

Modeling Committee Update

OTC Fall Meeting

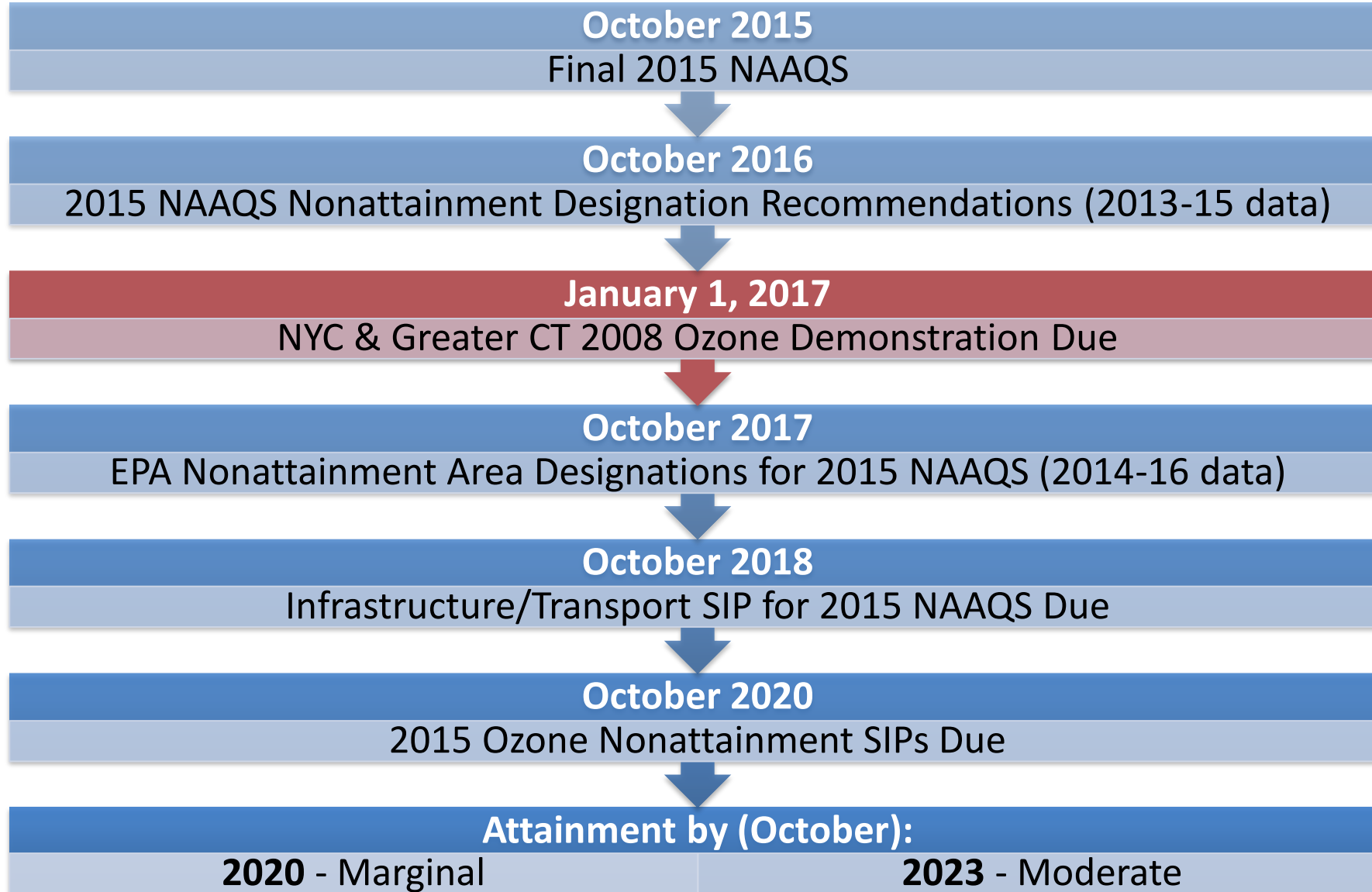
November 17, 2016

Washington, DC

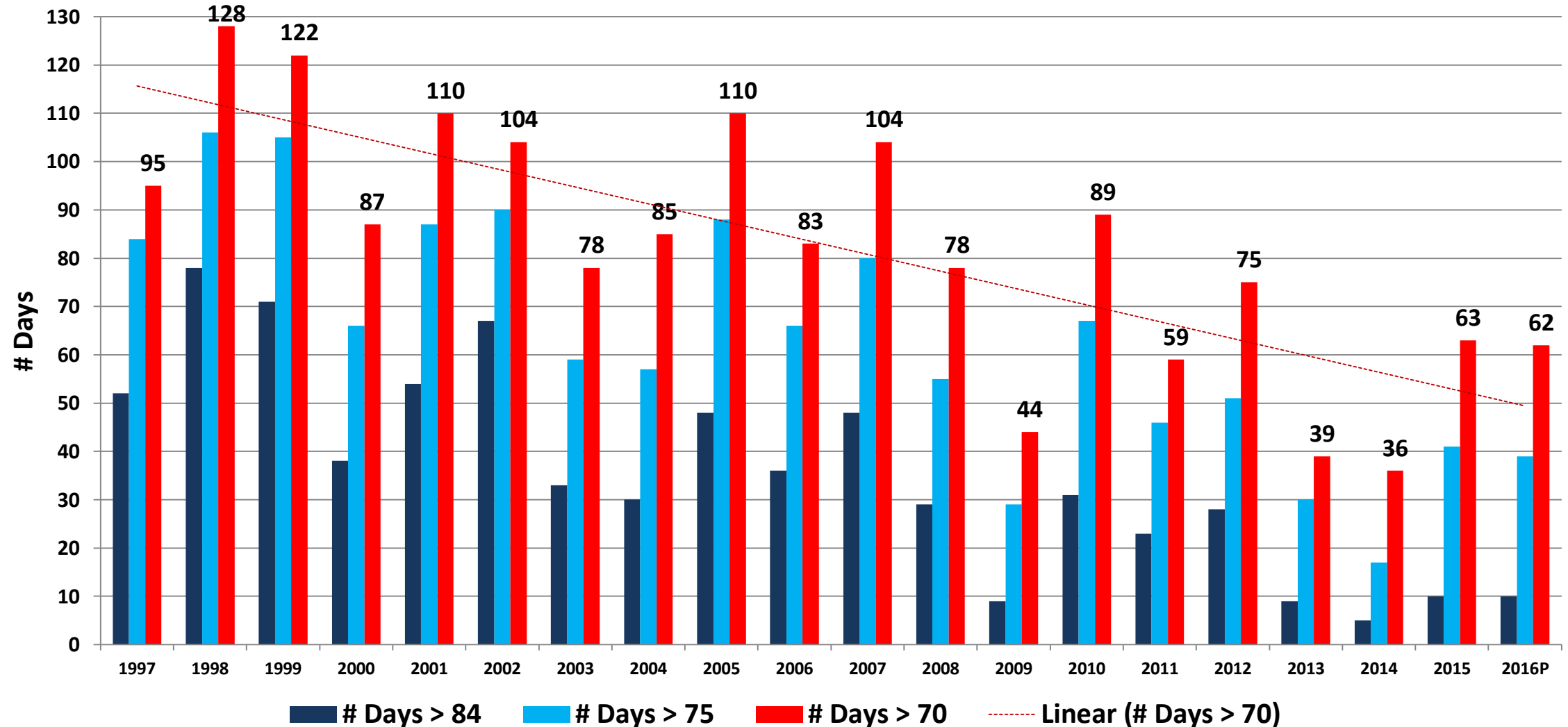


