Connecticut Department of Energy and Environmental Protection

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

Monitoring Network Plan / Enhanced Monitoring Plan

October 11, 2018

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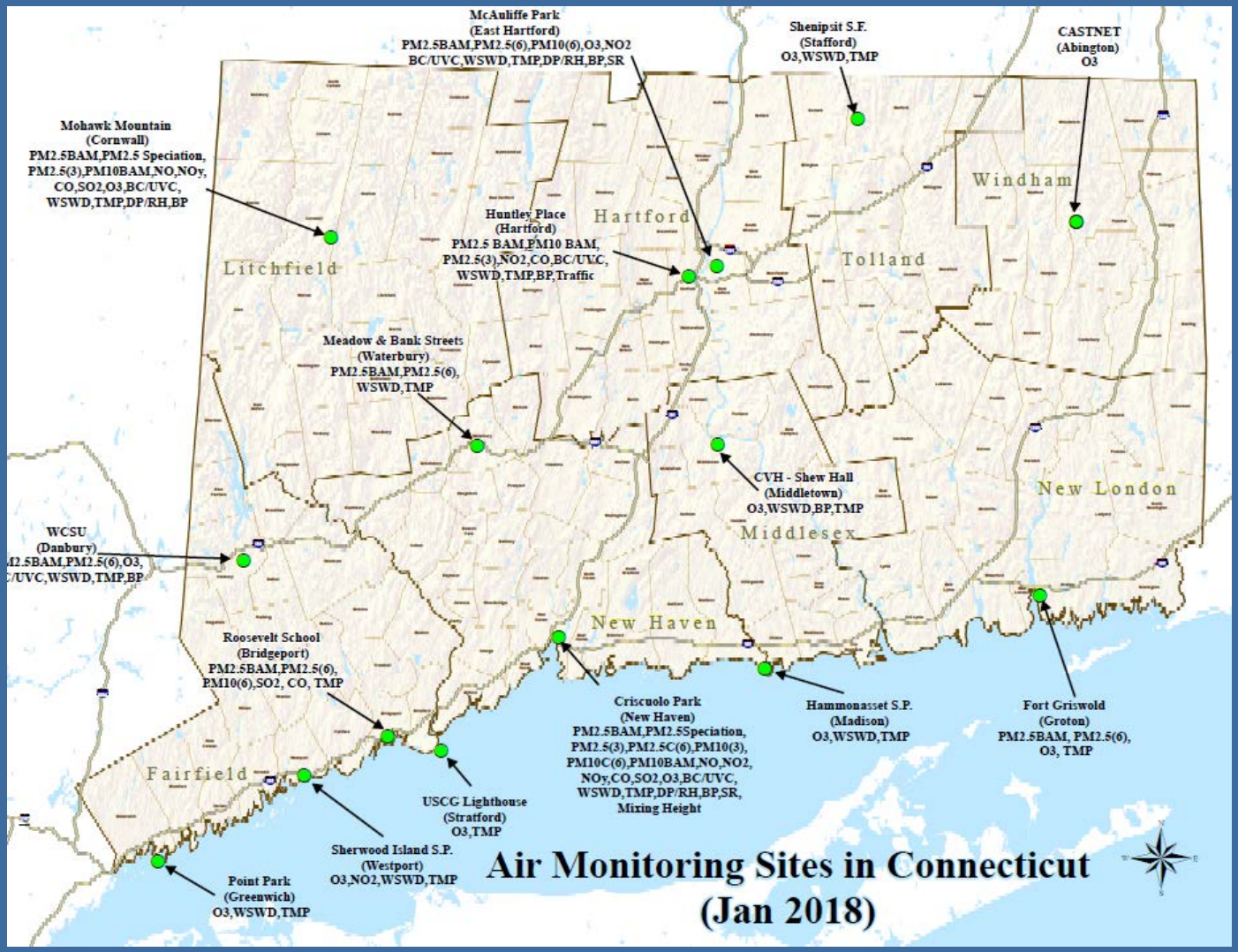
SIPRAC

Agenda

- AQ Monitoring Network
- AQ Monitoring Objectives
- Annual Monitoring Plan
- Enhanced Monitoring Plan

DEEP Air Monitoring Network



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AQ Monitoring Objectives

- Compliance Purposes: Determine attainment status for criteria pollutants.
- AQI Reporting: Provide timely and accurate data for Air Quality Index and forecasting.
- Control Strategies: Develop new strategies and assess existing ones.
- Trend Analysis: Assess short-term and long-term pollutant trends.
- SIP Development: Provide data used in modeling to aid in development of State Implementation Plans.
- Characterize Sources: Distinguish between contributions from local sources and the effects of long range transport.
- Support long-term health assessments and model evaluations.

