OTC Modeling Committee Update
OTC and MANEVU Stakeholders Meeting
April 21, 2023

OTC Modeling Committee

Chairs, Kevin Civerolo and Margaret LaFarr, NYS DEC
Committee Lead, Alexandra Karambelas, OTC/NESCAUM

OZONE TRANSPORT COMMISSION

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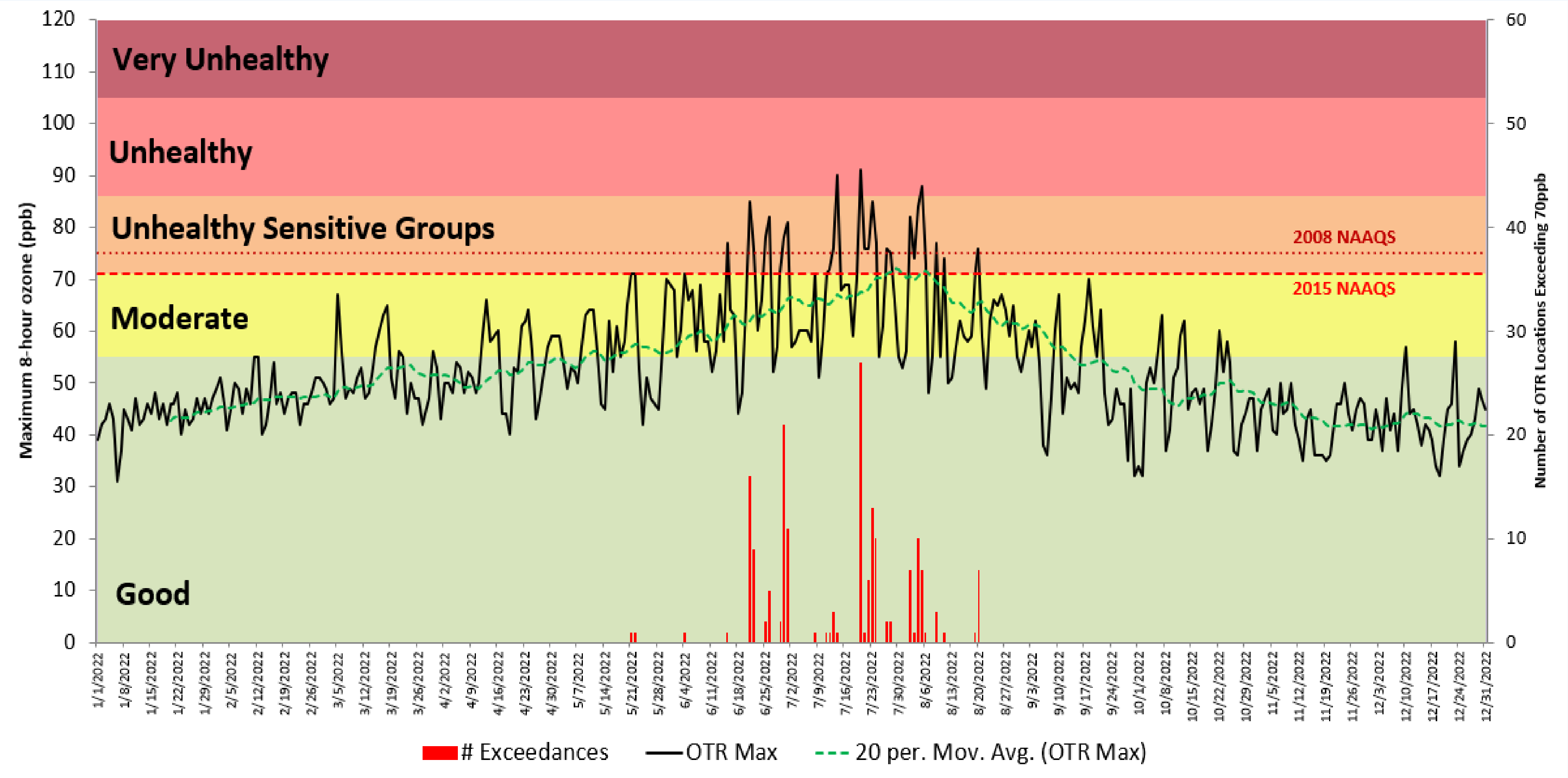
Accomplishments

- Tracked current OTR O_3 levels and preliminary attainment status
- Completed 2016 & 2023 simulations with CMAQ and CAMx – V1 platform (Emissions Collaborative), with ERTAC v16.1
- Completed V1 Technical Support Document – OTC website February 2023
- Completed 2016/2023/2026 simulations with CMAQ and CAMx – EPA V2 platform with V3 updates to CMV & solvents ("V2/V3"), with ERTAC v16.2
- Completed tagged emissions contribution modeling
- Completed 2018/19 episodic modeling on high electric demand days (HEDD), and relative impacts of NOx vs VOC reductions