OZONE TRANSPORT COMMISSION

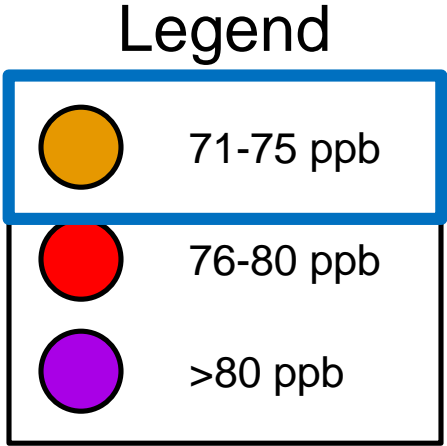
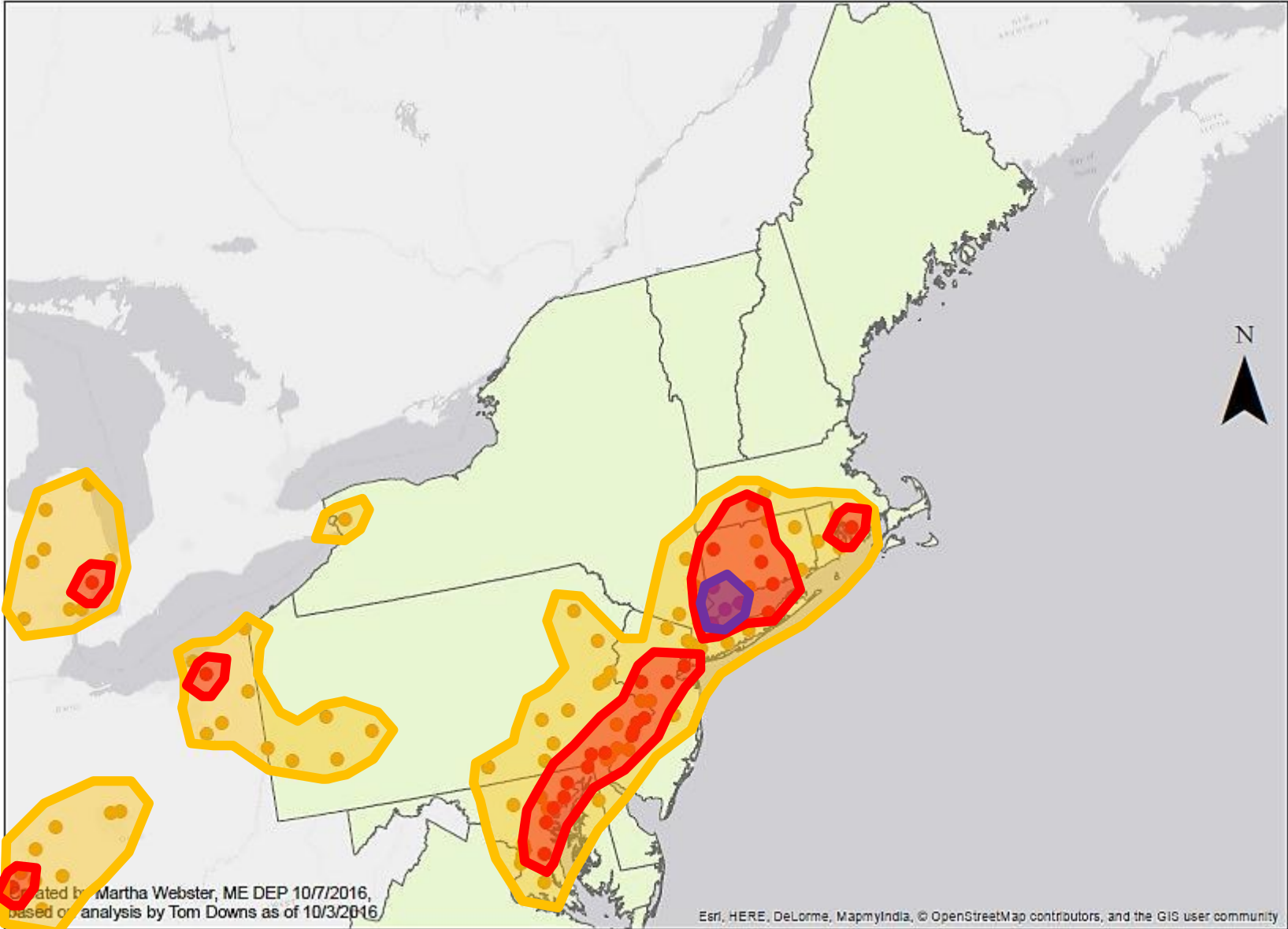
Ozone Planning Timeline