Annual Network Plan

- Satisfy regulatory requirements – 40 CFR 58.10
  - Submit by July 1st after 30-day public comment period
- Provide current air monitoring network configuration
- Propose network changes
- Provide analysis/rationale to demonstrate compliance with new EPA monitoring initiatives

Monitoring Network Summary

Town	Site	PM2.5 (FRM)	PM2.5 (FRM, Collocated)	PM2.5 (Continuous - FEM)	PM10/PM-Coarse (FRM)	PM10/PM-Coarse (FRM, Collocated)	PM10/PM-Coarse (Continuous)	PM Speciation (CSN)	PM Speciation (IMPROVE)	PM2.5 Carbon (BC/UVC, Continuous)	Ozone	SO2	CO	NO_2	$NO/NO_2/NOx$	NO/NOy	VOCs (PAMS)	Traffic Count	Wind Speed	Wind Direction	Temperature	Dew Point / Rel. Humidity	Barometric Pressure	Solar Radiation	Mixing Height
Bridgeport	Roosevelt School		1/6	X	T		P					X	X								X				
Bridgeport LIS Ferry	Park City Vessel										P														
Bridgeport LIS Ferry	Second Vessel										P														
Cornwall	Mohawk Mountain	1/3		X			X		1/3	X	X	X	X			X			X	X	X	X	X	X	
Danbury	Western Connecticut State University	1/6		X			P			X	X								X	X	X		X		
East Hartford	McAuliffe Park	1/6		X	1/6		P			X	X			X					X	X	X	X	X	X	
Greenwich	Point Park										X								X	X	X				
Groton	Fort Griswold		1/6	X			P				X										X				
Hartford	Huntley Place	1/3		X			X			X			X	X				X	X	X	X		X		
Madison	Hammonasset State Park										X								X	X	X				
Middletown	Connecticut Valley Hospital										X								X	X	X		X		
New Haven	Criscuolo Park	1/3	1/6	X	1/3	1/6	X	1/3		X	X	X	X	X		X			X	X	X	X	X	X	X
Stafford	Shenipsit State Forest										X								X	X	X				
Stratford	Stratford Lighthouse										X										X				
Waterbury	Meadow & Bank Street	1/6		X			P												X	X	X				
Westport	Sherwood Island State Park										X			X					X	X	X		X		X

X=Existing | P = Planned in 2019/2020 | T = Terminate in 2019/2020

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Network Plan – Site Description

Town – Site:	**New Haven – Criscuolo Park**		
County:	**New Haven**	Latitude:	**41.30117°**
Address:	**1 James Street**	Longitude:	**-72.90288°**
AQS Site ID:	**09-009-0027**	Elevation:	**3 m (10 ft)**
Spatial Scale:	**Neighborhood**	Year Established:	**2004**
Statistical Area:	**CSA (New York-Newark-Bridgeport)**		

PM2.5 (FRM)	PM2.5 (FRM, Collocated)	PM2.5 (Continuous - FEM)	PM10/PM-Coarse (FRM)	PM10/PM-Coarse (FRM, Collocated)	PM10/PM-Coarse (Continuous)	Lead-PM10	Lead-PM10 (Collocated)	PM Speciation (CSN)	PM Speciation (IMPROVE)	PM2.5 Carbon (BC/UVC, Continuous)	Ozone	SO2	CO	Direct NO_2	$NO/NO_2/NOx$	NO/NOy	VOCs (PAMS)	Total Column NO_2/HCOC	Wind Speed	Wind Direction	Temperature	Dew Point / Rel. Humidity	Barometric Pressure	Solar Radiation	Mixing Height
1/3	1/6	X	1/3	1/6	X			1/3		X	X	X	X	X		X		P	X	X	X	X	X	X	X

