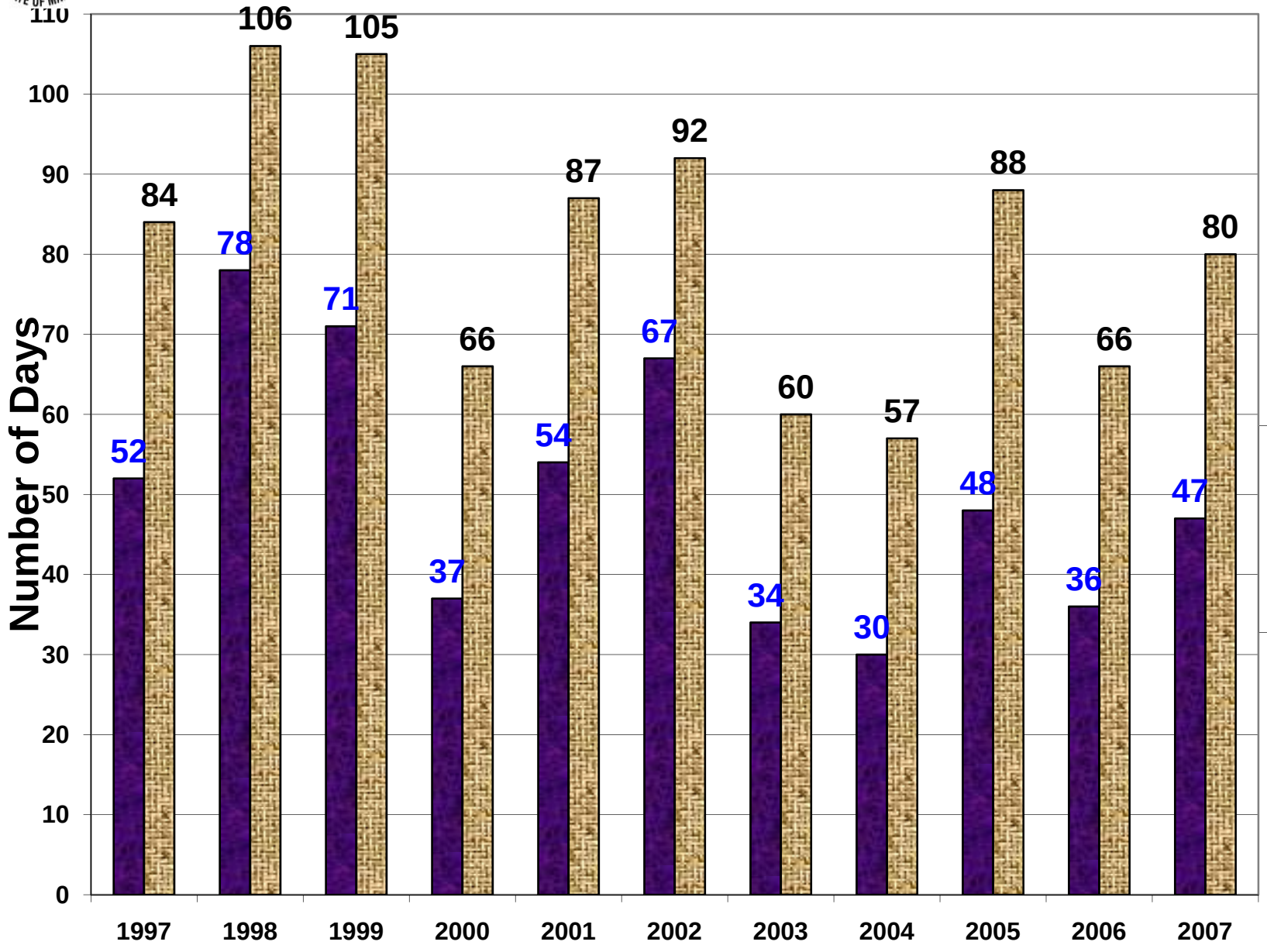
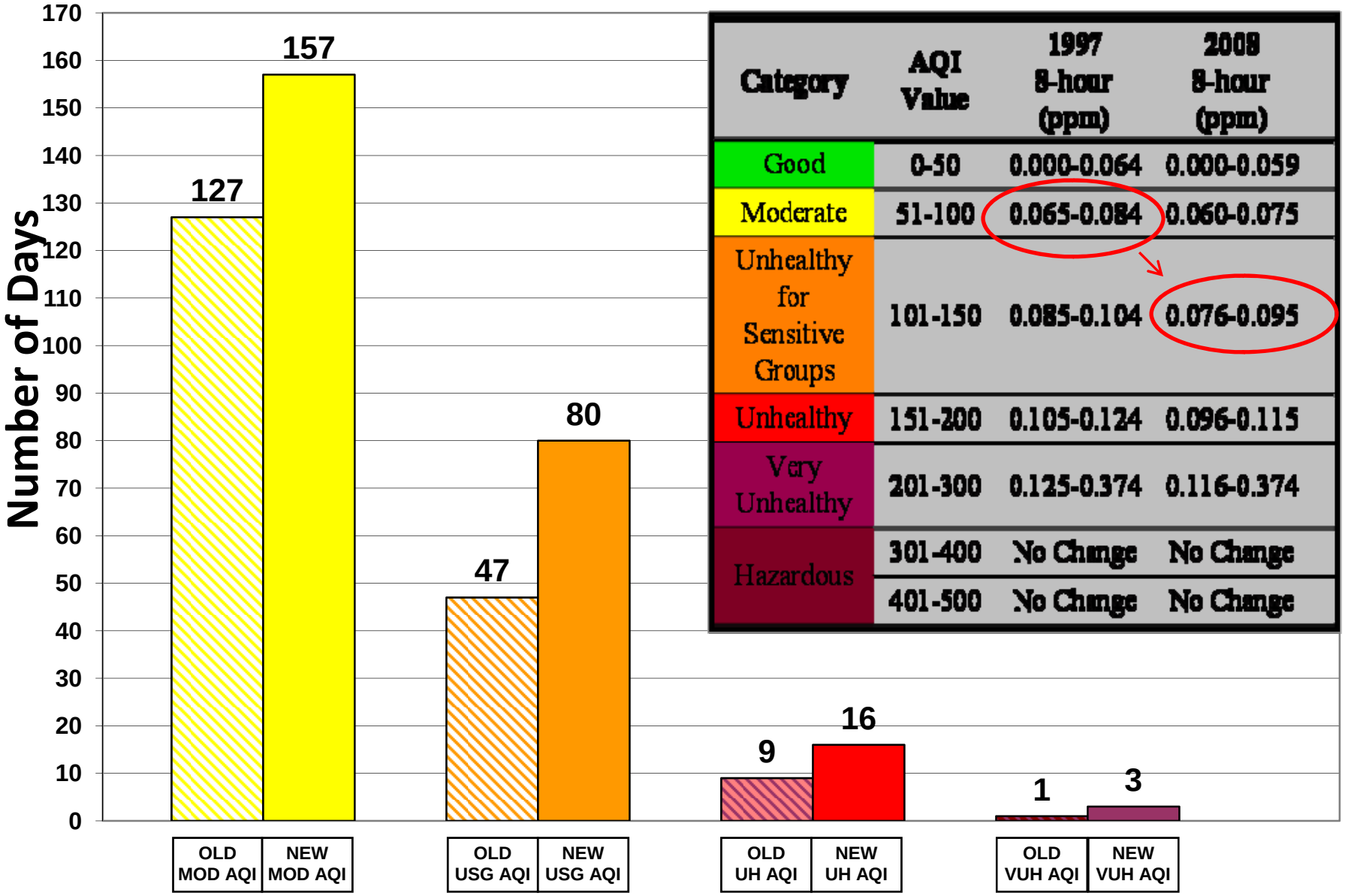
Annual Comparison of Days in the OTR Over 1997 & 2008 8-hour Ozone NAAQS



