



Department of
Environmental
Conservation

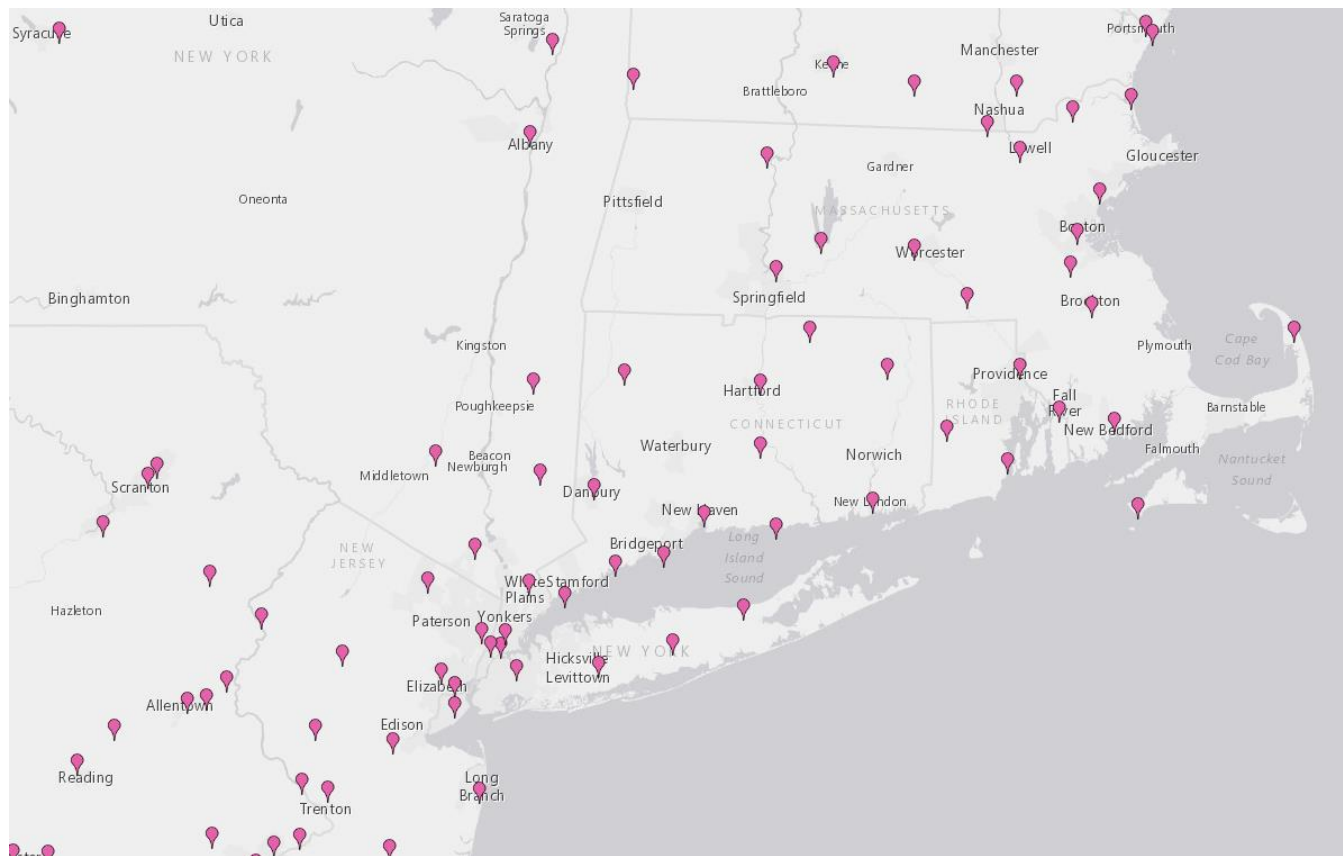


Regulatory Monitoring for Ozone and Ozone Precursors

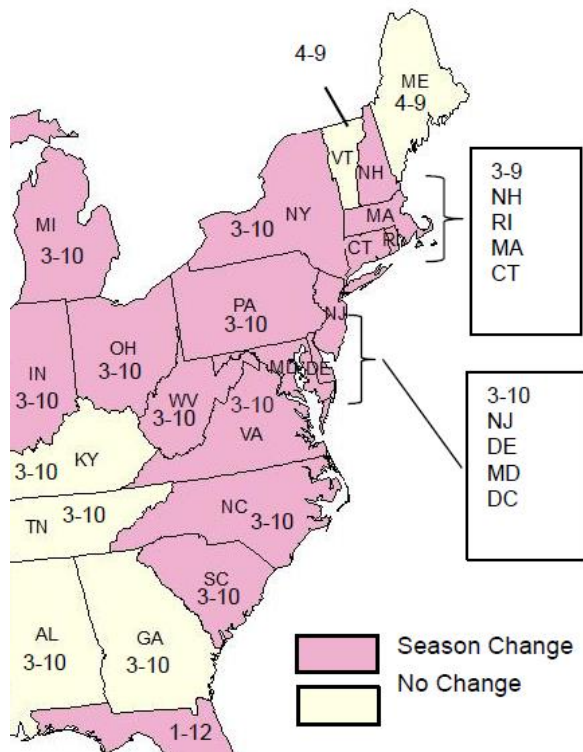
New York City Metro Area Energy & Air Quality
Data Gaps Workshop

May 24-25, 2017
Palisades, NY

Regulatory Ozone Monitoring: Location



Regulatory Ozone Monitoring: Season



Ozone Monitors at NCore sites operate year round

Other monitors are required to operate during the months noted

NY, NJ, PA: March – Oct.

CT, MA, RI: March – Sept.

PAMS: Precursor Assessment Monitoring Stations

Included in the 1990 Clean Air Act Amendments

Enhanced research oriented monitoring required in areas with serious non-attainment for 1-Hr ozone standard

