Incremental Measures Available to Downwind States to Reduce VOC and NOx

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Gregory Stella
Alpine Geophysics, LLC

Objective

- EPA has provided “known” controls beyond attainment of the 75 ppb NAAQS for areas to implement in order to achieve proposed alternate NAAQS levels

- Files for 70, 65, and 60 ppb located in docket
  - For this analysis, we reviewed the 60 ppb packets
    - EPA-HQ-OAR-2013-0169-0024 (NOx)
    - EPA-HQ-OAR-2013-0169-0026 (VOC)

- This presentation is not a proposed control strategy for attainment at northeastern receptors and is simply an accounting of what has EPA has documented as available beyond attainment of the 75 ppb baseline

Presentation Focus

- EPA applied controls regionally with intention of impacting regional air quality
- Our focus on EPA “nonattainment” receptors identified in Steve Page memorandum

Table 1. Ambient and 2018 projected average and maximum 8-hour ozone design values (DVs) at 2018 nonattainment receptors in the East (nonattainment receptors have a 2018 average design value of ≥ 76.0 ppb). Units are ppb.

State	County	Site ID	2009 - 2013 Avg DVs	2009 - 2013 Max DVs	2018 Avg DVs	2018 Max DVs
Connecticut	Fairfield	90013007	84.3	89.0	76.7	81.0
Connecticut	Fairfield	90019003	83.7	87.0	77.5	80.6
Maryland	Harford	240251001	90.0	93.0	79.4	82.1
New York	Suffolk	361030002	83.3	85.0	78.2	79.8