2022 OTR Statistical Information

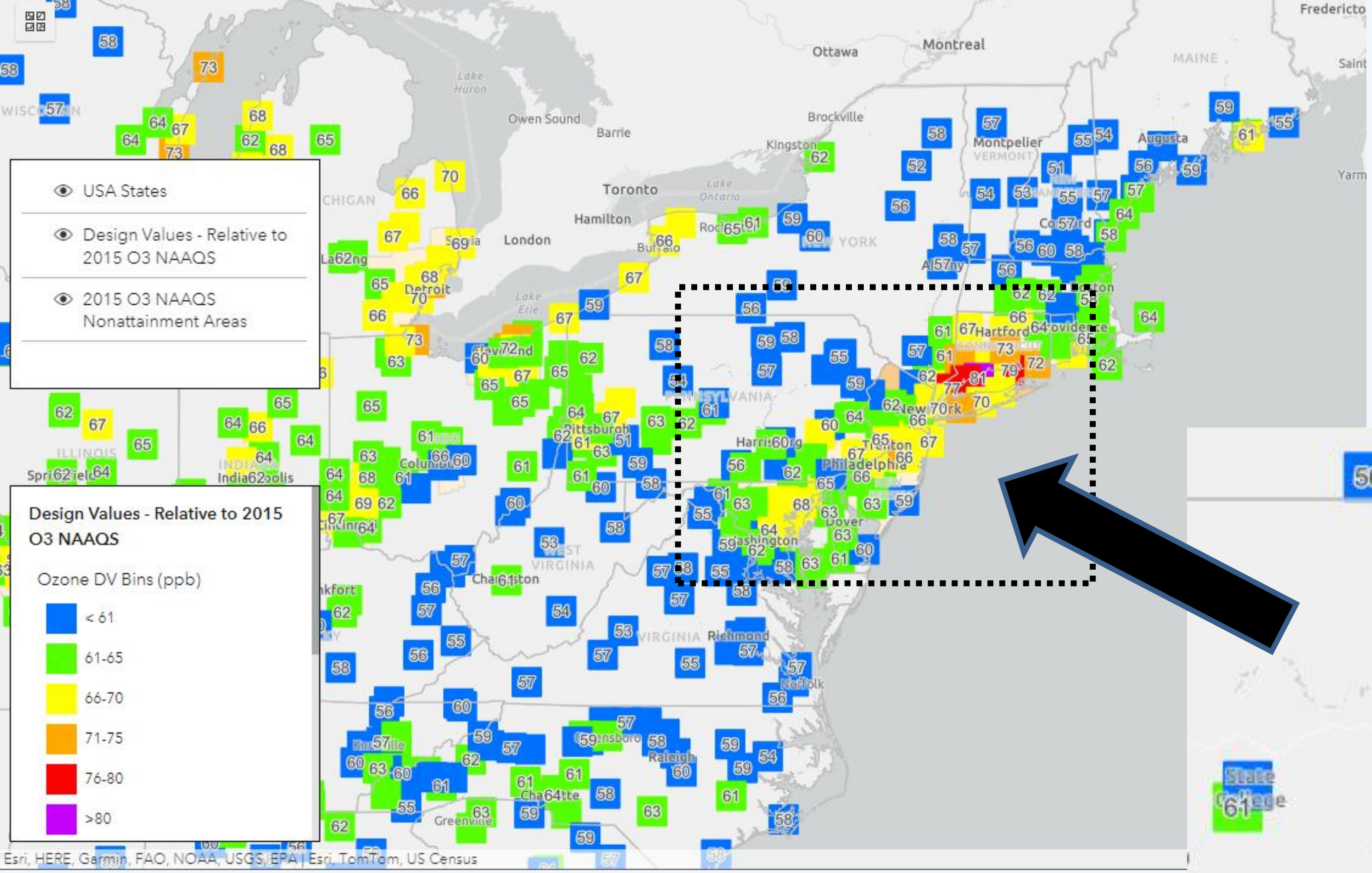
- Highest 8-hour average was 91 ppb found at East Matunuck, RI
- 74 sites have exceeded 70 ppb at least once, with 6 sites exceeding 84 ppb
- 7 sites in NYC NAA, 1 site in the Phila. NAA, and 1 site in the Greater CT NAA have a Preliminary 2020-22 DV > 2015 NAAQS

