

US EPA ARCHIVE DOCUMENT

Long Island Sound Tropospheric Ozone Study (LISTOS)

What is LISTOS?

EPA scientists are collaborating on a multi-agency field study from June to September 2018 to investigate the complex interaction of emissions, chemistry and meteorological factors contributing to elevated ozone levels along the Long Island Sound shorelines, including parts of Connecticut, Rhode Island, New Jersey and New York. The Long Island Sound Tropospheric Ozone Study (LISTOS) includes researchers from state and federal agencies and academia, with combined expertise in aircraft, satellite and ground-based measurements.



EPA scientists are using spectrometers to measure compounds which form ozone to better understand the underlying causes of high ozone across the Long Island Sound Region.

Monitoring Approach

During the study, EPA and partners will be using advanced measurement technology to collect data across the greater Long Island Sound region. Measurements will include ozone, nitrogen dioxide, carbon dioxide, sulfur dioxide, carbon monoxide, and formaldehyde, along with other volatile organic compounds, and pollutant mixing heights. These measurements will be used to better understand emission sources, pollutant transport, and ozone formation, particularly during high ozone events.

EPA and NASA will also be using high resolution satellite measurements from the recently launched European Space Agency TROPOspheric Monitoring Instrument (TROPOMI) to evaluate regional distributions of nitrogen dioxide and formaldehyde, compounds, which form ozone in the presence of sunlight.

Background

The Long Island Sound's unique geographical layout and meteorological factors influence the formation and transport of ozone and other pollutants in this region.

For example, the sound's cooler waters can trap regional air pollutants above the water. Then when temperatures rise, breezes pull the pollution inland. This can lead to high ground-level ozone concentrations along the shorelines of New York, New Jersey, Connecticut and Rhode Island.

While ozone levels in this area have decreased in recent years, there are still persistently high ozone concentrations that exceed National Ambient Air Quality Standards (NAAQS).

Study Partners

In addition to EPA, federal partners collaborating on LISTOS include NASA, and the National Oceanic and Atmospheric Administration.

State partners include:

- New Jersey Department of Environmental Protection,
- New York State Department of Environmental Conservation,
- Connecticut Department of Energy and Environmental Protection,

- Rhode Island Department of Environmental Management,
- Rhode Island Department of Health, and
- Maine Department of Environmental Protection.

Academic partners include:

- University of Maryland,
- State University of New York at Albany,
- Stony Brook University, and
- City College of New York.

The Northeast States for Coordinated Air Use Management (NESCAUM) is coordinating LISTOS and funding participation by the universities.

Sensors Used in LISTOS

Specific measurement instruments being used by EPA during LISTOS include:

- Sensor pods that measure carbon monoxide to provide a better understanding of emission activity near dense urban areas;
- Ground-level advanced chemistry instruments that measure formaldehyde, nitrogen oxides and ozone to better understand ground-level ozone chemistry;
- Ceilometers, which send pulses of light up through the atmosphere to help scientists analyze backscatter from aerosols and identify how pollutants are mixing in the atmosphere; and
- Spectrometers that measure large-scale transport of ozone precursors (primarily nitrogen dioxide and formaldehyde) and will also be used to validate and evaluate urban-scale measurements from the TROPOspheric Monitoring Instrument (TROPOMI), a satellite instrument on board the European Space Agency Sentinel-5 Precursor satellite launched in fall 2017.

In addition to EPA's ground-based sensors, University of Maryland and NASA are flying aircraft fitted with instruments that measure nitrogen dioxide and formaldehyde in the atmosphere. University of Maryland will fly its aircraft over the study area during high-ozone episodes throughout the study, and NASA plans to fly a plane over the study area during June 2018.

Results

Study results are expected to provide greater understanding of ozone formation and transport in the Long Island Sound Region, and information to assist state air quality managers in controlling ozone and the pollutants that form ozone.

A workshop is planned for early 2019 to discuss preliminary results from LISTOS.

Technical Contact:

Jim Szykman
 Research Environmental Engineer
 EPA National Exposure Research Laboratory
 (757) 864-2709
szykman.james@epa.gov

Communications Contact:

Emily Smith
 Communications Director
 EPA National Exposure Research Laboratory
 (919) 541-5556
smith.emily@epa.gov

Related Links:

[EPA Air Research](http://www.epa.gov/air-research)
www.epa.gov/air-research

[Northeast States for Coordinated Air Use Management \(NESCAUM\): LISTOS:](http://www.nescaum.org/documents/listos/)
www.nescaum.org/documents/listos/

[EPA \(in collaboration with NASA\) Lake Michigan Ozone Study 2017:](http://www-air.larc.nasa.gov/missions/lmos/)
www-air.larc.nasa.gov/missions/lmos/

[By Air, Land, and Sea: Tackling the Ozone Issue on Lake Michigan's Shores:](http://www.epa.gov/sciencematters/air-land-and-sea-tackling-ozone-issue-lake-michigans-shores)
www.epa.gov/sciencematters/air-land-and-sea-tackling-ozone-issue-lake-michigans-shores