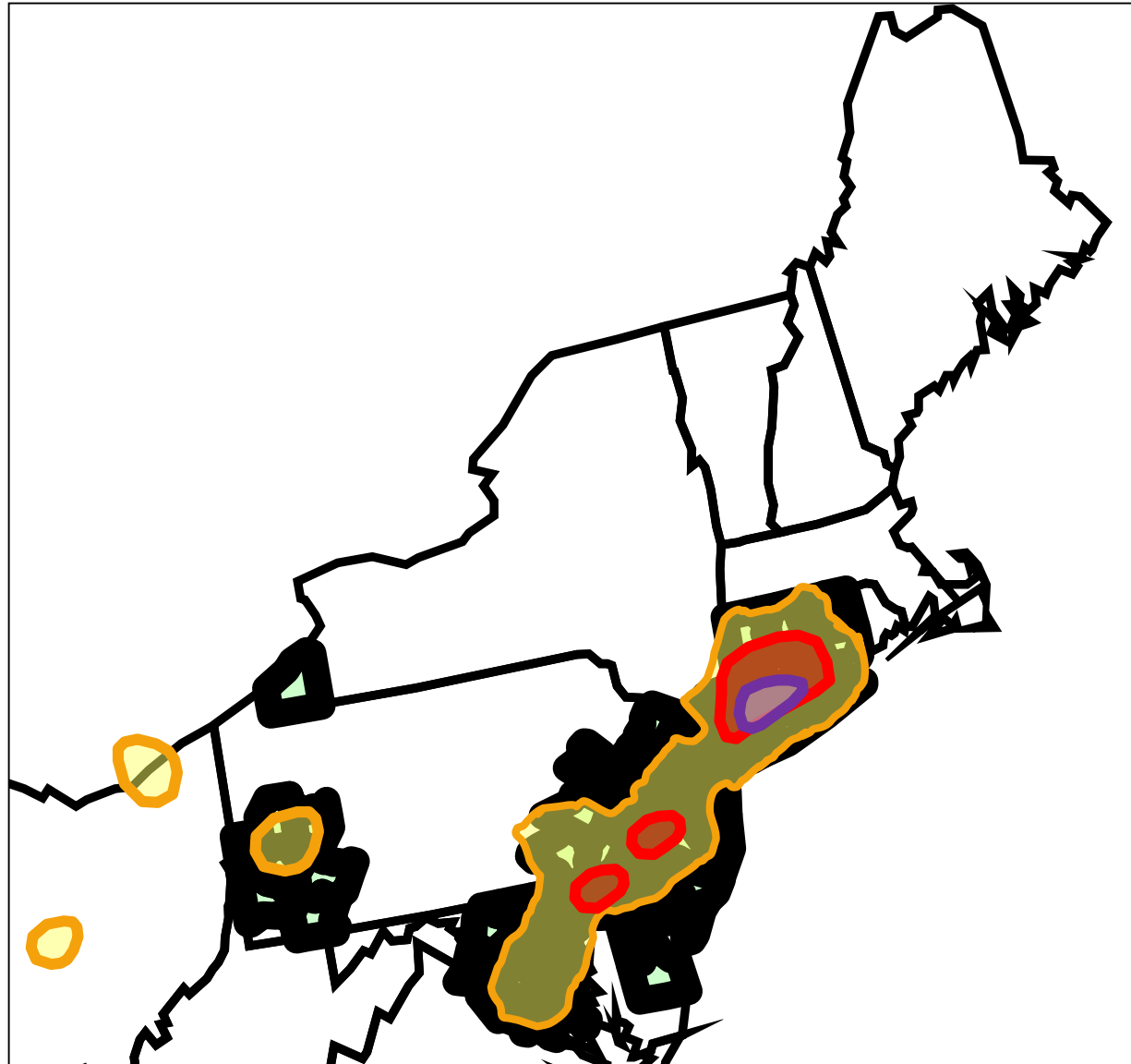
Trends for OTR Exceedance Days to 11/1/16



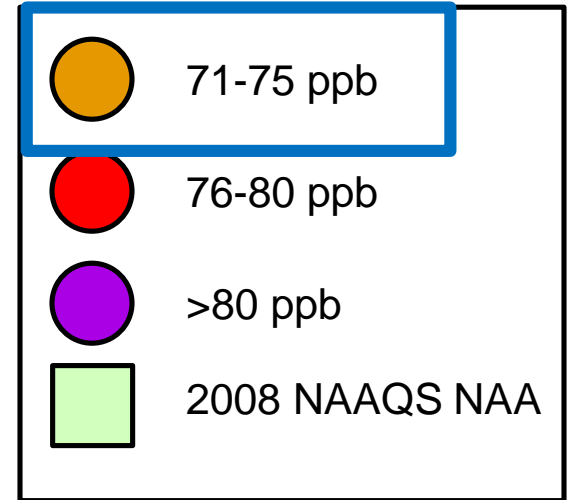
2016 4th High 8hr Ozone Value (Preliminary)



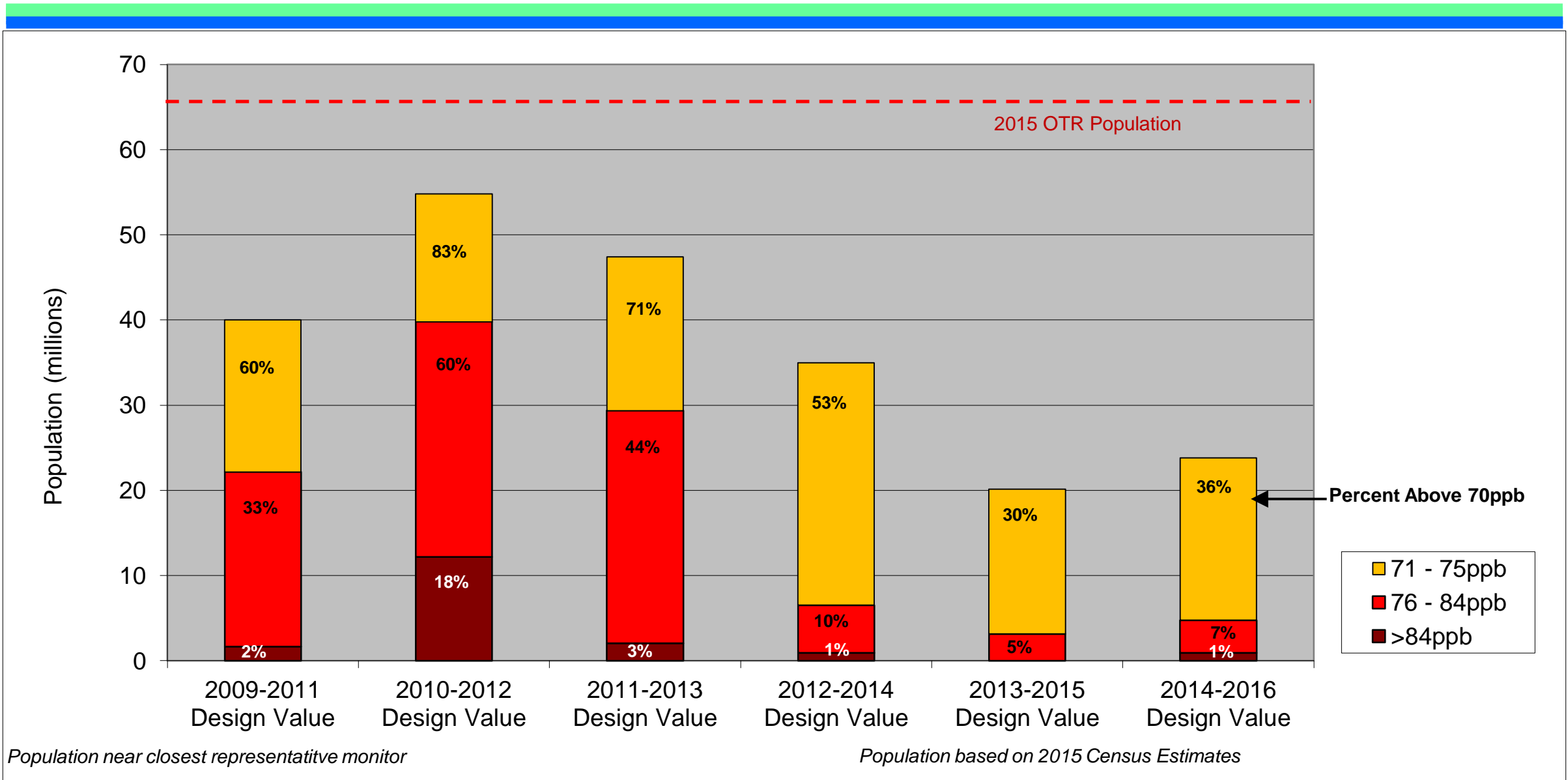
2014-16 8hr Ozone Preliminary Design Value