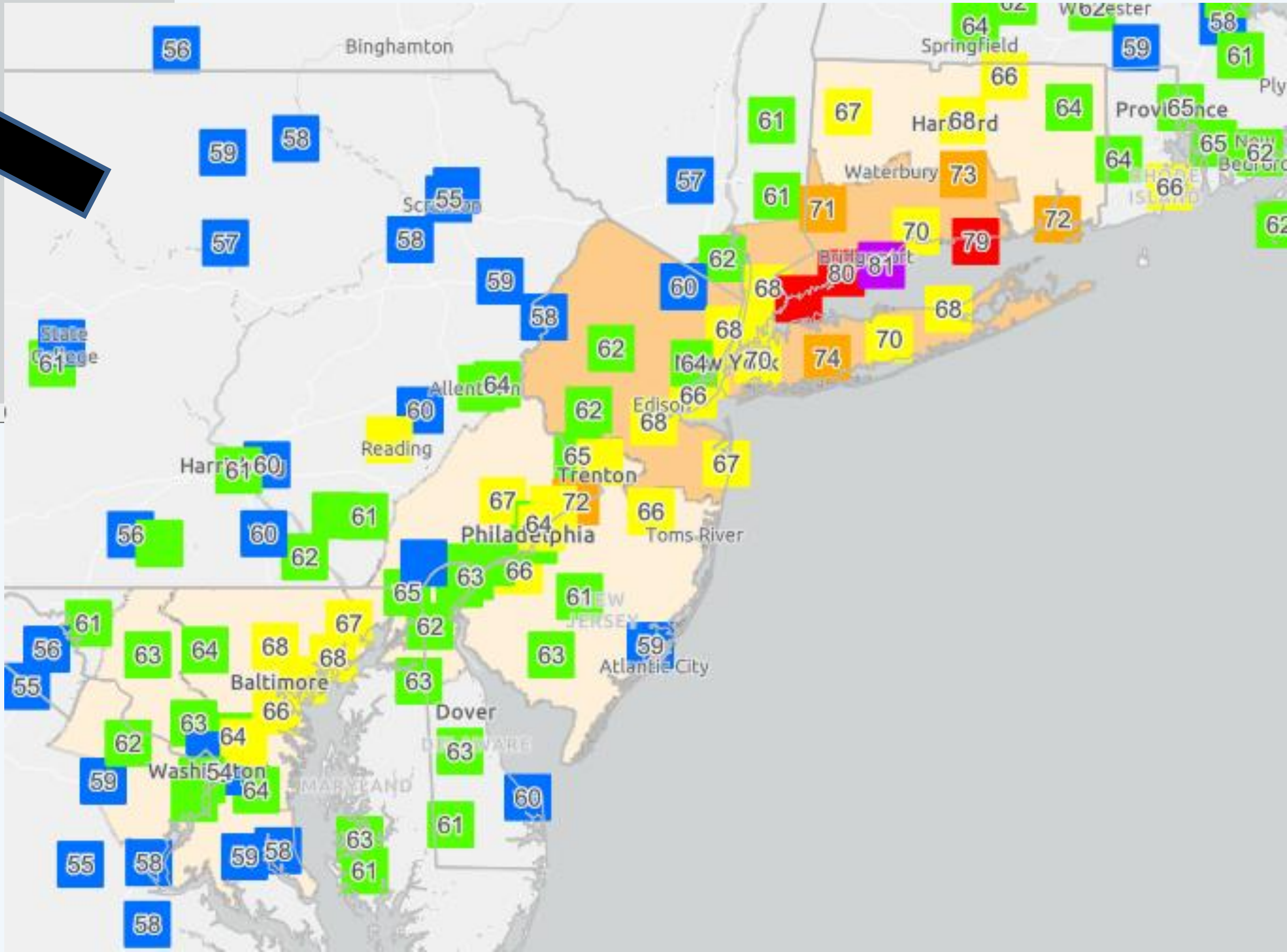


32 days exceeding 70ppb	74 different monitors in	10 states (including DC) exceeded 70ppb
20 days exceeding 75ppb	35 different monitors in	10 states (+DC) exceeded 75ppb
5 days exceeding 84ppb	6 different monitors in	4 states exceeded 84 ppb

Data prepared by Marcus Chase (NH DES)