X=Existing P = Planned in 2018/19 T = Proposed to terminate in 2018/2019

Network Plan – Site Description

PM2.5 (FRM)	PM2.5 (FRM, Collocated)	PM2.5 (Continuous - FEM)	PM10/PM-Coarse (FRM)	PM10/PM-Coarse (FRM, Collocated)	PM10/PM-Coarse (Continuous)	Lead-PM10	Lead-PM10 (Collocated)	PM Speciation (CSN)	PM Speciation (IMPROVE)	PM2.5 Carbon (BC/UVC, Continuous)	Ozone	SO2	CO	Direct NO_2	NO/NO_2/NOx	NO/NOy	VOCs (PAMS)	Total Column NO_2/HCOC	Wind Speed	Wind Direction	Temperature	Dew Point / Rel. Humidity	Barometric Pressure	Solar Radiation	Mixing Height
1/3	1/6	X	1/3	1/6	X			1/3		X	X	X	X	X		X		P	X	X	X	X	X	X	X

X=Existing P = Planned in 2018/19 T = Proposed to terminate in 2018/2019

Site Description: The Criscuolo Park site is a neighborhood-scale site located on the western side of the city of New Haven. The site is approximately 0.25 km to the north of the I-95 Quinnipiac River Bridge. The site is approximately 1.0 km to the east of the I-91 and I-95 interchange. Bulk gasoline transfer stations are located 0.3 to 2.0 km to the south of the site. Residential neighborhoods are located to the west, north and east of the site.

Monitoring Objectives: The primary monitoring objectives are to meet NCore requirements for O_3, CO, SO_2, $PM_{2.5}$, PM_{10}, $PM_{10-2.5}$, $PM_{2.5}$ speciation, NO/NO_Y and surface meteorology. NO_2 monitoring is conducted in fulfillment of the requirement for NO_2 monitoring of vulnerable and sensitive populations 40 nationwide sites selected by the Regional Administrators. $PM_{2.5}$ chemical speciation measurements are collected through the Chemical Speciation Network (CSN) as one-in-three day 24-hour samples and by continuous analyzers for fine particulate carbon parameters (BC/UVC and EC/OC) and sulfate.

Planned changes for 2018-2019: DEEP installed a Teledyne API T640X PM_{10}/$PM_{2.5}$/$PM_{10-2.5}$ FEM continuous analyzer in November 2017 and will remove the BAM $PM_{2.5}$ analyzer and BAM PM_{10} analyzer in late 2018. In addition, DEEP plans to install a second Teledyne API T640X PM_{10}/$PM_{2.5}$/$PM_{10-2.5}$ FEM continuous analyzer on date. A total column trace gas spectrometer, operated by EPA, was installed in May, 2018 (see EMP, Appendix B).

Enhanced Monitoring Plan

Overview

The Enhanced Monitoring (required by CAA), or Photochemical Assessment Monitoring Station (PAMS) program requires areas to collect enhanced ambient air measurements related to ozone. The rulemaking for the final 2015 ozone NAAQS included significant revisions to the PAMS requirements (80 FR 65292; October 26, 2015).

The first significant change was to only require PAMS sites at NCore sites in CBSAs of 1 million population or more, regardless of attainment status.

The second significant change required that States with Moderate and above 8-hour O_3 nonattainment areas and all states in the Ozone Transport Region to develop and implement an Enhanced Monitoring Plan (EMP) detailing enhanced O_3 and O_3 precursor monitoring activities to be performed.

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Enhanced Monitoring Plan

Enhanced Monitoring Requirements

-Require PAMS monitoring at existing NCore monitoring site(s) in large urban areas with a population of 1,000,000 or more. (NCore is a multi-pollutant monitoring network for particles, gases and meteorology.) This change reduces the required number of PAMS sites while improving national geographic distribution and reduces "redundancy" in the PAMS network. At a minimum, PAMS measurements must be performed in June, July, and August (not linked to the "season" where ozone must be measured*).

-Required NCore/PAMS sites are to measure ozone, nitrogen dioxide -true NO_2, NOy, hourly speciated VOCs, three 8-hour averaged carbonyls on every third day, and hourly averaged mixing height, in addition to a number of other meteorological parameters (e.g. wind speed and direction).