- Provide data to evaluate control strategies
- Provide pollutant and met data for photochemical grid models
- Provide data to evaluate source emission impacts
- Provide data to detect trends
- Provide data to support attainment designations and maintenance plans
- Provide data to evaluate exposure to air toxics



PAMS: Precursor Assessment Monitoring Stations

Target List – difficult program to implement

VOCs: 54 Hourly Speciated (Limited to June - August)

Auto-system GC at field location

NO_x: NO₂, Nitric Acid

NO_y analyzer (inlet at 10m elevation)

Formaldehyde, Acetone, Acetaldehyde (3-Hr, 24-Hr)

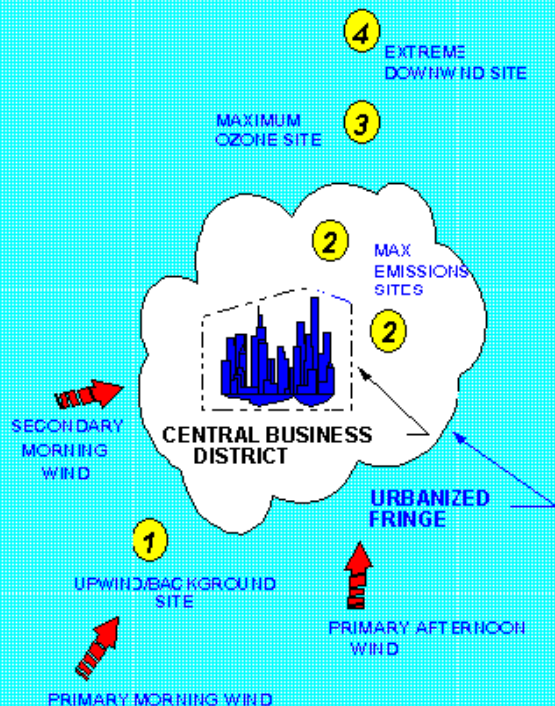
DNPH Cartridge Collection

Meteorology (upper air recommended not required)