Preliminary 2020-22 Design Values

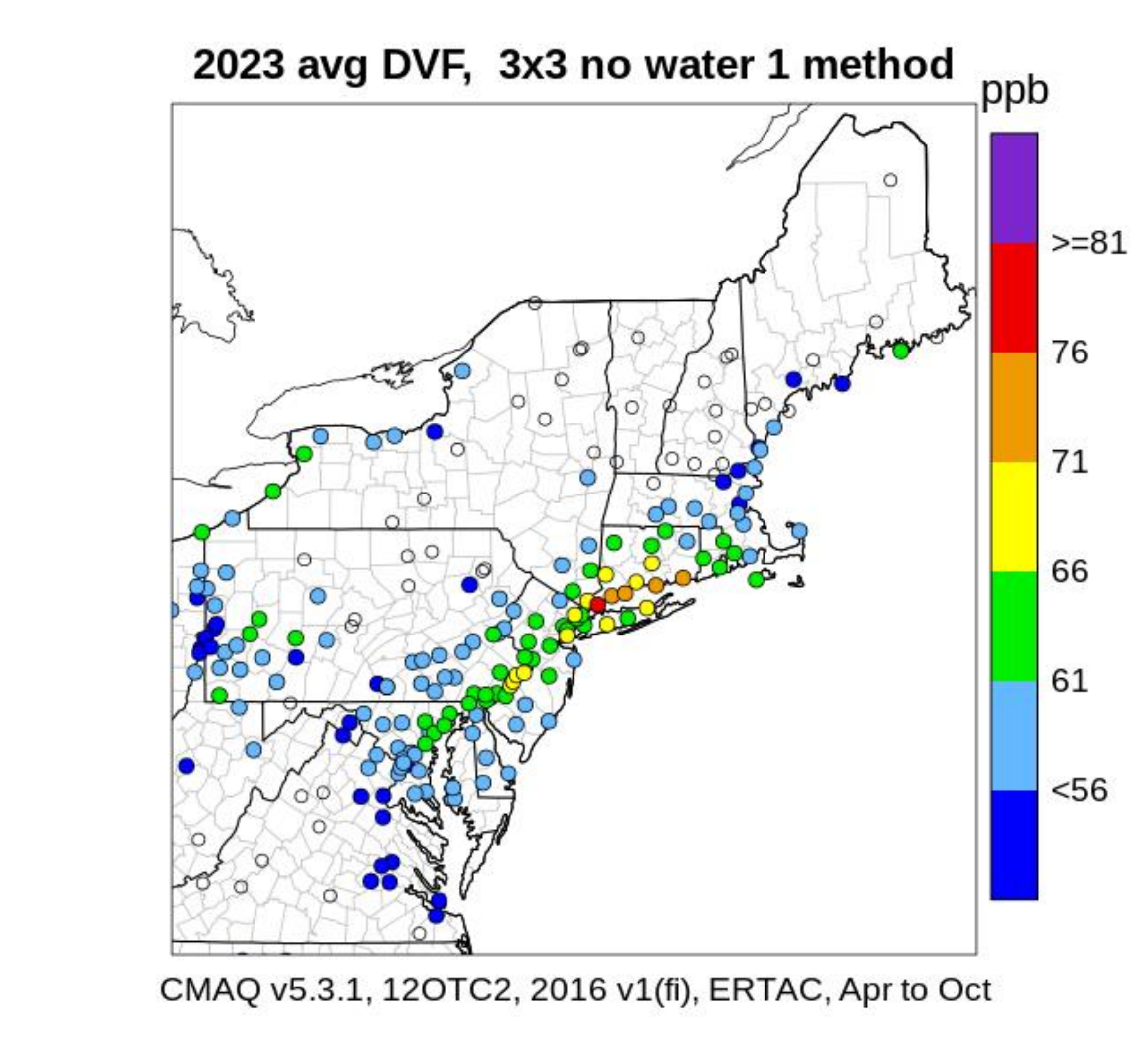


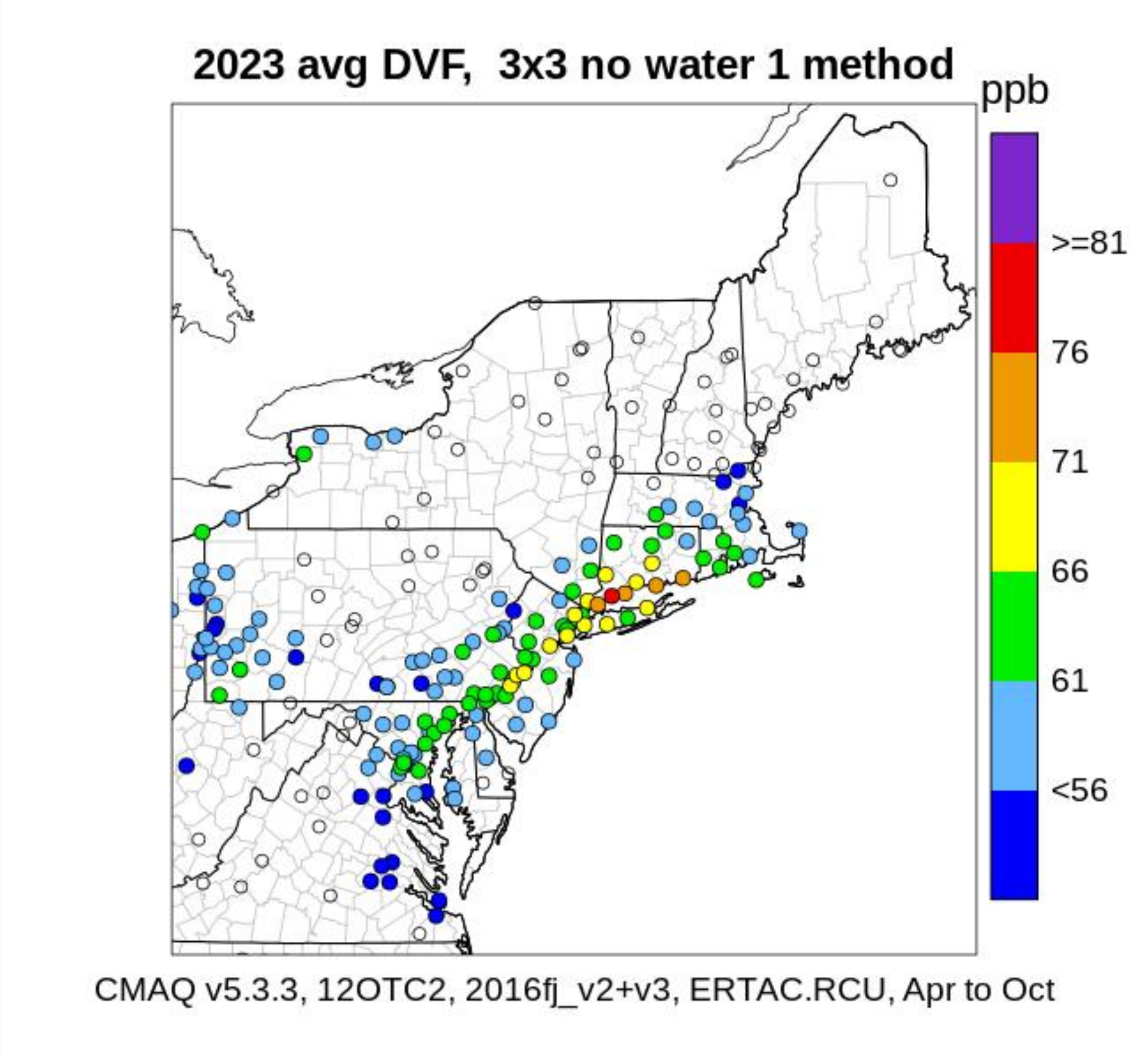


"2022 Ambient Ozone Concentrations - Relative to the 2008 and 2015 8-Hr Ozone NAAQS" – https://experience.arcgis.com/experience/502feb600b32460caee6bbd10f8f4559/page/2015-O3-NAAQS---Prelim-DV//