Legend



Population Ozone Exposure in the OTR

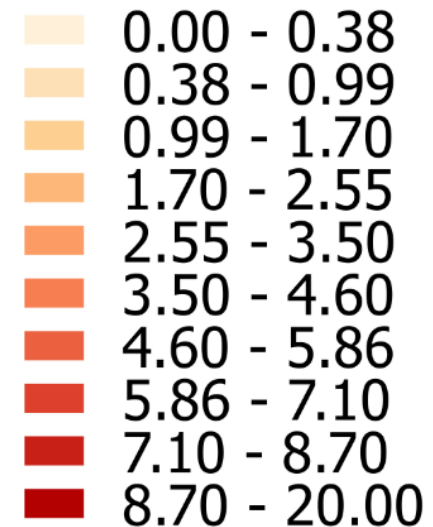
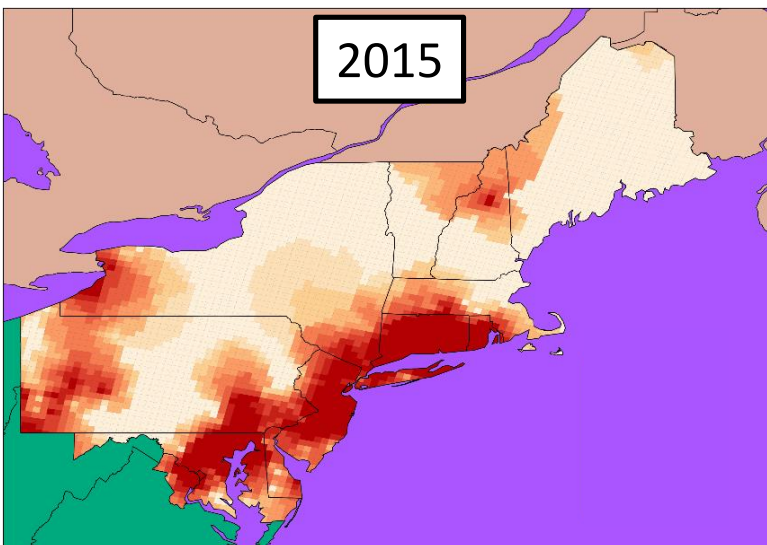
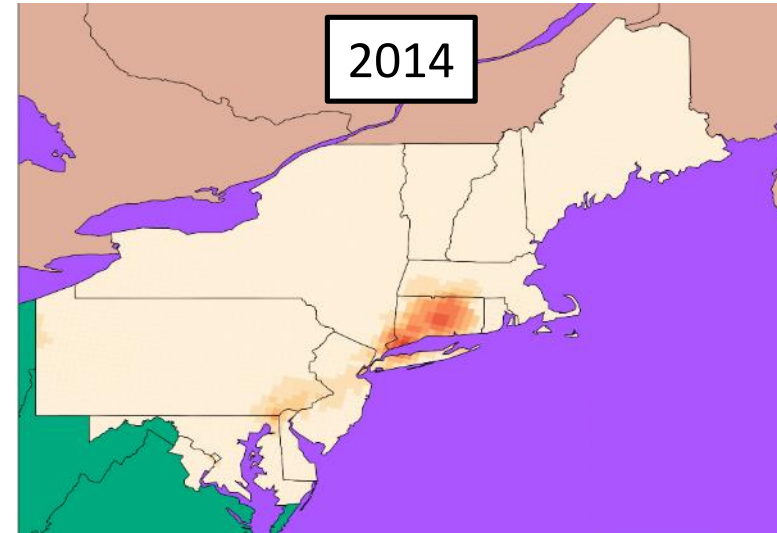
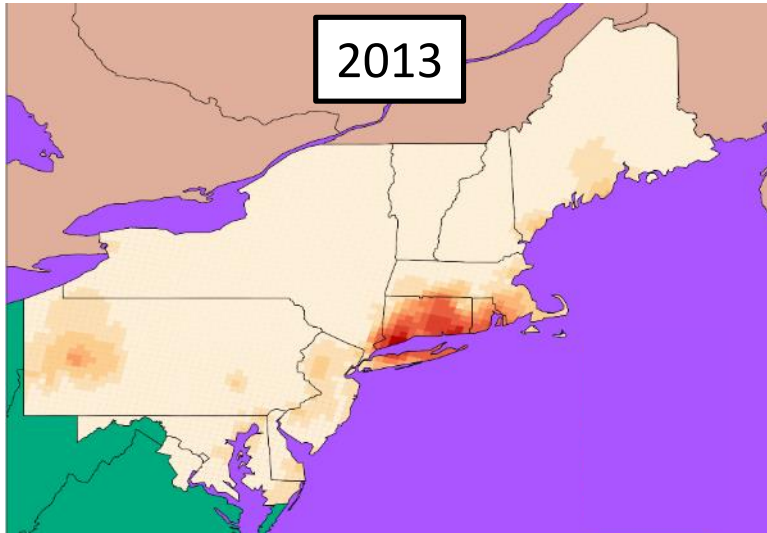


Ben Map Rollback Overview

- Data from 2013-15 hourly monitored Ozone data
- “Rolled back” the monitor data
 - Monitors with a 4th high >70ppb had ozone reduced through “peak shaving” to meet the NAAQS
- Employed health functions and economic valuations that are used by EPA in RIAs
- 2013-14 population projected from 2010 Census
- Conservative Estimate
 - Analysis does not consider
 - Downwind benefits from upwind controls
 - Benefit of over control on borderline monitors
 - Mortality from long-term Ozone exposure