-**Enhanced Monitoring Plans (EMPs)** are required to be developed and implemented by monitoring agencies with moderate (and above) ozone nonattainment areas and *by states in the Ozone Transport Region (OTR).* These EMPs provide agencies with some flexibility to collect additional data that are needed to better understand and control their ozone pollution problems.

-According to the CFR, states will need to comply with the new PAMS monitoring requirements (begin operation) at NCore sites by June 1, 2019. Enhanced Monitoring Plans will be due within two years after EPA designates nonattainment areas or by Oct. 1, 2019, whichever is later.*

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Enhanced Monitoring Plan

EMP Timeline

Enhanced Monitoring Plans (EMPs) for the OTR

The NAAQS rule requires that these EMPs be submitted by October 1, 2019 (or two years after the effective date of a designation to a classification ≥Moderate for O_3 nonattainment area whichever is later)…

But PAMS Implementation Guideline suggests the following schedule…
https://www3.epa.gov/ttnamti1/files/ambient/pams/PAMS%20Monitoring%20Network%20and%20EMP%20Plan%20Guidance.pdf

Draft EMPs (for ≥Moderate NA areas and State in the OTR) should have been submitted to EPA Regional Offices by May 1, 2018 (as with any AMNP for 30 day public notice)

Final EMPS should have been submitted to the Regions along with the final AMNP by July 1, 2018.

Based on EPA 120 day review, formal response by Regions by October 31, 2018.

Part of the reason for the expedited submission in the OTR was to aid in State/ local planning the transition from existing PAMS sites to these EMPs. It was also informed by the fact that States in the OTR didn't need to wait and wonder if they would be designated as moderate nonattainment or not. Every area in the OTR knew from the time that the 2015 NAAQS was finalized that they needed to develop and submit an EMP!

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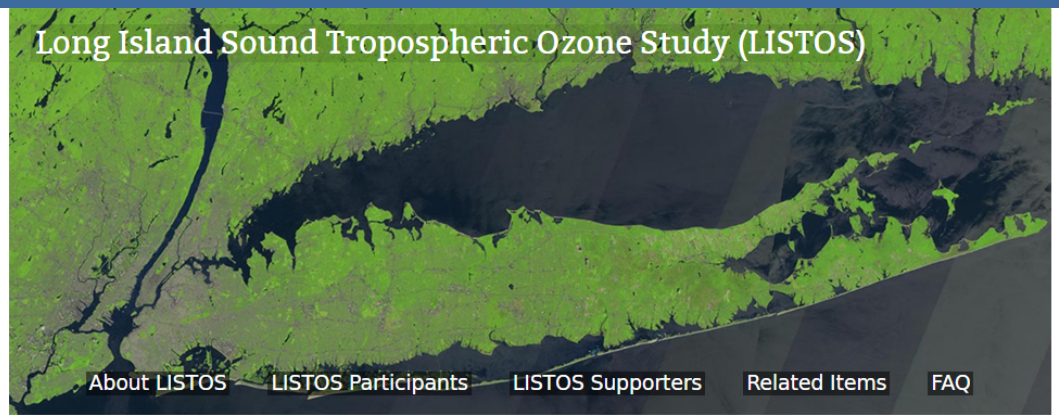
DEEP Proposed EMP Activities

- Additional O_3 monitoring (+2 in Fairfield Cnty; +1 in Hartford Cnty)
- Additional NO_2 monitoring (Westport)
- Ferry O_3 monitoring (Bridgeport, CT – Port Jefferson, NY)
- Formaldehyde monitoring
- Ceilometer/mixing height (New Haven & Westport)
- PANDORA spectrometers/NASA (total column NO2 and formaldehyde) - New Haven, Madison, Westport (& Outer Island)
- Participation in research efforts such as LISTOS

LISTOS

http://www.nescaum.org/documents/listos



About LISTOS

While air pollution levels have dropped markedly over the years across much of the United States, the New York City (NYC) metropolitan area (comprised of portions of New Jersey, New York, and Connecticut in and around NYC) continues to persistently violate both past and recently revised federal health-based air quality standards for ground-level ozone. This air quality problem afflicts not only the health and well-being of over 20 million people living in the NYC metro area, but also millions of people living downwind in Connecticut, Rhode Island, Massachusetts, and beyond.