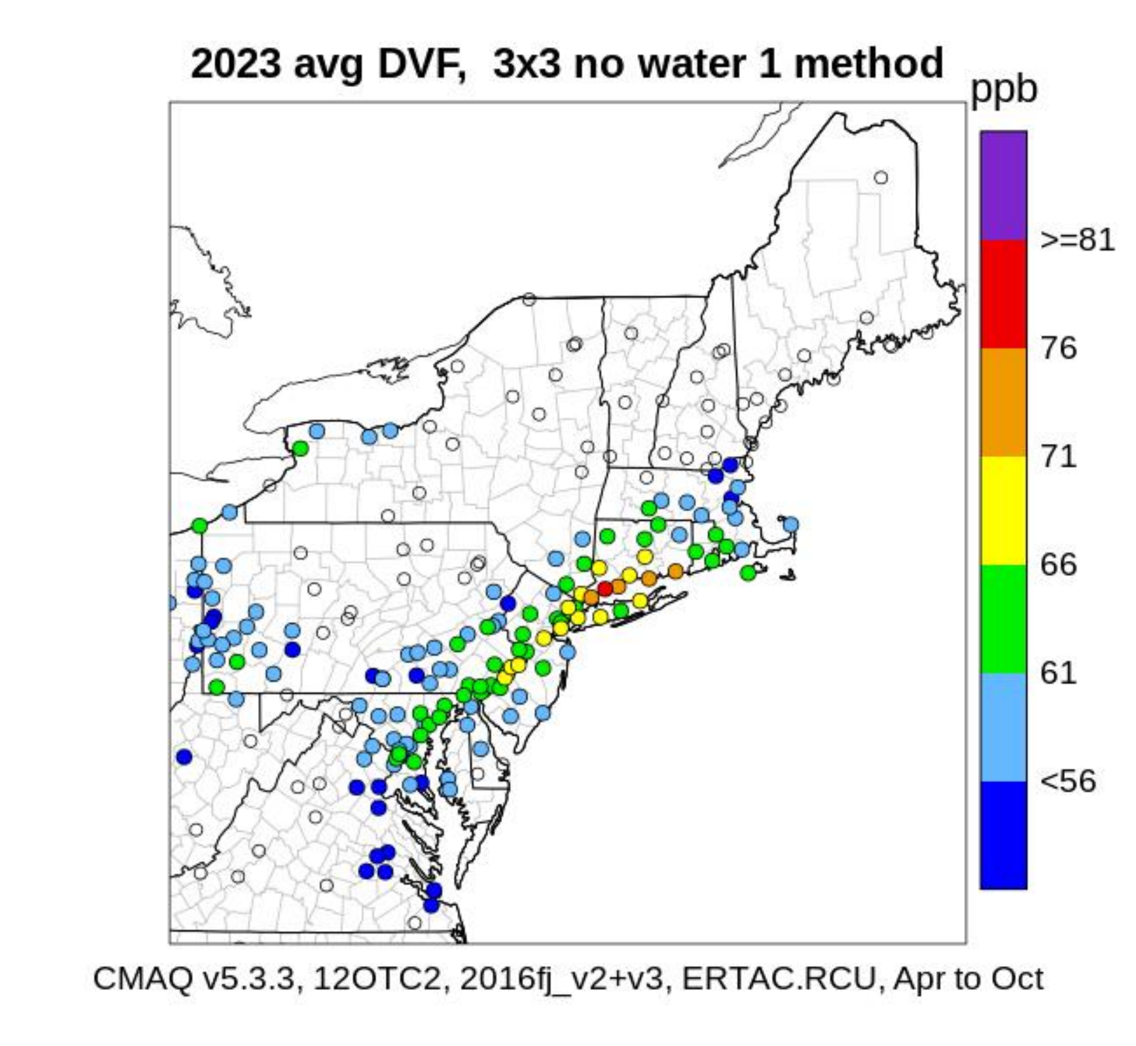
Data through October 2022
(Credit: Mark Prettyman and DE DNREC. Data available at https://experience.arcgis.com/experience/502feb600b32460caee6bbd10f8f4559/page/2015-O3-NAAQS---Prelim-DV/)