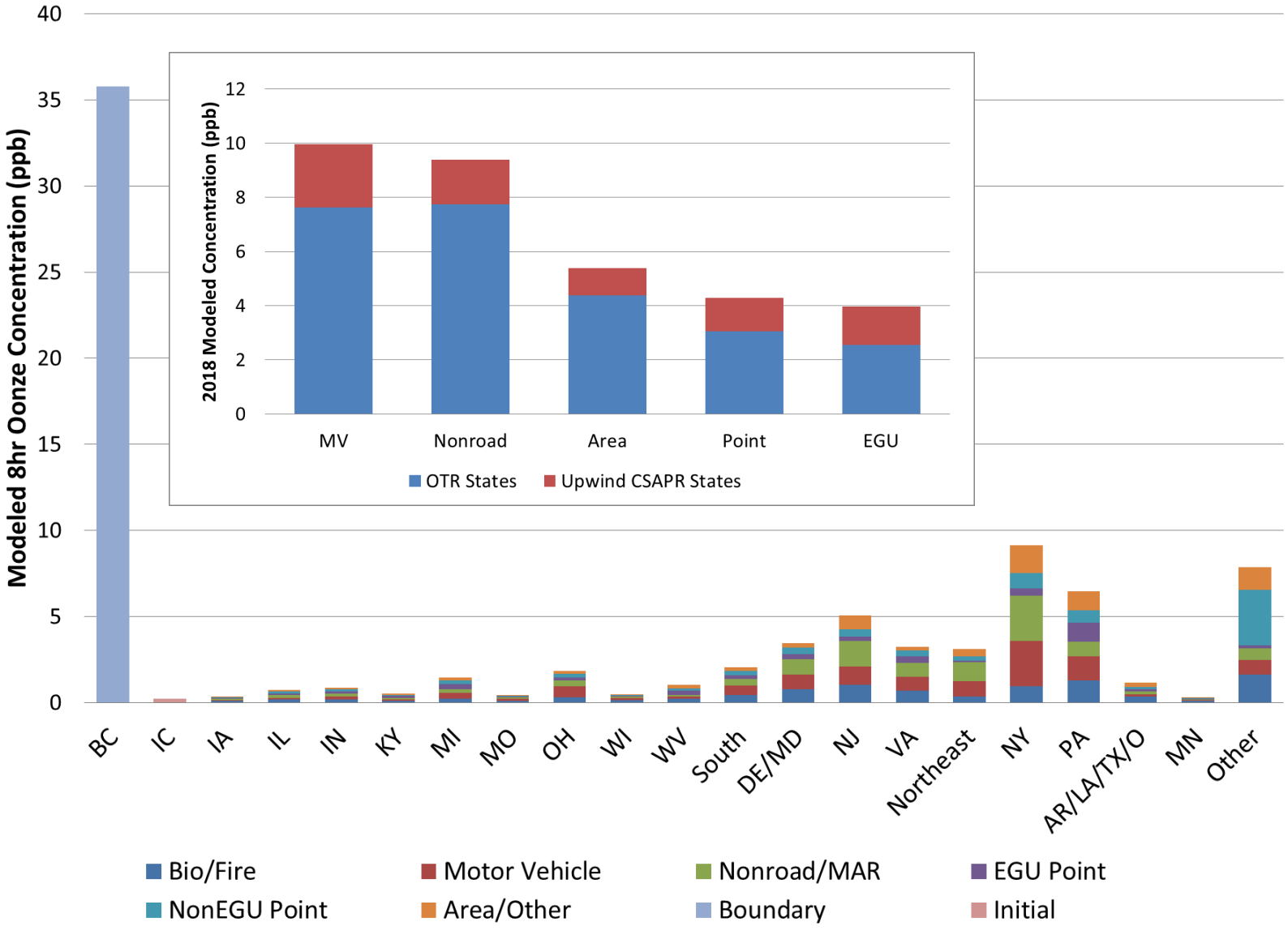
Our Review

- Compared recent OSAT results of residual relative contribute and determined local incremental control would best be applied

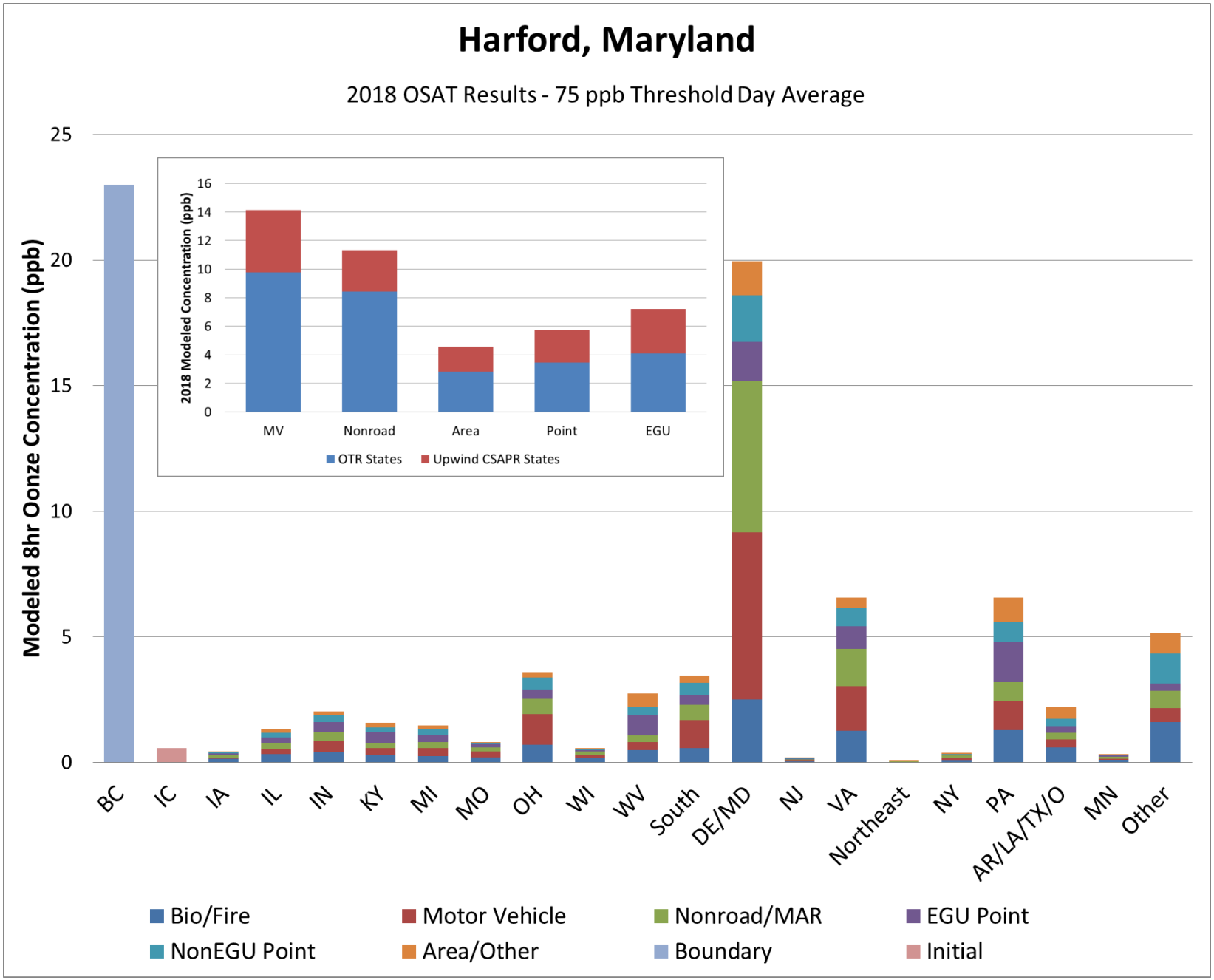
- Extract control programs from EPA proposed ozone NAAQS files to document incremental emission reduction opportunities in northeast
  - Limits control to where EPA indicates it is needed and therefore not exhaustive list of available controls