Changes in Ozone Concentration after Rollback to 70ppb

Average ppb change in max 8hr ozone



Costs of Ozone Mortality from not meeting the 70 ppb NAAQS from 2013-15

	Reduced Incidence/Economic Benefit (95% CI)		
	2013	2014	2015
Mortality, All Causes (all ages)	190 (97-290)	100 (50-150)	1,800 (890-2,600)
Mortality Economic Impact (Billions \$)	\$1.4 (\$0.2-\$2.8)	\$0.8 (\$10-\$1.5)	\$14 (\$0.2-\$28)

Ranked 2016 OTR+VA Mortality Causes		
Endpoint	Deaths	Rank
Diarrhoeal diseases	2442	35
Oral Cancer	1763	36
HIV/AIDS	1547	37
Alcohol	1492	38
Congenital Anomalies	1440	39
Hepatitis C	1266	40



Note 1: Mortality that results from ozone exposure could be labeled in data as from asthma, COPD, etc.
Note 2: OTC BenMap results only include VA in OTR

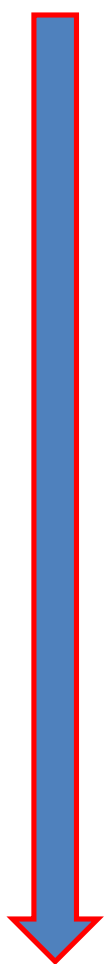
2011 SIP Modeling Platform TSD

- Covers Ozone and Regional Haze
- Final document available on otcair.org
- Available for citation in SIPs

- Includes:

Overview •Ch. 1	Meteorological Model •Ch. 2	Biogenic Emission Model •Ch. 3	Documentation of Emissions Processing •Chs. 4, 8
Model Setup •Ch. 5	2011 Performance Evaluation for Ozone & Haze •Ch. 6	Nested Gridding Work •Ch. 7	RRF Calculations & Land-Water Interface Issues •Ch. 9
	Future Year Base Case Modeling Results •Ch. 10	Episodic Modeling Protocol •Ch. 11	

OTC/MARAMA Emission Inventories



Alpha

- 2011

Alpha 2

- 2011
- 2018
- 2028

Beta

- 2011
- 2017

Beta 2

- 2017

✓ Beta Inventory Improvements

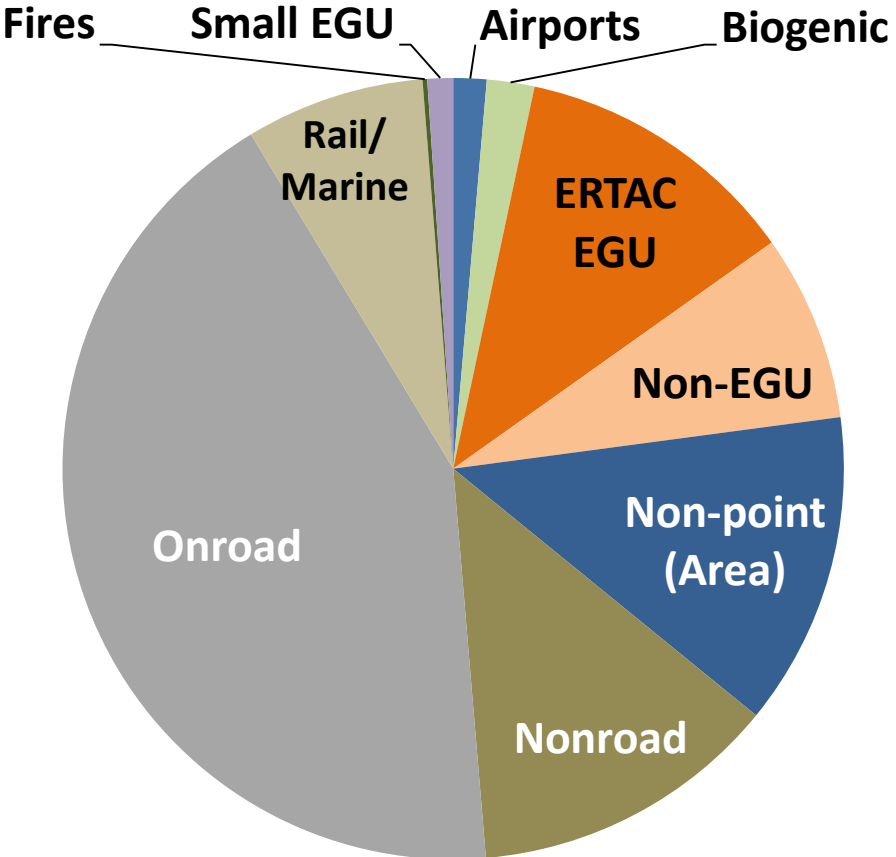
- Project future year to **2017**
- Upgrade to **ERTAC v2.5**
- MOVES2014a Emission Factors
- Small EGU Temporalization
- Include new rules (e.g. residential wood NSPS)
- State Adjustments/Updates
- BEIS 3.6.1 (from BEIS 3.6)
- Include state banked emissions
- EMF Growth

