

# NEISA: Rationale, Progress, & Future Plans

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## Why Air Quality in New England?

New England lies directly downwind of major urban and industrial centers in the eastern United States

## Effects of Exposure to O<sub>3</sub>/PM<sub>2.5</sub>

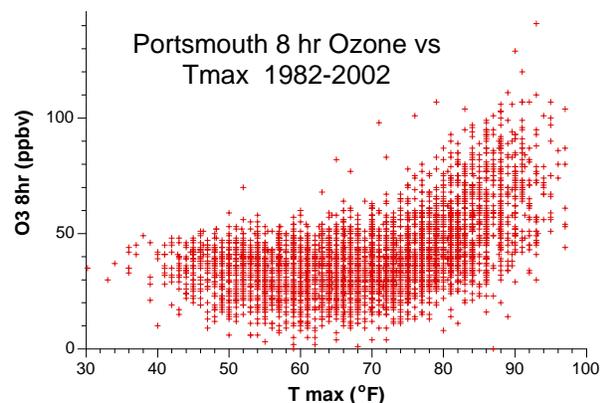
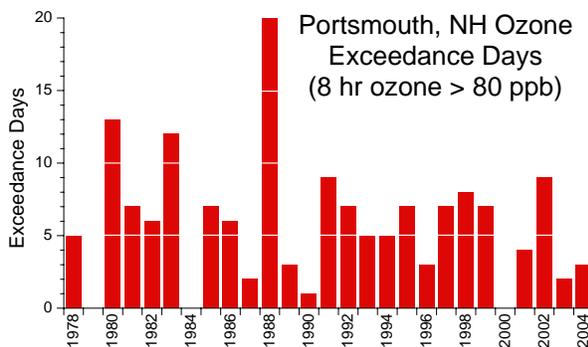
### Ozone

- coughing
- nose and throat irritation
- chest pain
- reduced lung function
- increased susceptibility to respiratory illness
- aggravation of asthma
- children and people with chronic lung disease are particularly at risk



### PM<sub>2.5</sub>

- increased risk of cardiac arrest and premature death
- aggravation of asthma
- respiratory related hospital visits
- reduced lung function and chronic bronchitis
- work and school absences
- children, people with chronic lung disease are particularly at risk



## NEISA Objectives

Support efforts to improve public health in New England by:

- improving our understanding of the link among climate, air quality, and human health
- estimating the health care and other economic costs associated with poor air quality
- developing and modeling strategies for predicting, communicating, and adapting to poor air quality events

## NEISA Partners

*Internal: UNH Departments and Institutes*

AIRMAP - Institute for the Study of Earth,  
Oceans and Space  
UNH Office of Sustainability  
NH State Climate Office  
Whittemore School of Business and Economics  
School of Health and Human Services  
New Hampshire Institute for Health Policy  
New Hampshire Health Information Center

UNH Cooperative Extension

*Academic: Other Universities*

Northeast Regional Climate Center, Cornell  
University  
Harvard School of Public Health  
Columbia School of Public Health  
Graduate School of Oceanography, University  
of Rhode Island

## NEISA Stakeholders

*Governmental Organizations*

NH Dept. of Environmental Services (DEP) &  
Dept. Health and Human Services (HHS)  
Vermont DEP and HHS  
Maine DEP and Bureau of Health  
EPA Region 1  
NOAA

Maine Thoracic Society  
Asthma Regional Council (ARC) of New  
England  
Exeter, Portsmouth and Wentworth Douglas  
Hospitals (NH)  
NH Community Health Access Network  
Dartmouth Hitchcock and Penobscot Bay  
Medical Center  
John Snow Institute  
New England Society of Allergists (NESA)

*Non - Governmental Organizations*

Lung Association (NH, Maine, New Brunswick)

## Stakeholder Identification & Influence

Evolution of the Learning Community

- Stakeholders identified by networks of individuals already engaged in learning community
- Most influential stakeholders are those that share integrated assessment approach / philosophy, and manage boundaries with “networking” outlook
- NEISA working with “early adopters” from multiple sectors

## NEISA Stories

Fall rise in demand for hospital services  
Pulmonary function study (2004)

Illness cost of air pollution (ICAP)  
Climate/Air Quality links

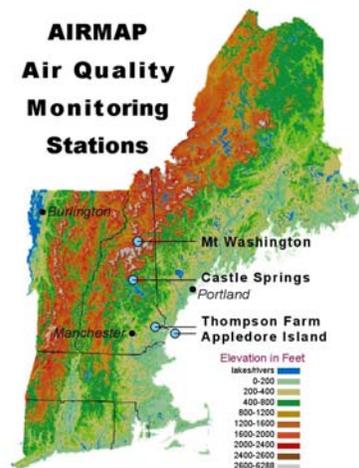


### Project Summary:

UNH-led air quality and climate program unraveling fundamental chemistry-climate connections in the rural atmosphere of New England that is situated directly downwind of major urban/industrialized emissions.

### Research Goals:

- Document and analyze trends in the regional air quality of New England
- Delineate regional climate and air quality connections in the Northeast (especially those related to the biosphere)
- Quantify the relationship of regional air quality in New England to intercontinental transport of North American outflow over the Atlantic.



## Ozone Climatology

- PCA-based regionalization of O<sub>3</sub> 8-hour maxima
- Apr 1 – Oct 31, 1980-2004
- Approx. 82% of variance explained by five coherent ozone regions
- Circulation-to-environment synoptic climatology
- Identify preferred regional circulation anomalies associated with high O<sub>3</sub> events in each region

Circulation Types	
Bermuda High *	Ohio Ridge
Coastal Ridge	Ohio Trough
Coastal Trough	Overhead High
Great Lakes Ridge	Southern High
Great Lakes Trough	Tilted Ridge
Mid-Atlantic Ridge	Zonal Flow

\* e.g., Bermuda High pattern linked to 25% of high O<sub>3</sub> days in northern New England, but only 3-5% of days in other regions

## NEISA-AIRMAP Framework



## Future of NEISA

### Limitations of NEISA as RISA

- Some NEISA objectives aren't well-aligned with RISA program goals
- e.g., improved pollen monitoring network
- At the moment, the climate-AQ-health issue precludes other RISA initiatives

### Current/Future Plans: non-RISA

- Leverage other funding sources
  - AHRQ (NIH)
  - New Hampshire HHS
  - AIRMAP
  - EPA
  - Others?
- More generally – find ways to conduct some original research, database development, etc. independent of RISA

### Current/Future Plans: RISA

- Can we effectively forecast the fall peak in hospital admissions, due to pollen?
  - i.e., Is there a “forecast of opportunity”?
- Does an air quality forecast – one day, several days, or months in advance – improve public health?
  - Further development/dissemination of illness cost of air pollution
  - On multiple time scales & for all New England counties
- Improved messaging to stakeholders regarding EPA/NOAA air chemistry forecasts/information