- EPA proposed ozone NAAQS list of controls does not contain on-road mobile source strategies beyond Tier 3
  - However, demonstrated, incremental reductions are known to be available

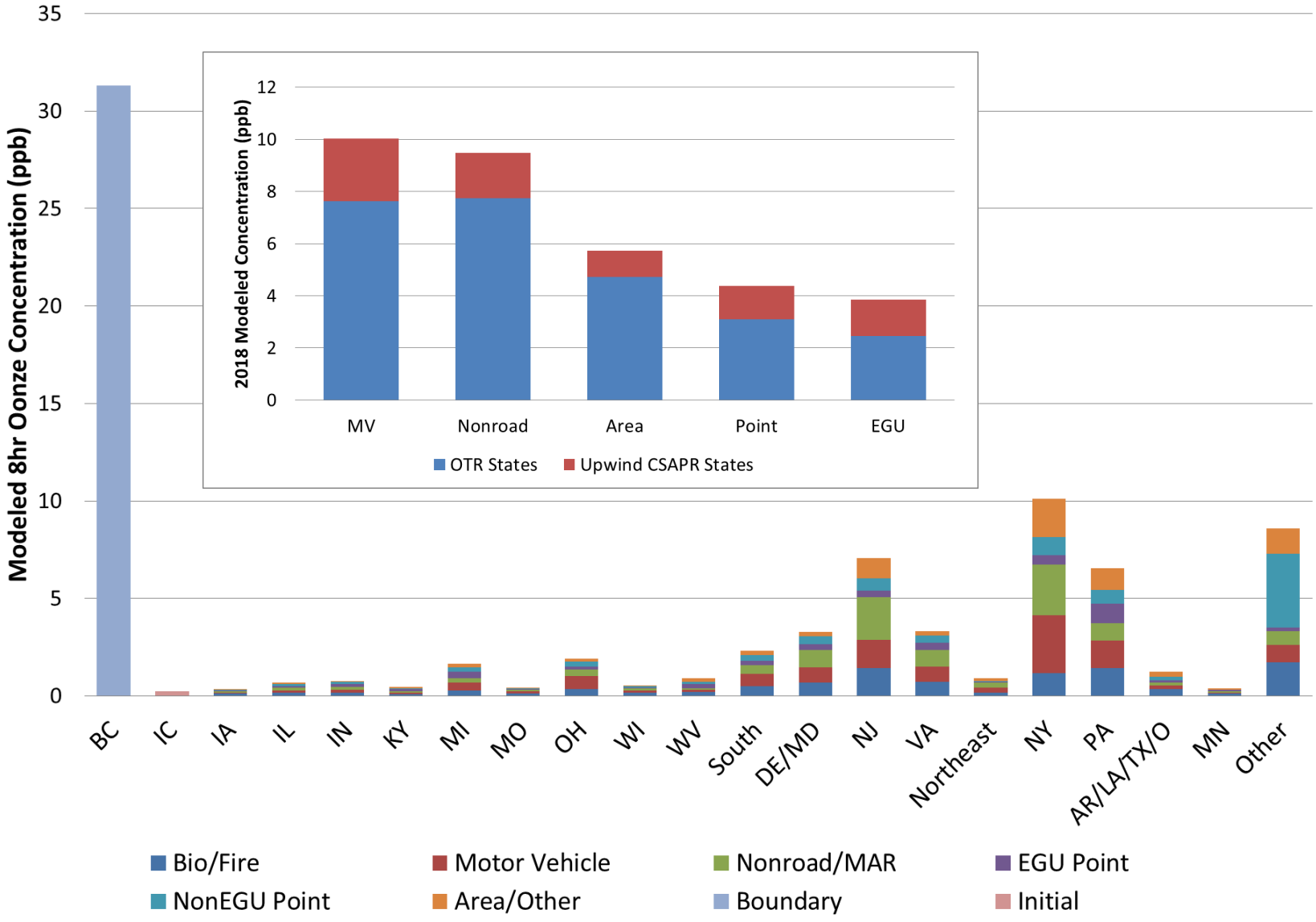
Fairfield, Connecticut



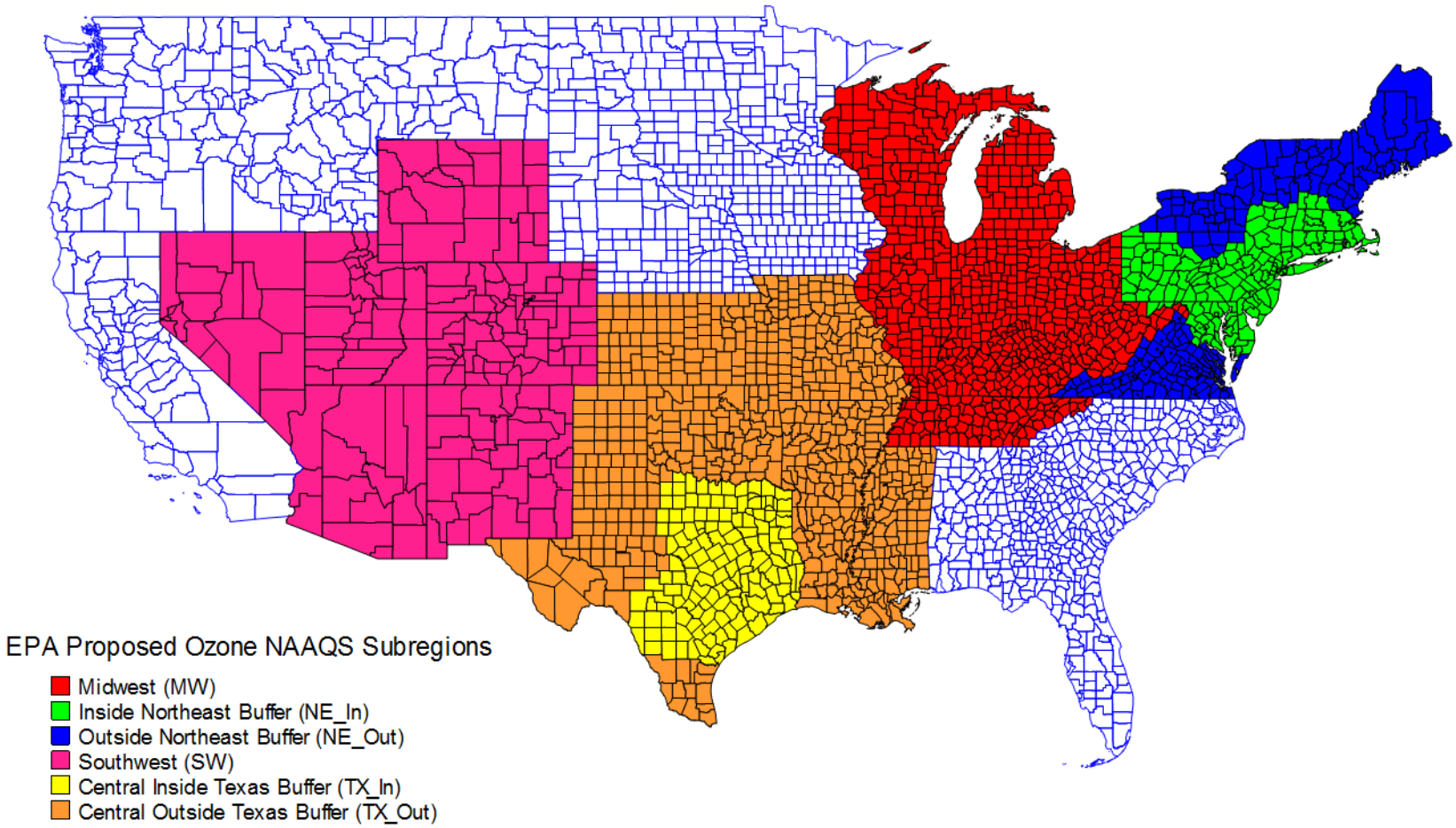
Harford, Maryland



Suffolk, New York



EPA Designated Control Regions



EPA “Known” NOx Reductions

Region	Sub-Region	Source	2025 Baseline NOx Emissions (tpy)	Known Annual NOx Emission Reductions (60 ppb) TPY	% Red
Northeast	Inside NE Buffer	Area	240,910	68,036	28%
	Inside NE Buffer	EGU	88,023	5,685	6%
	Inside NE Buffer	Non-road	166,525	1,840	1%
	Inside NE Buffer	On-road	159,249	0	0%
	Inside NE Buffer	Point	140,295	47,157	34%
	Subtotal	***All Sources***	***795,002***	***122,717***	***15%***
	Outside NE Buffer	Area	98,263	24,431	25%
	Outside NE Buffer	EGU	11,499	892	8%
	Outside NE Buffer	Non-road	72,505	743	1%
	Outside NE Buffer	On-road	72,504	0	0%
	Outside NE Buffer	Point	69,674	22,369	32%
	Subtotal	***All Sources***	***324,445***	***48,434***	***15%***

EPA “Known” NOx Reductions

State	2025 Baseline NOx Emissions (tpy)	Known Annual NOx Emission Reductions (60 ppb) TPY	% Red
Connecticut	40,784	3,520	9%
Delaware	15,393	1,187	8%
District of Columbia	4,221	664	16%
Maryland	80,138	17,605	22%
Massachusetts	75,977	9,934	13%
New Jersey	86,758	11,270	13%
New York	231,968	34,179	15%