Surface, solar radiation and profiler:\$\$\$



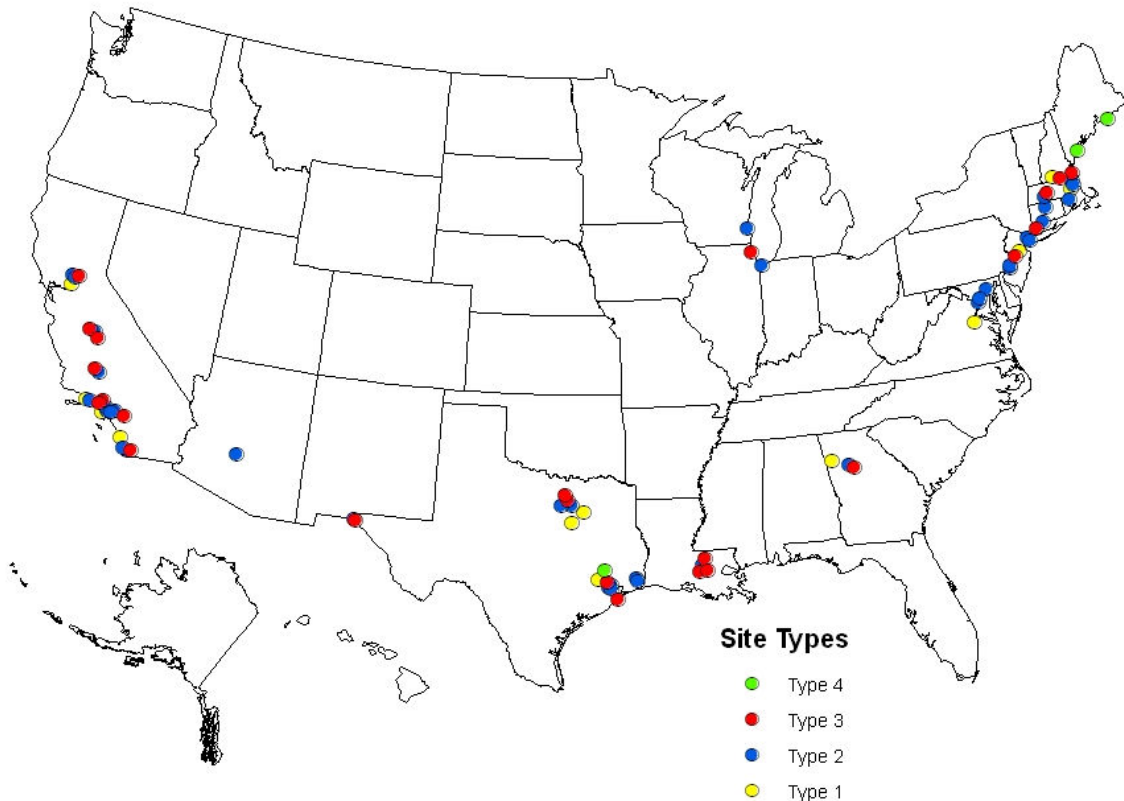
PAMS NETWORK DESIGN



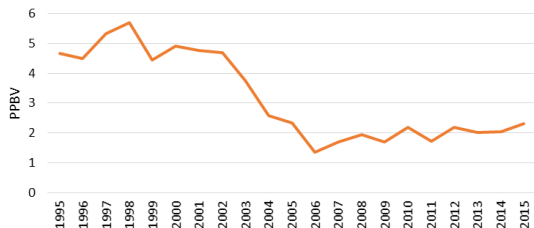
Initial Network Design

1. Upwind background, Ozone and precursor conc. (upwind grid edge)
2. Max precursor conc. (up to two in larger cities)
3. Max Ozone conc.
4. Downwind transport of Ozone and precursors to adjacent MSA

Existing PAMS Sites: 75 Total



Formaldehyde: Bronx (Year Round)



20 years of PAMS VOCs

Reactivity: The concentrations of most VOCs associated with Ozone production have decreased