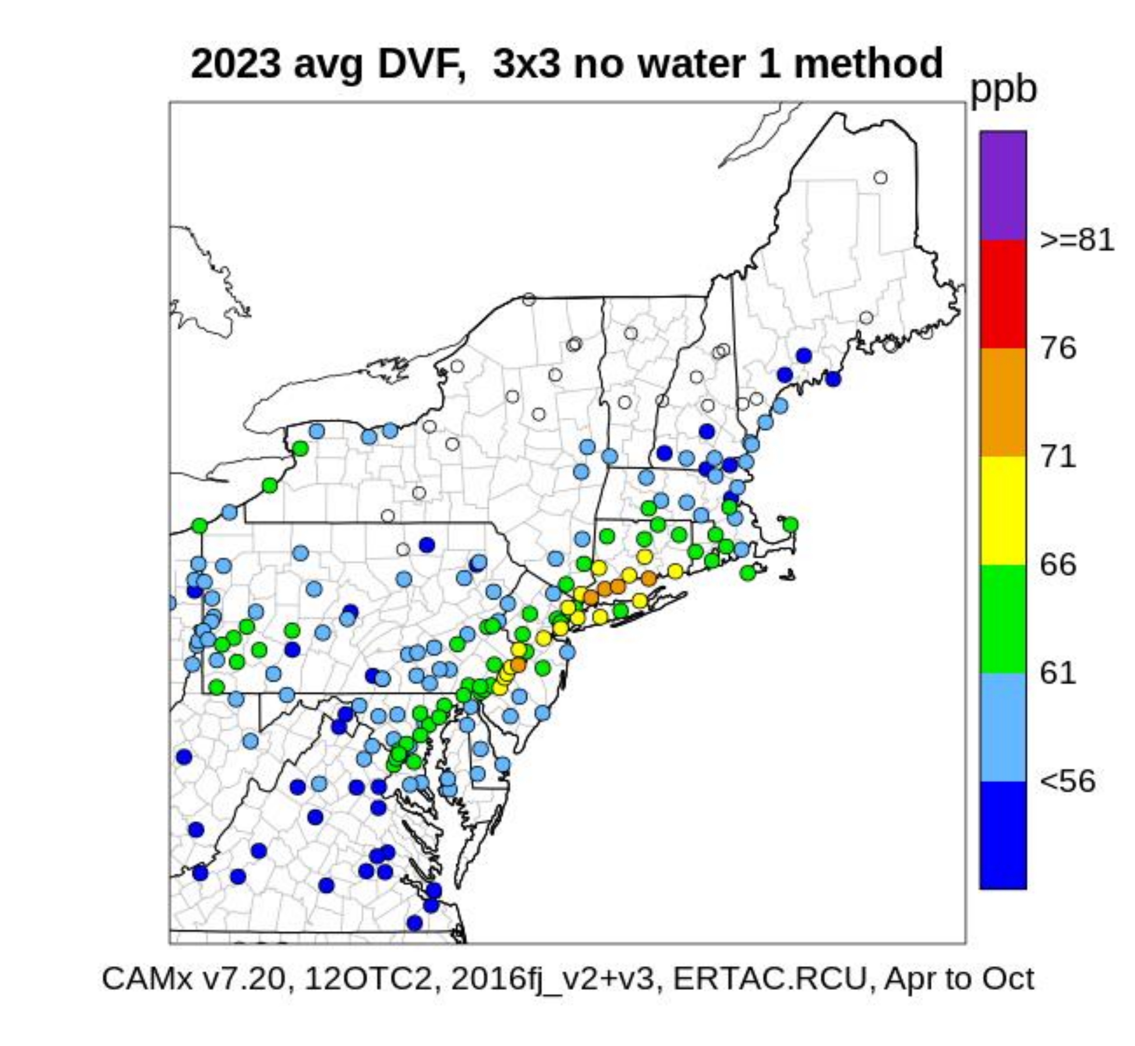
2023 Modeling – V1 vs V2/V3





2023 Modeling – CMAQ vs CAMx



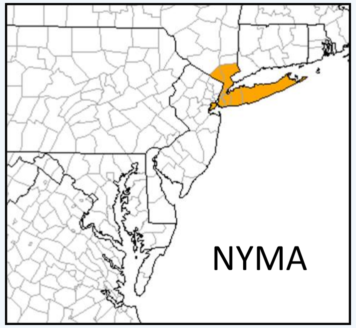


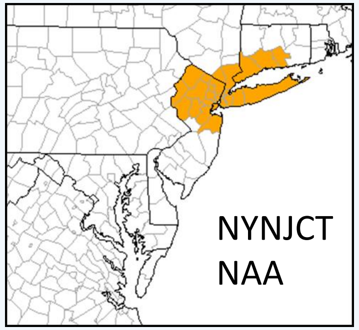
Model-Projected 2023 Design Values

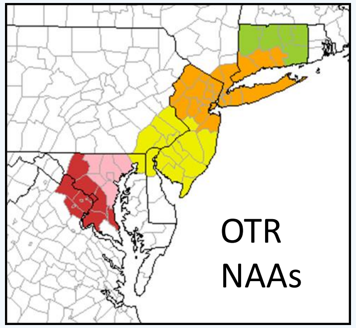
	2020-22 Preliminary	OTC V1 CMAQ	OTC V1 CAMx	OTC V2/V3 CMAQ	OTC V2/V3 CAMx	EPA V3 CAMx
Greenwich, CT	77	78.5	74.5	74.6	73.4	71.6
Danbury, CT	71	69.1	69.3	69.3	69.5	67.3
Stratford, CT	81	75.3	75	74.7	75.1	72.9
Westport, CT	80	75.6	76	76	75.6	73.3
Middletown, CT	73	69.2	70.3	69.6	70.5	68.7
Madison, CT	79	71	72.3	71.1	72.7	70.5
Groton, CT	72	71.3	68	71	67.8	65.5
Babylon, NY	74	67.6	68.2	67.7	68.5	66.2
Bristol, PA	72	69.3	71.1	70.2	71.6	67.9