Pennsylvania	351,111	59,038	17%
Rhode Island	13,134	76	1%
Maine	39,523	2,746	7%
New Hampshire	16,599	1,192	7%
Vermont	9,995	533	5%
Virginia	153,847	28,515	19%
Northeast Buffer Total	**1,119,447**	**170,458**	**15%**

List of EPA "Known" Controls – NOx Within Northeastern Buffers

	2025 NOx Annual Emissions/Reductions (60 ppb)		
Source Group	**Baseline**	**Reduction**	**% Red**
Agriculture	8,272	622	8%
By-Product Coke Mfg; Oven Underfiring	2,571	1,543	60%
Cement Kilns	1,009	232	23%
Cement Manufacturing - Dry	8,848	7,894	89%
Cement Manufacturing - Wet	4,627	4,103	89%
Coal Cleaning-Thrml Dryer; Fluidized Bed	642	313	49%
Comm./Inst. Incinerators	2,830	1,108	39%
Commercial	5,821	353	6%
Commercial/Institutional - NG	34,802	18,899	54%
Construction	35,025	1,542	4%
EGU	9,040	6,577	73%
External Combustion Boilers, Elec Gen, Nat Gas (1)	123	62	50%
Fluid Cat Cracking Units; Cracking Unit	1,691	1,519	90%
Gas Turbines - Natural Gas	4,894	3,531	72%
Glass Manufacturing - Container	2,700	2,264	84%
Glass Manufacturing - Flat	8,565	7,280	85%
Glass Manufacturing - General	273	232	85%
Glass Manufacturing - Pressed	399	339	85%
IC Engines - Gas/ Diesel/ LPG	1,778	444	25%
ICI Boilers - Coal/Cyclone	3,021	2,417	80%
ICI Boilers - Coal/Stoker	2,894	2,292	79%
ICI Boilers - Coal/Wall	6,749	6,060	90%
ICI Boilers - Natural Gas	5,116	4,202	82%
ICI Boilers - Process Gas	1,914	1,670	87%
ICI Boilers - Residual Oil	4,476	2,380	53%