Created by Tom Downs, Maine DEP-BAQ -

2007 Air Quality Index Days
Comparison of the Number of Old vs. New AQI



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Created by Tom Downs, Maine DEP-BAQ - 6/3/2008

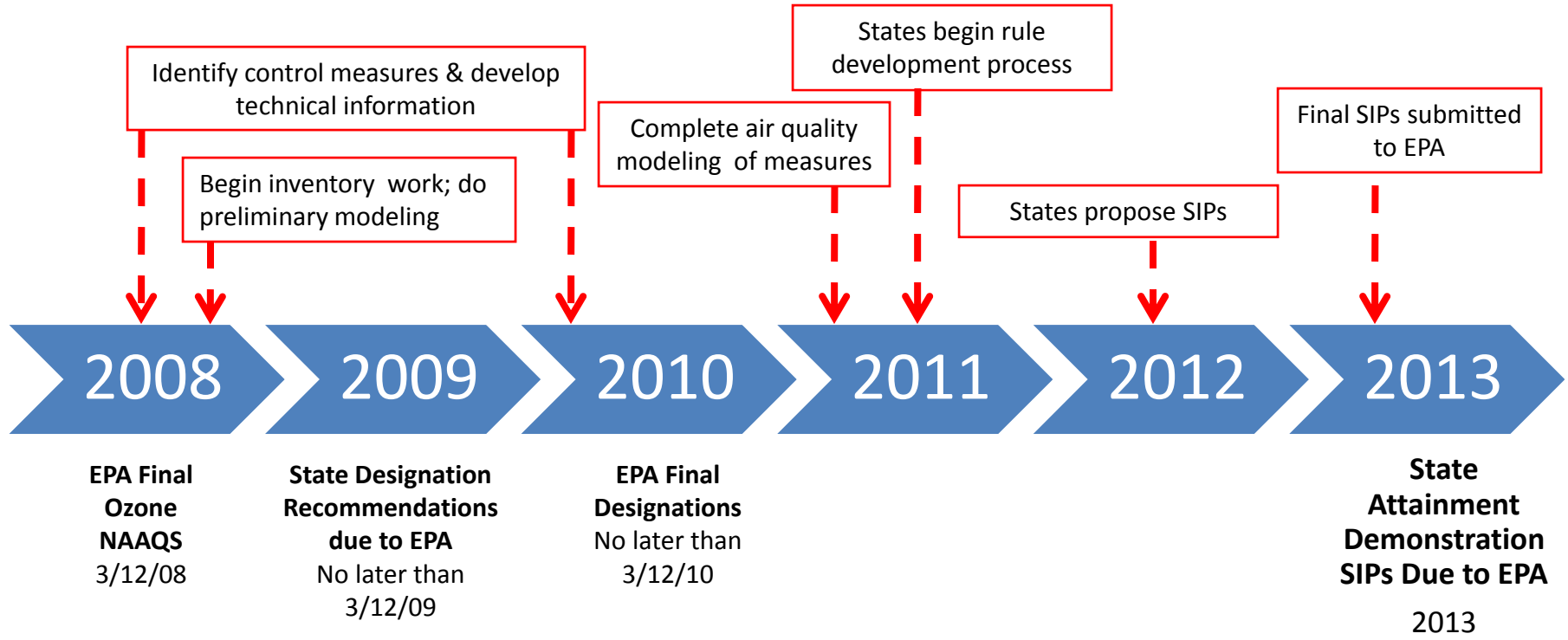
Days Above the New Standard Have Already Occurred…

- Compiled preliminary data from ten OTC states on 8-hour daily maximum readings
- For the pre-ozone season week of April 17 to April 23, 2008, the region had:
  - 103 readings above the new 8-hr ozone standard of 0.075 ppm
  - 6 readings were above 0.090 ppm
  - Highest reading: 0.099 ppm

What States Need from EPA

- Resources (e.g., funding for monitoring)
- Guidance – need for it to be timely and comprehensive
- National measures for EGUs and ICI boilers
- Update on conceptual model to include transport and changes in transport patterns
- Measures/programs to address transport

SIP Timeline for New O_3 NAAQS



2008 Ozone NAAQS Attainment Dates 2013 - 2030

Conclusion

- Reducing ozone precursors is effective
  - Successful programs point the way
  - Air quality improvements have happened
- Air quality challenges
  - Reducing regional transport of pollutants still key
  - Climate and air quality interaction will be a factor
  - New ozone standard will require national action
- Planning for the future
  - Collaborative efforts are important for attainment