Formaldehyde decreased

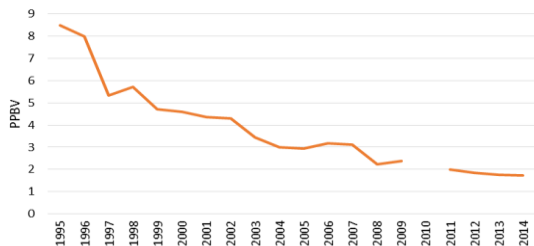
but has trended up for 10 yrs

Ethylene decreased 79%

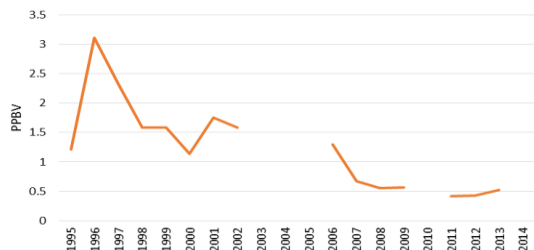
SOAP: The concentrations of VOCs associated with aerosol production have decreased

1,2,3 TriMBenzene has decreased by 57%

Ethylene

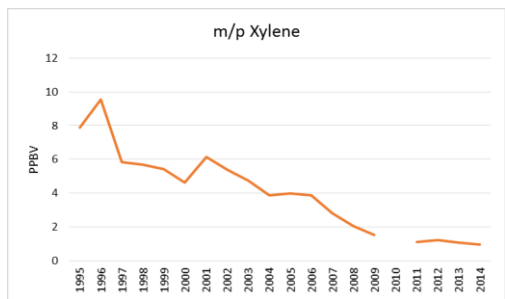
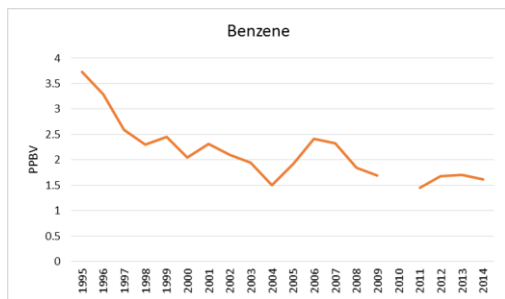