List of EPA "Known" Controls – NOx Within Northeastern Buffers

	2025 NOx Annual Emissions/Reductions (60 ppb)		
Source Group	**Baseline**	**Reduction**	**% Red**
In-Proc;Process Gas;Coke Oven/Blast Furn	597	328	55%
In-Process; Bituminous Coal; Cement Kiln	158	142	90%
Indust. Incinerators	493	222	45%
Industrial	1,794	42	2%
Industrial Coal Combustion	4,840	366	8%
Industrial NG Combustion	99	5	5%
Industrial NG ICE, 4cycle (rich)	36,073	32,466	90%
Industrial Oil Combustion	910	42	5%
Internal Combustion Engines - Gas	3,914	1,147	29%
Internal Combustion Engines - Oil	1,586	1,269	80%
Iron & Steel - In-Process Combustion - Bituminous	524	472	90%
Iron & Steel Mills - Annealing	81	80	99%
Iron & Steel Mills - Reheating	340	262	77%
Lean Burn IC Engine - Gas	11,414	9,930	87%
Lime Kilns	4,172	1,252	30%
Mining	674	24	4%
Municipal Waste Combustors	1,113	501	45%
Open Burning	2,268	1,814	80%
Petroleum Refinery Gas-Fired Process Heaters	110	95	87%
Residential Heating	31,936	3,194	10%
Residential NG	61,615	29,696	48%
Solid Waste Disp;Gov;Other Incin;Sludge	9,579	8,462	88%
Space Heaters - Natural Gas	37	30	80%
Utility Boiler - Coal/Wall	1,247	1,038	83%
Utility Boiler - Oil-Gas/Wall	497	397	80%

EPA “Known” VOC Reductions

Region	Sub-Region	Source	2025 Baseline VOC Emissions (tpy)	Known Annual VOC Emission Reductions (60 ppb) TPY	% Red
Northeast	Inside NE Buffer	Area	578,805	35,641	6%
	Inside NE Buffer	EGU	3,202	0	0%
	Inside NE Buffer	Non-road	170,700	0	0%
	Inside NE Buffer	On-road	123,199	0	0%
	Inside NE Buffer	Point	45,299	297	1%
	Subtotal	***All Sources***	**921,205**	**35,938**	**4%**
	Outside NE Buffer	Area	260,285	0	0%
	Outside NE Buffer	EGU	1,418	0	0%
	Outside NE Buffer	Non-road	84,497	0	0%
	Outside NE Buffer	On-road	49,299	0	0%
	Outside NE Buffer	Point	27,875	0	0%
	Subtotal	***All Sources***	**423,374**	**0**	**0%**

EPA “Known” VOC Reductions

State	2025 Baseline VOC Emissions (tpy)	Known Annual VOC Emission Reductions (60 ppb)	
		TPY	% Red
Connecticut	61,893	5,537	9%
Delaware	16,682	0	0%
District of Col	6,363	0	0%
Maryland	87,484	0	0%
Massachusetts	112,018	0	0%
New Jersey	140,615	16,502	12%
New York	308,784	13,899	5%
Pennsylvania	291,720	0	0%
Rhode Island	16,304	0	0%
Maine	43,983	0	0%
New Hampshire	34,558	0	0%
Vermont	21,624	0	0%
Virginia	202,551	0	0%
Northeast Buffer Total	**1,344,579**	**35,938**	**3%**

List of EPA "Known" Controls – VOC Within Northeastern Buffers

	2025 VOC Annual Emissions/Reductions (60 ppb)		
Source Group	**Baseline**	**Reduction**	**% Red**
Adhesives - Industrial	2,326	1,698	73%
Aircraft Surface Coating	244	149	61%
Architectural Coatings	24,111	13,261	55%
Architectural, Industrial Maintenance, and Traffic Coatings	4,147	1,949	47%
Automobile Refinishing	2,434	2,166	89%
Bakery Products	949	379	40%
Coating; Arts	149	134	90%
Coating; Arts; Miscellaneous	2,162	1,945	90%
Cutback Asphalt	60	60	100%
Electrical/Electronic Coating	240	168	70%
Flexible Package Printing	192	129	67%
Graphic Arts	4,588	2,982	65%
Industrial Cleaning Solvents	11	11	94%
Lithographic Printing & Letterpress Printing	10	8	75%
Machn, Electric, Railroad Ctng	678	413	61%
Marine Surface Coating	841	757	90%
Metal Can Coating	2,291	2,062	90%
Metal Can Surface Coating	104	98	95%
Metal Coil Coating	375	338	90%
Metal Furn, Appliances, Parts	5,276	2,902	55%
Motor Vehicle Coating	489	176	36%
Municipal Solid Waste Landfill	385	270	70%
Paper and Other Web Coating	23	22	95%
Petroleum Flare	13	12	98%
Printing/Publishing	20	18	90%
Stage II Service Stations - Underground Tanks	3,606	2,632	73%
Wood Furniture Surface Coating	2,014	947	47%
Wood Product Surface Coating	293	252	86%