*3x3 no water values

Urban Nonpoint Solvent VOCs Emissions







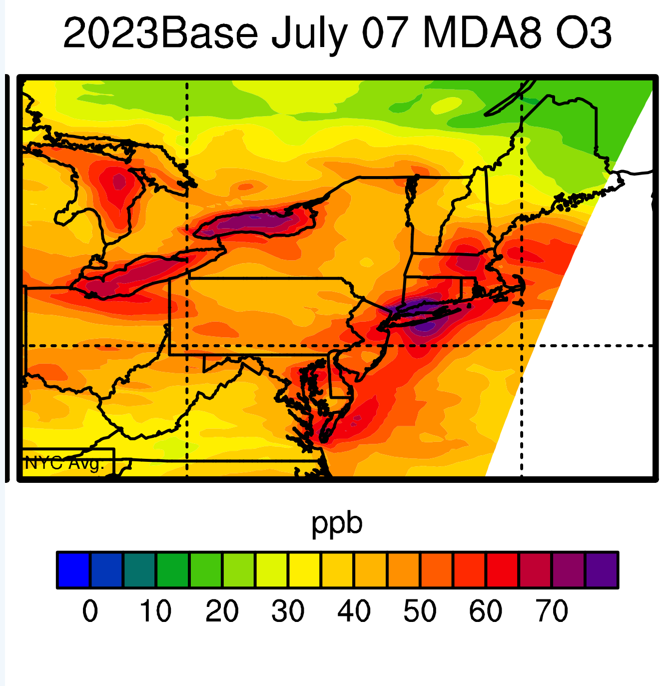
Nonpoint solvent contributions to total anthropogenic VOC emissions

Regions	Solvents	Nonpoint	Nonroad	Onroad	Others
NYMA	55.4%	14.0%	15.8%	10.3%	4.5%
NYNJCT (NAA)	52.3%	13.2%	15.3%	10.8%	8.4%
OTR (NAAs)	49.7%	11.8%	15.5%	11.5%	11.5%

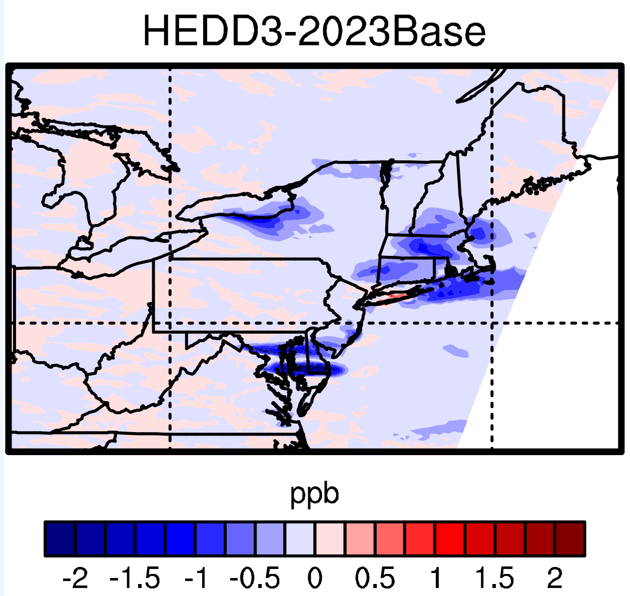
Top 6 SCC contributions to total nonpoint solvent VOC emissions

Regions	2460100000	2460200000	2460500000	2460600000	2401001000	2425000000	Others
	Consumer Products: Personal Care Products	Consumer Products: Household Products	Consumer Products: Aerosol Coatings and Paint Thinners	Consumer Products: Adhesives and Sealants	Architectural Coatings (not including traffic markings and IM)	Graphic Arts	Other 33 SCCs
NYMA	26.2%	18.5%	10.9%	12.6%	8.4%	7.4%	16.0%
NYNJCT (NAA)	22.9%	17.5%	10.6%	8.5%	8.6%	8.5%	23.4%
OTR (NAAs)	22.6%	17.0%	10.2%	9.0%	8.6%	7.6%	25.0%

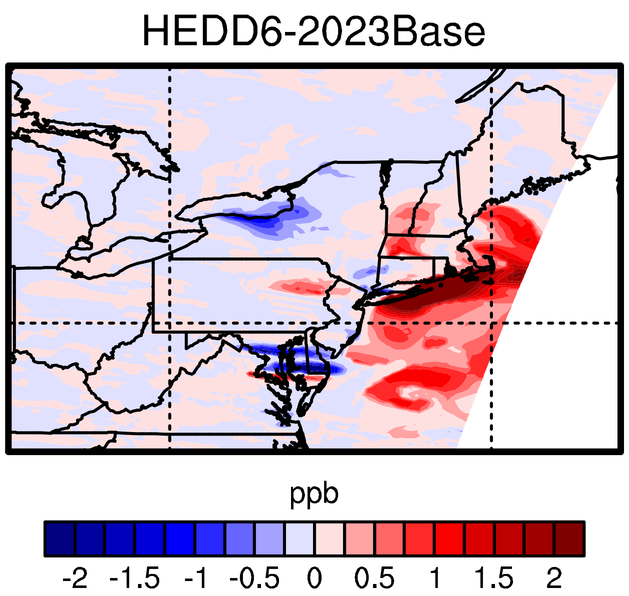
July 7th: One Day MDA8 O_3 Differences from Base