1,2,3-Trimethylbenzene



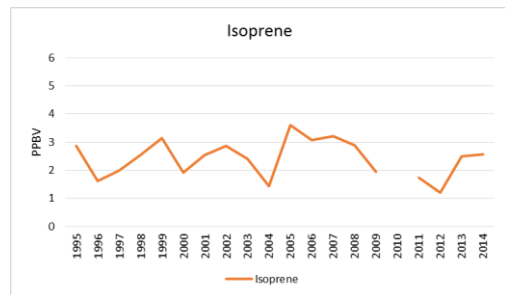
20 years of PAMS VOCs

Toxicity: Benzene has decreased 56%

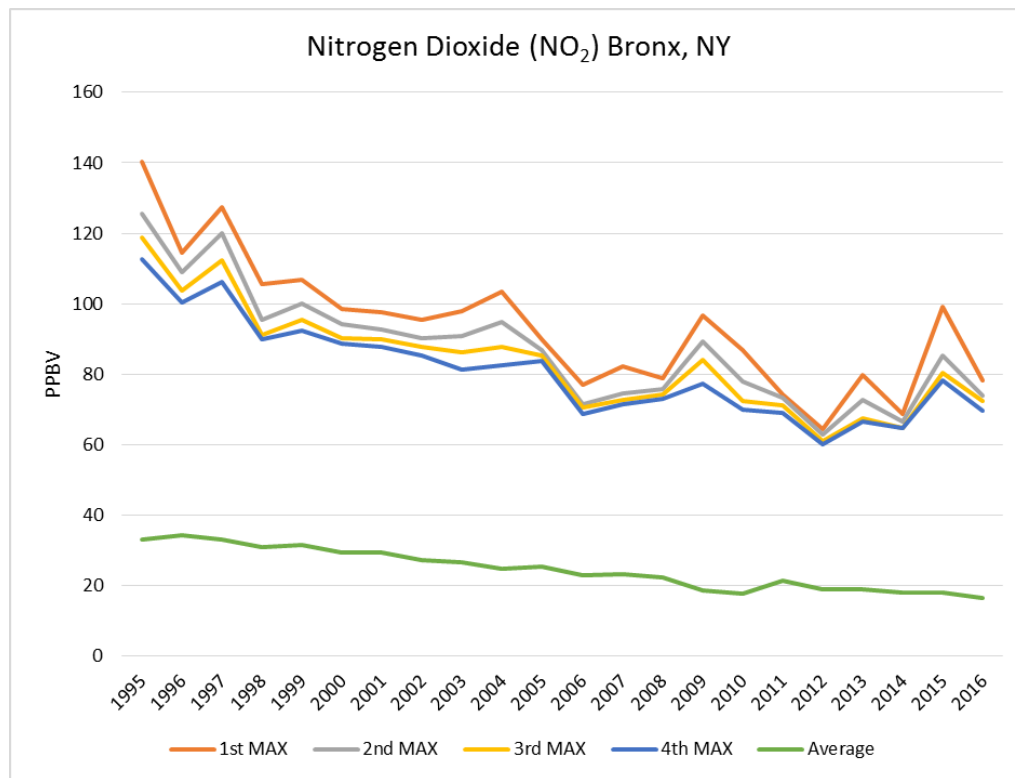


Source Attribution: MP Xylene and Toluene have both decreased by 87%

Isoprene is variable and shows no trend



20 years of Nitrogen Measurements (NO₂)



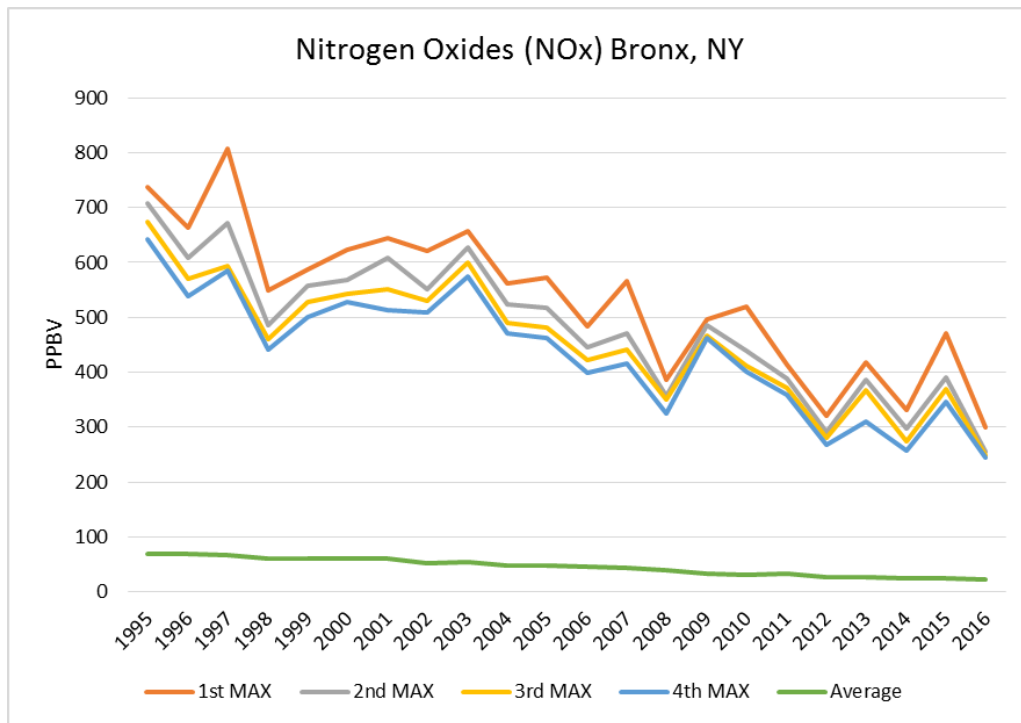
1st Max Hr
decreased
44%

Mean
decreased
50%



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20 years of Nitrogen Measurements (NOx)



1st Max Hr
decreased
59%

Mean
decreased
68%

PAMS: Reengineering - 2015 Ozone NAAQS Review

Eliminated old:

- Network design based on attainment designation
- Site type I-IV designation

Required new: (Full implementation by June 1, 2019)