Noted Emission Reductions from OTC Measures Not Currently Modeled by EPA in Baseline

OTC Model Control Measures	Regional Reductions (tons per year)	Regional Reductions (tons per day)
Aftermarket Catalysts	14,983 (NOx) 3,390 (VOC)	41 (NOx) 9 (VOC)
On-Road Idling	19,716 (NOx) 4,067 (VOC)	54 (NOx) 11 (VOC)
Nonroad Idling	16,892 (NOx) 2,460 (VOC)	46 (NOx) 7 (VOC)
Heavy Duty I & M	9,326 (NOx)	25 (NOx)
Enhanced SMARTWAY	2.5%	
Ultra Low NOx Burners	3,669 (NOx)	10 (NOx)
Consumer Products	9,729 (VOC)	26 (VOC)
AIM	26,506 (VOC)	72 (VOC)
Auto Coatings	7,711 (VOC)	21 (VOC)

- Just in the OTC states
- Reductions developed as part of OTC Committee work
- These emission reduction estimates are being updated
- Result in about 150 tpd total NOx and 150 tpd total VOC emission reduction in the 13 OTR states
- Not included in EPA OTB/OTW modeling

Source: "What Does the Modeling Tell Us About Good Neighbor SIPs and the New EPA Transport Guidance?", Tad Aburn, April 8, 2014

“Inside MD” Reductions Not Currently Modeled BY EPA

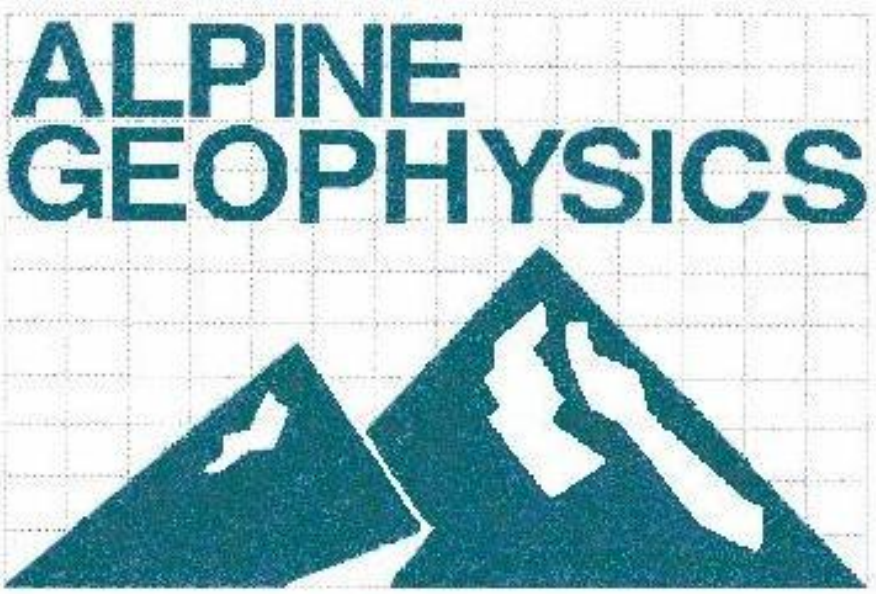
- New EGU regulation for NOx
  - Required for RACT and Attainment
- Maryland efforts on mobile sources
  - Electric vehicle initiatives
  - ZEV efforts
  - “Beyond Conformity” partnerships

Source: “What Does the Modeling Tell Us About Good Neighbor SIPs and the New EPA Transport Guidance?”, Tad Aburn, April 8, 2014

Observations

- There appear to be ample measures available locally to impact ozone concentrations in the northeastern domain

- Additional, incremental mobile source reductions exist in northeastern states although not documented by EPA in proposed ozone NAAQS



Gregory Stella
Managing Partner
Alpine Geophysics, LLC
gms@alpinegeophysics.com
828-675-9045