✓ Beta 2 Inventory Improvements

- Upgrade to **ERTAC v2.5L2**

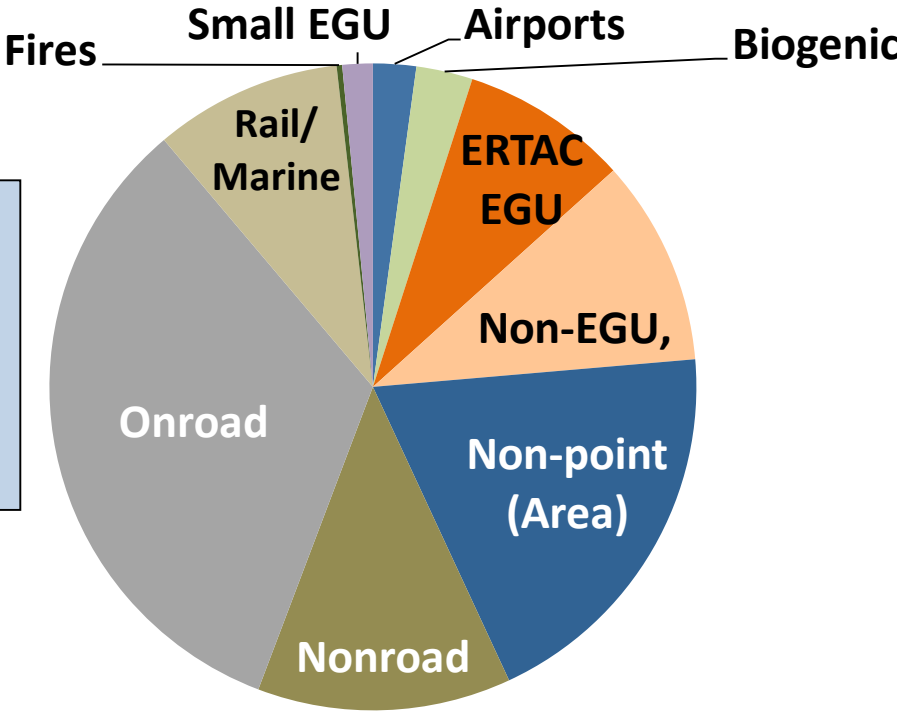
✓ Review by States & Stakeholders

OTR+VA Annual NO_x Emissions Summary 2011 → 2017



~2,000,000 tons/year
2011

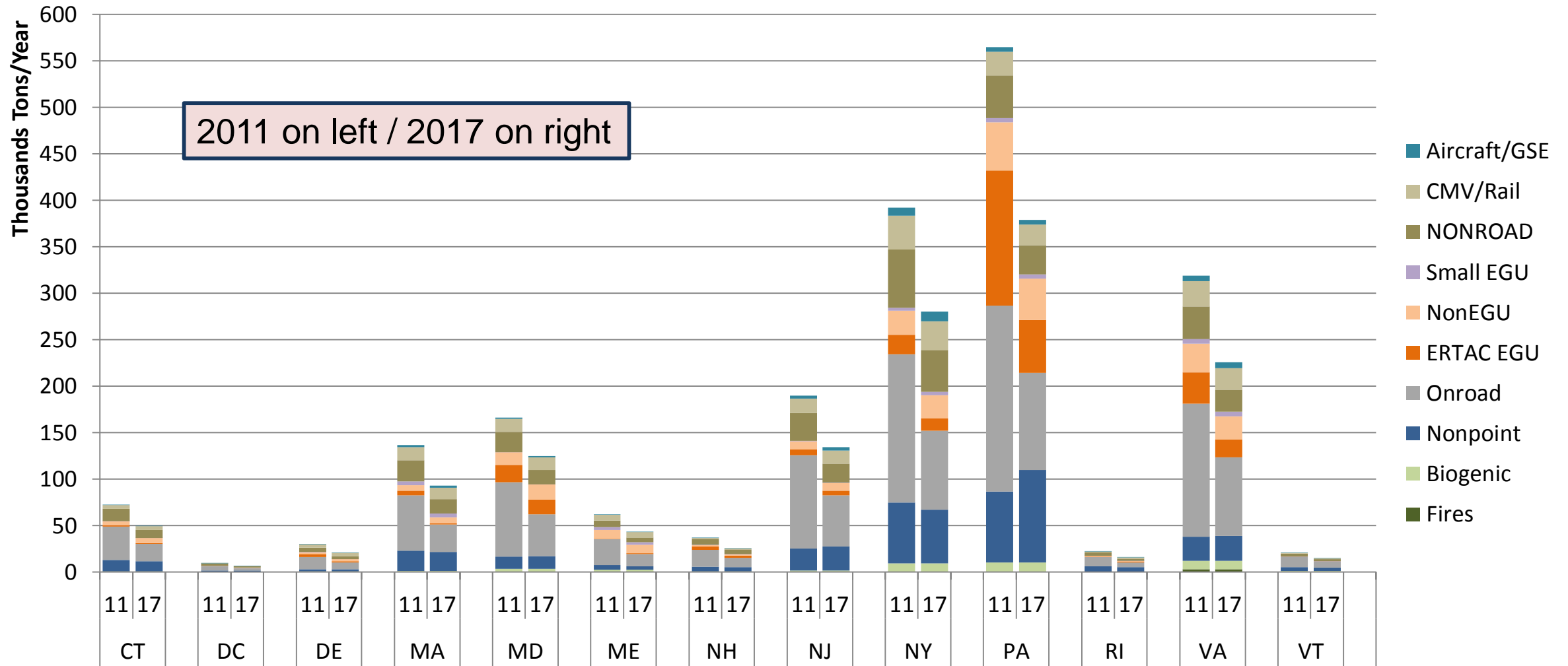
Overall NO_x reduction from 2011 → 2017 ~ 29%