NCore sites with populations > 1 million

- VOCs 1-hr June through August

- Carbonyls 3-day every 3rd day or 1-hr Formaldehyde

- True NO₂ and NOy

- Mixing Height (1-hr boundary height required)

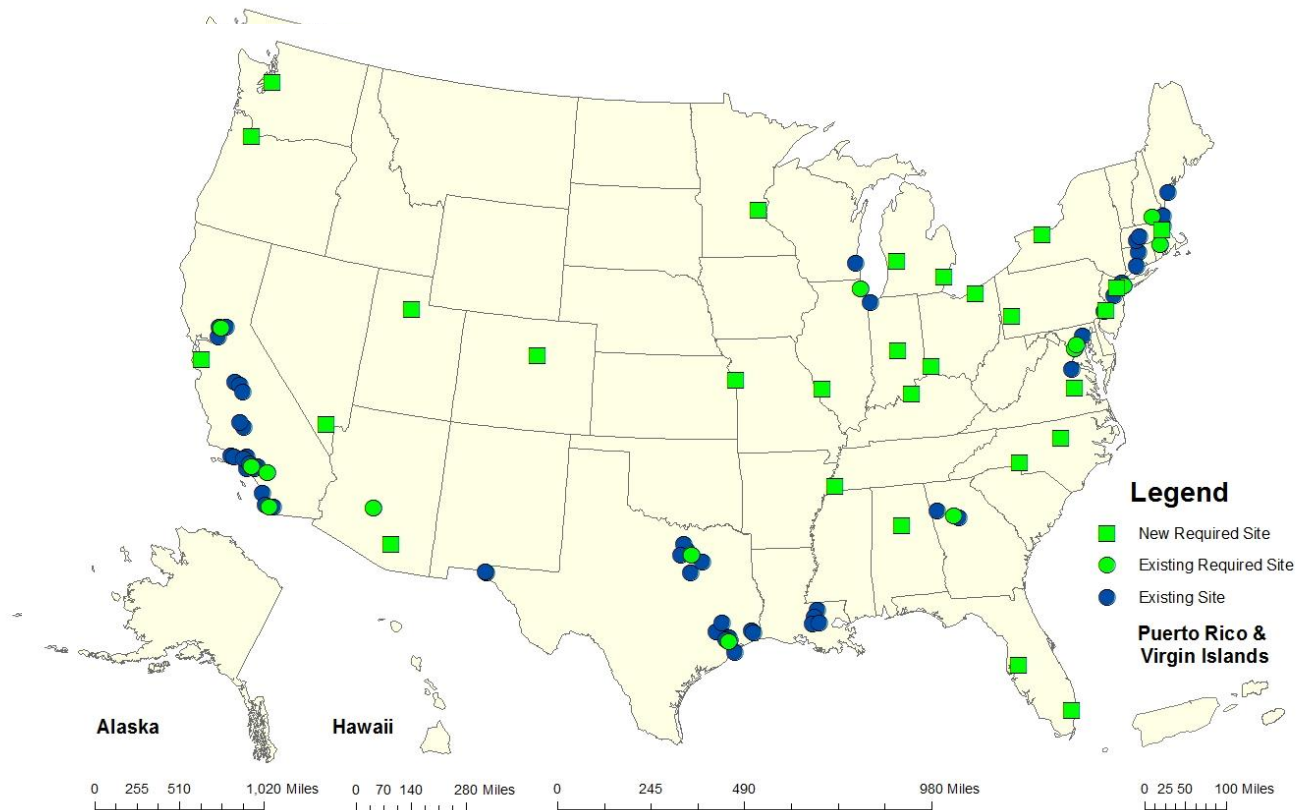
- (can apply for a waiver to opt out or move site)

Enhanced Monitoring Plans (EMP) in Ozone Transport Region and in areas with moderate or above non-attainment