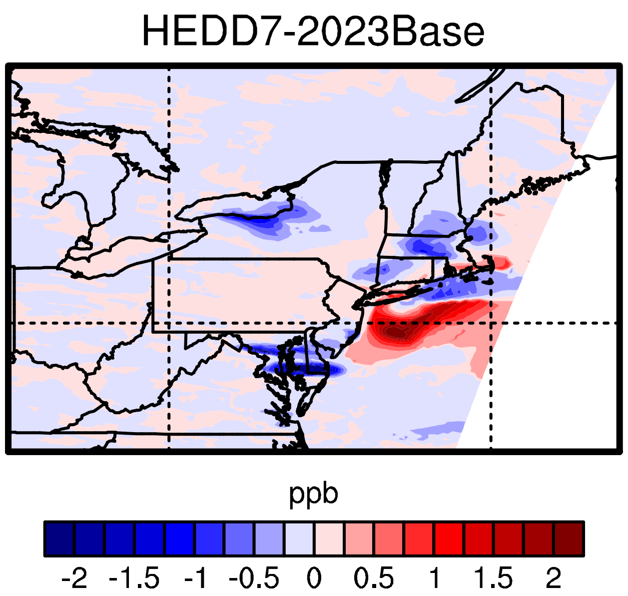
Base case



Zero-out Part 75 peakers



Part 75 peakers dispatched prioritizing highest emitters

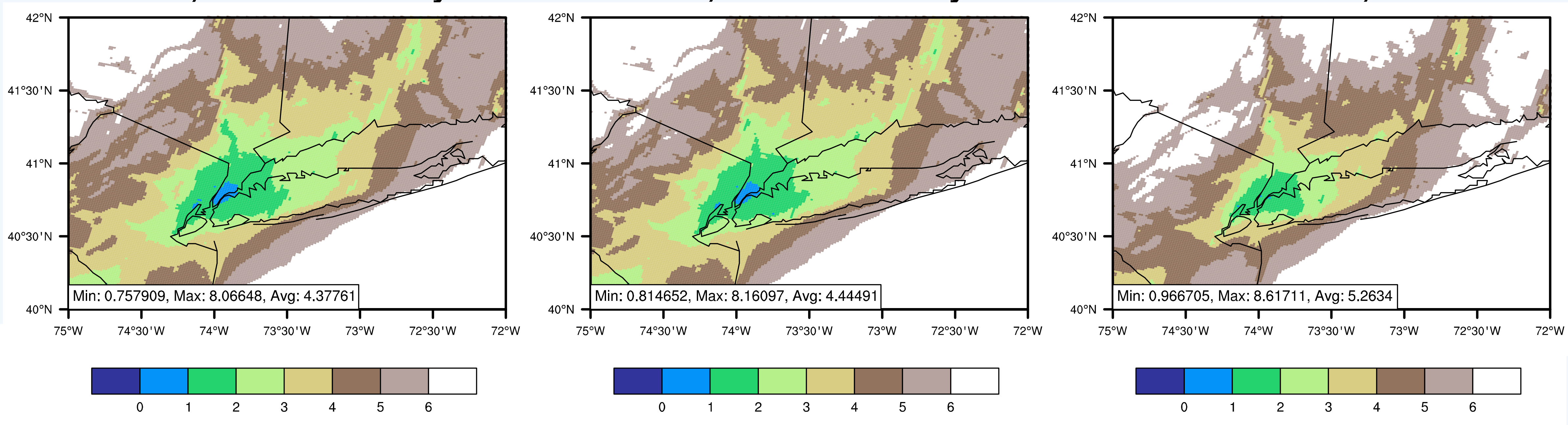


Part 75 peakers dispatched prioritizing lowest emitters

- Example of impacts on a high O_3 day
- Contributions from peaking units exceed 2 ppb
- Highest emitting peaking units increase MDA8 O_3 by 2+ ppb in localized in-land and coastal areas
- Lowest emitting peaking units still lead to some isolated instances of higher MDA8 O_3 by 2 ppb

Changing NO_X Sensitivity with Emissions Reductions

Baseline, exceedance days | **HEDD7, exceedance days** | **90% Reduced On-road, exceedance days**



NO_X Saturated/VOC Limited

NO_X Limited

- Cut on-road emissions by 90% (all pollutants) and layered with HEDD prioritizing cleanest dispatched units
- By applying both measures in tandem, formaldehyde to NO_X ratios (FNR) move from NO_X saturated to transitional in NYC and weakly NO_X limited to strongly NO_X limited in coastal CT.

Additional Modeling Committee Initiatives

- V2/V3 supplemental addendum to the V1 Technical Support Document
- Track field campaigns in the region in 2023 – AEROMMA, CUPiDS, GOTHAAM, STAQS, and others (AGES+) – Lukas Valin (EPA)
- Work with EPA, states, MJOs on next modeling platform – likely 2022 base year, with future years 2026, early 2030s, 2038
- Collaborate with SAS (e.g., residential heating, solvents) and MSC (e.g., heavy, medium, and light-duty vehicles)
- Continue investigation of O_3 limiting regimes
- Investigate model updates, boundary conditions, chemical mechanism, etc.

Thank you!

Model Committee Chairs

- Kevin Civerolo and Margaret LaFarr, NYSDEC (kevin.civerolo@dec.ny.gov and margaret.lafarr@dec.ny.gov)

OTC Committee Lead

- Alexandra Karambelas, OTC/NESCAUM (akarambelas@nescaum.org)

Emissions Inventory Lead

- Susan McCusker, MARAMA (smccusker@marama.org)