~1,400,000 tons/year
2017



Annual NO_x Beta2 Emissions Summary 2011 → 2017



Photochemical Modeling

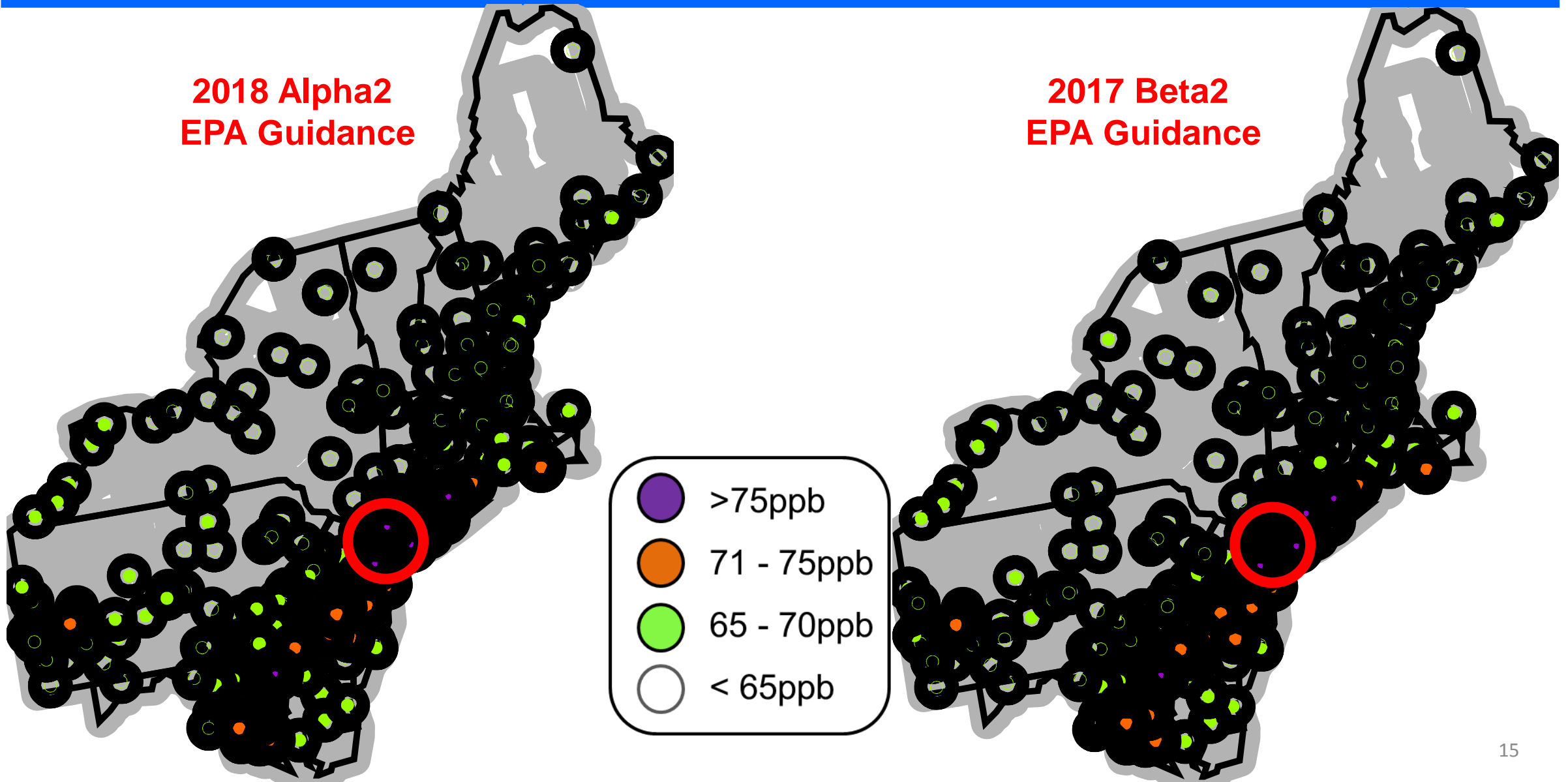
Current Work

- ✓ 2011 Beta Emission Inventory Base Case
 - Model performance meets applicable guidance
- ✓ 2017 Beta Emission Inventory Base Case
- 2028 Alpha2 emission Inventory Base Case
 - Results will be available soon after the OTC-MANE-VU Fall Meeting

Potential Next Steps

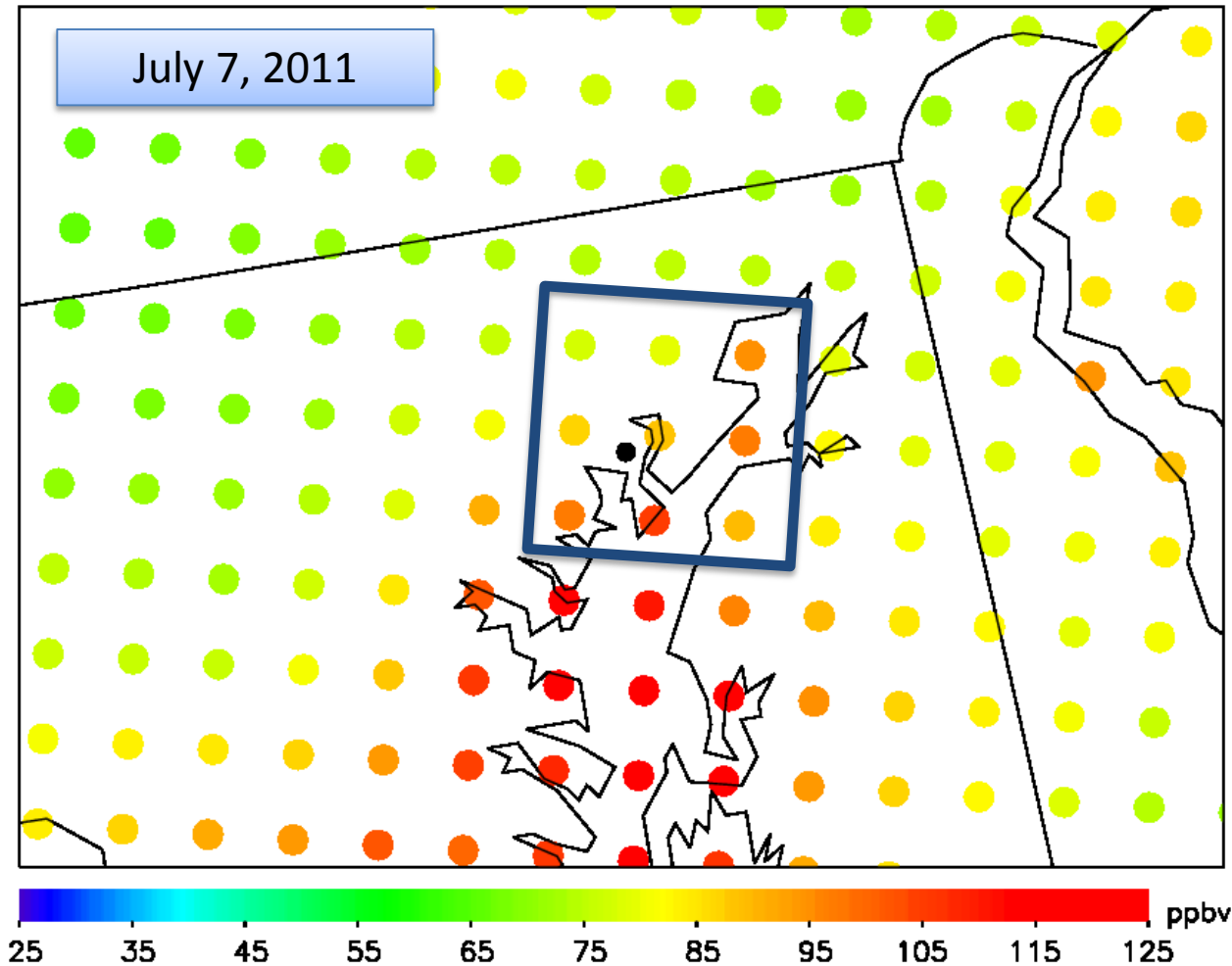
- 2020 and 2023 interpolated screening run for 2015 NAAQS planning
- Development of updated modeling platform for 2015 ozone NAAQS SIPs
 - Updated emissions and meteorology
 - Coordinating with other regions and EPA