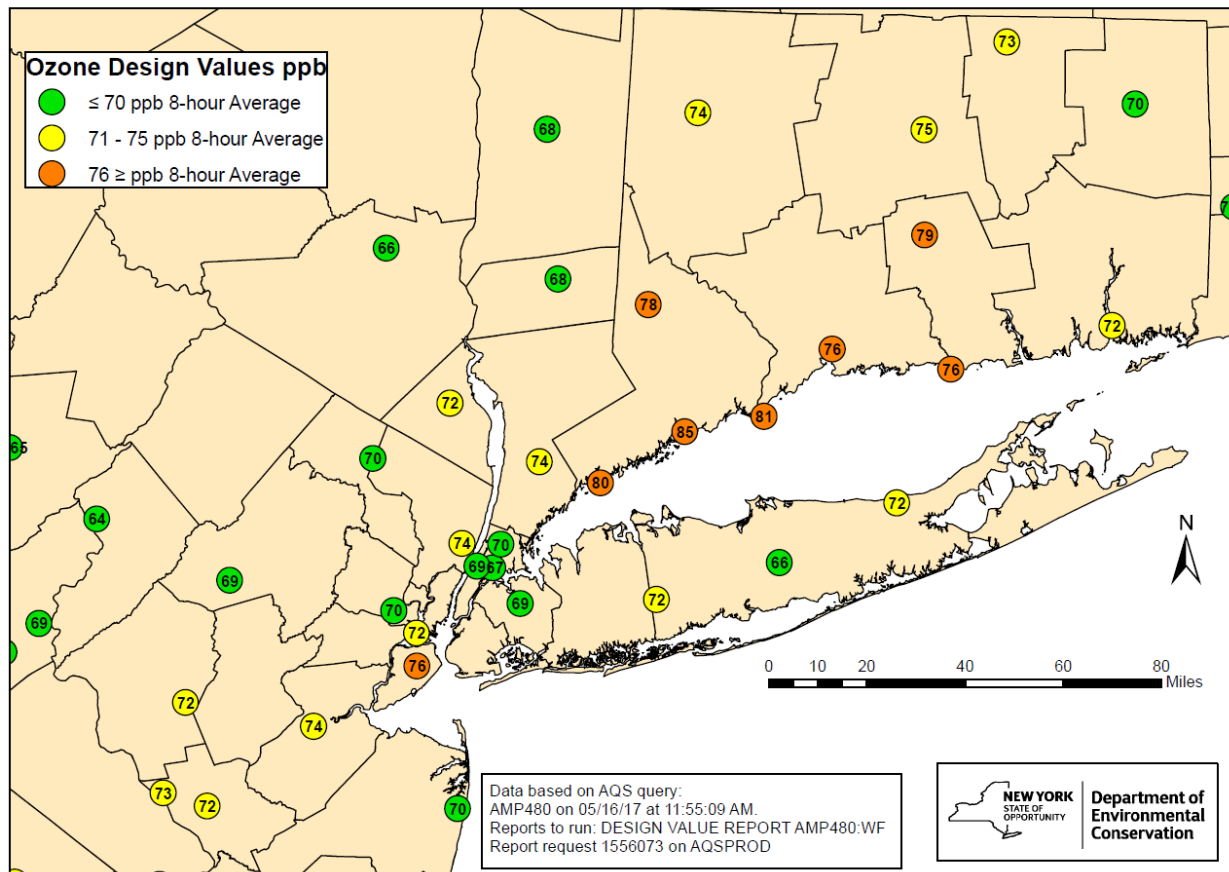
- Supports flexible approach to monitoring in regions specifically to address data gaps



Existing and Newly Required PAMS Sites:



8-hour Ozone 2016 Design Values



PAMS: Reengineering – New York's Proposal

NCore Required Sites: Waivers

1. Queens PAMS site moved to existing Bronx site
(Higher VOC and NO_x area)
2. Rochester site moved to a new location on Long Island
No attainment issues in Rochester
Site on North Shore to capture emissions just before
precursors travel over Long Island Sound
towards DV site on Connecticut shoreline

Enhanced Monitoring Plan: (to address Data Gaps)

1. Define Ozone enhancement over water
Install 2 portable Ozone monitors on shore
2. Define mixing height near land water interface
Evaluate Mesonet program
3. Collaborate with other research efforts



Thank You

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PAMS Priority Compounds