A unique feature of this chronic ozone problem is pollution transported in a northeast direction out of NYC over Long Island Sound. The relatively cool waters of Long Island Sound confine the pollutants in a shallow and stable marine boundary layer. Afternoon heating over coastal land creates a sea breeze that carries the air pollution inland from the confined marine layer, resulting in high ozone concentrations in Connecticut and at times farther east into Rhode Island and Massachusetts. The following map shows a recent example of this from May 18, 2017, with high ozone levels seen along the entire Connecticut shoreline and farther downwind along the Rhode Island/Massachusetts border.

LISTOS

LISTOS Participants

- The City College of New York / NOAA-CREST Center
- Connecticut Department of Energy and Environmental Protection
- Maine Department of Environmental Protection
- National Aeronautics and Space Administration Langley Research Center
- National Oceanic and Atmospheric Administration Air Resources Laboratory
- National Oceanic and Atmospheric Administration Earth System Research Laboratory
- New Jersey Department of Environmental Protection
- New York State Department of Environmental Conservation
- Northeast States for Coordinated Air Use Management (NESCAUM)
- Stony Brook University School of Marine and Atmospheric Sciences
- University at Albany Atmospheric Sciences Research Center
- University of Colorado, Cooperative Institute for Research in Environmental Sciences
- University of Maryland, College Park RAMMPP
- U.S. Environmental Protection Agency Office of Research and Development
- U.S. Environmental Protection Agency Region 1 (New England)
- Yale University Department of Chemical & Environmental Engineering and Peabody Museum

LISTOS Supporters

- Connecticut Department of Energy and Environmental Protection
- National Aeronautics and Space Administration
- National Fish and Wildlife Foundation
- National Oceanic and Atmospheric Administration
- New Jersey Department of Environmental Protection
- New York State Department of Environmental Conservation
- New York State Energy Research and Development Authority
- U.S. Environmental Protection Agency Office of Research and Development

LISTOS

Related Items

SEPTEMBER 06, 2018 PRESENTATION
NASA Langley Mobile Ozone Lidar (LMOL) Data Collection During LISTOS

SEPTEMBER 06, 2018 PRESENTATION
The Yale Coastal Field Station

SEPTEMBER 06, 2018 PRESENTATION
NYSDEC LISTOS Data Update

JULY 16, 2018 EPA ARTICLE
EPA Scientists Collaborate with States to Protect Long Island Sound Air Quality

JUNE 26, 2018 ANIMATION
Long Island Sound Ferry Ozone Animations (preliminary data not QA/QC'd)

- June 18, 2018 Animation [MOV] [WMV]

JUNE 25, 2018 NASA ARTICLE
NASA Joins Effort to Sniff Out Ozone in the Northeast

JUNE 11, 2018 DATA AND ANIMATIONS
Long Island Sound Ferry Ozone Data and Animations May 24-26, 2018 (preliminary data not QA/QC'd)

- Ozone Data Spreadsheet
- May 24, 2018 Animation [MOV] [WMV]
- May 25, 2018 Animation [MOV] [WMV]
- May 26, 2018 Animation [MOV] [WMV]

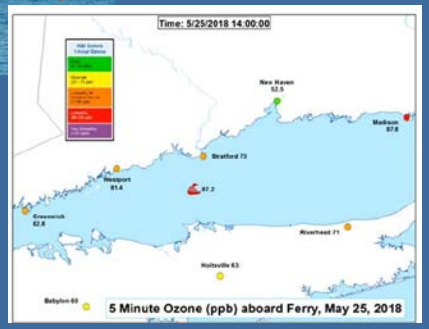
JUNE 11, 2018 PRESENTATION
Eastern U.S. Ozone Event, May 23-29, 2018

DECEMBER 15, 2017 DRAFT WHITE PAPER
Retrospective and Future Analysis of Air Quality In and Downwind of New York City

Summer 2018 Efforts

Westport Sherwood Island

PANDORA



Ferry O_3 monitoring

ozonesondes

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Questions?