2017 SIP Ready vs 2018 Base Case Modeling Results



Design Values at Water/Land Interface

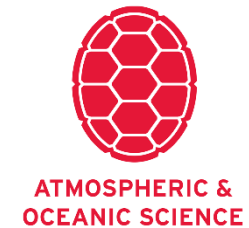
CAMx(Base) 8-hr Max Surface Ozone



Observed 8-hr Max:
87 ppb

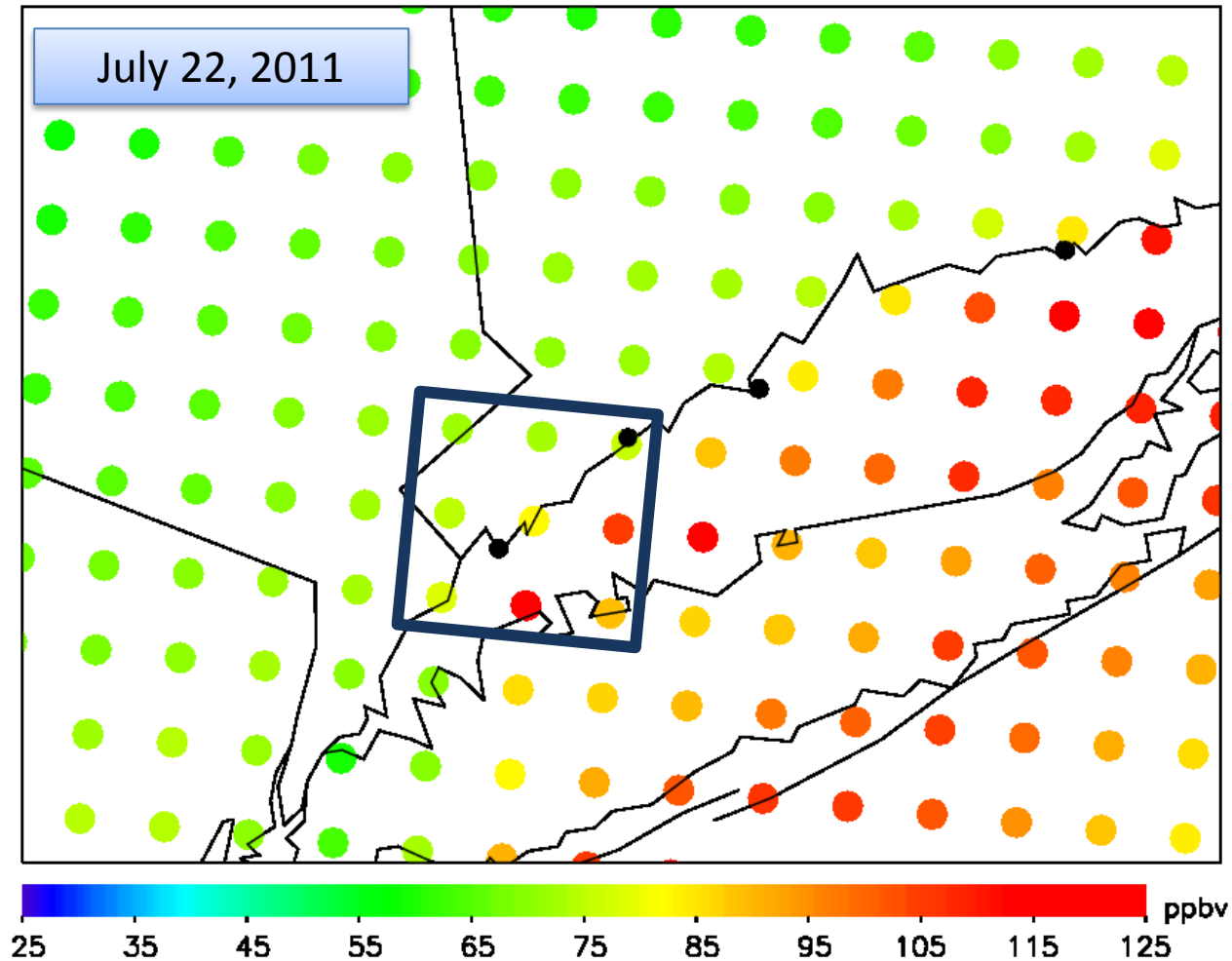
2011 8-hr Max Modeled O₃

78	79	95
87	88	97
97	105	90

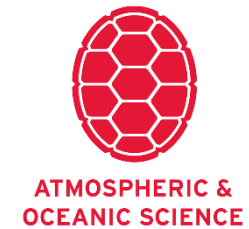


Design Values at Water/Land Interface

CAMx(Base) 8-hr Max Surface Ozone

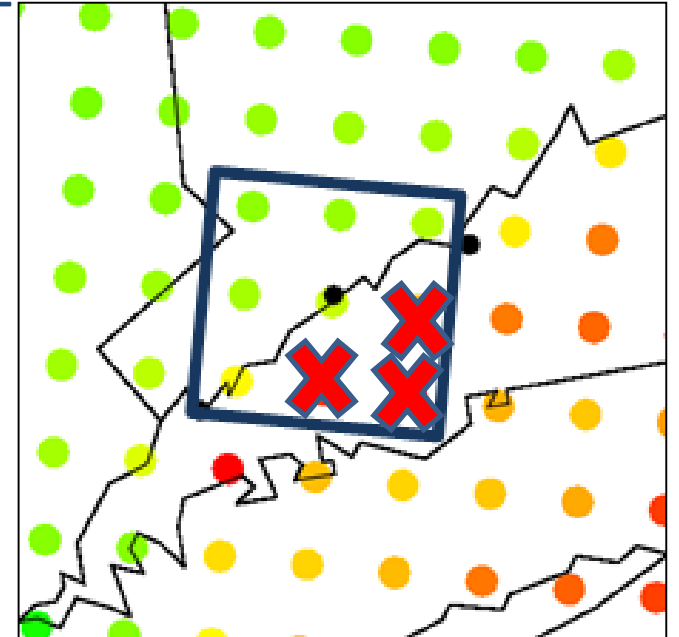


Same
issues in
Connecticut



Land-Water Interface Monitors

- Modeled Results at Monitors near water:
 - Model performance indicates risk of substantial over-prediction
 - Monitors can become rigid to control – don't respond
- Following EPA Guidance, grid cells over water are included in calculations for coastal monitors
- Ozone tends to model higher over water so this can distort the results
- Modeling Committee has developed a different approach that reduces this effect
 - Removes over water model grid cells from the 9-grid cell calculation



Near Water Monitor Conclusions

- Location REALLY matters when near the coast!
 - Grid cells over water may not be representative of monitor location
- The OTC technique of removing over water grid cells provides a sound alternative approach:
 - Improves performance
 - Easily implemented
 - Maintains foundation of EPA's Guidance by relying on max value over land from multiple grid cells (just not all 9)

Conclusions/Next Steps

- Portions of the Ozone Transport Region are not currently attaining the new 2015 ozone standard.
 - Some portions are also not yet meeting the 2008 ozone standard
- 2011 and 2017 MARAMA Beta emission inventories are complete and modeled
 - Available to states needing to file 2008 ozone nonattainment SIPs
 - Technical support document is also available
- Sensitivity modeling indicates that near water monitor locations can improve model performance with a modified analysis technique
- Planning work is now underway to develop a new SIP quality modeling for the 2015 ozone standard