

Study of Baseline Quality of Ambient and Personal Air within the New Jersey Meadowlands District: Modeling Components

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Introduction

The objectives of this project are to (1) model local and regional emissions of air toxics impacting the Meadowlands District, (2) model air quality in the Meadowlands District, identifying contributions from different types of local and regional sources, and (3) evaluate emission and dispersion modeling using field data and refine an air quality modeling system for the Meadowlands District.

A GIS-based air quality database has been developed to incorporate available (historic) air quality monitor data for the last 15 years from all air quality monitors that have operated at locations within a 10 km radius from the Meadowlands District. Weather data from all NWS and ASOS stations within a 25 km radius from the Meadowlands are also incorporated in this geodatabase to complement the air quality data. Fine scale allocation of emission at census tract level, in the area around Meadowlands District, is presented for four air toxics (2 VOCs - Benzene, Formaldehyde, 2 metals - Arsenic and Mercury) using USEPA's Emission Modeling System for Hazardous Air Pollutants (EMS-HAP version 3.0) and the 1999 National Emission Inventory (NEI-99, final version 3.0). An ARC/GIS interface has been developed for visualization of EMS-HAP emission estimates, modeled air concentrations (based on 1996 and 1999 NATA (USEPA, 2005) results), and geographic distribution of source facilities (based on data from NEI, TRI, HazDat, CERCLIS, KCS-NJ, and MERI) for the Meadowlands district. Preliminary analyses examining relative contributions of different emission sources to locations in the vicinity of Meadowlands, based on the 1996 and 1999 NATA estimates are also presented here.

Modeling Domain: the Meadowlands District

Geodatabases of local and regional emissions and aerometric information utilizing existing inventories and standard modeling approaches

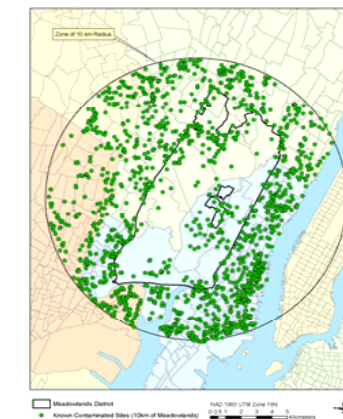
Air Quality and Meteorological Monitors



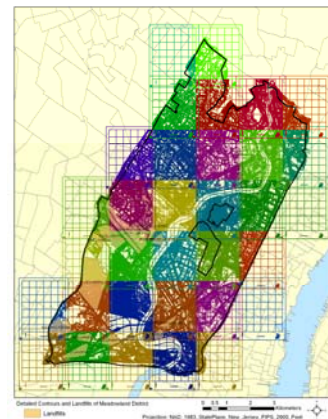
TRI and NEI Facilities



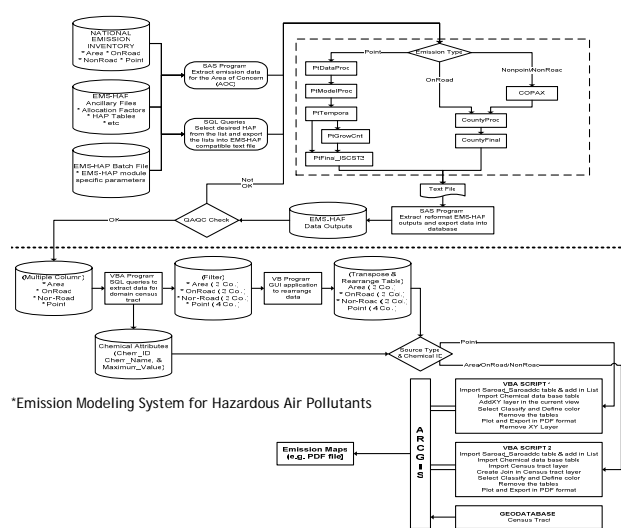
Known Contaminated Sites



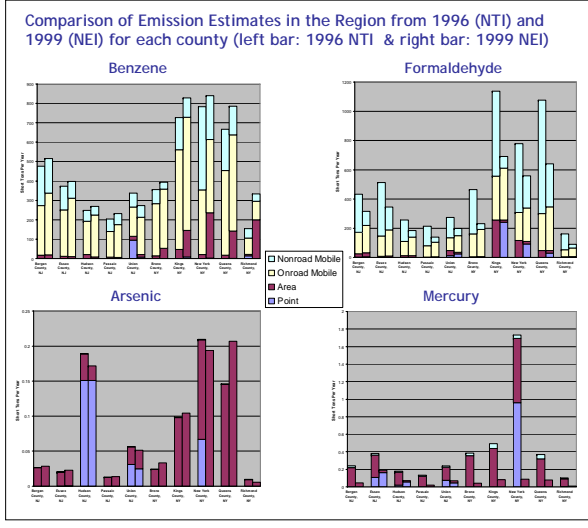
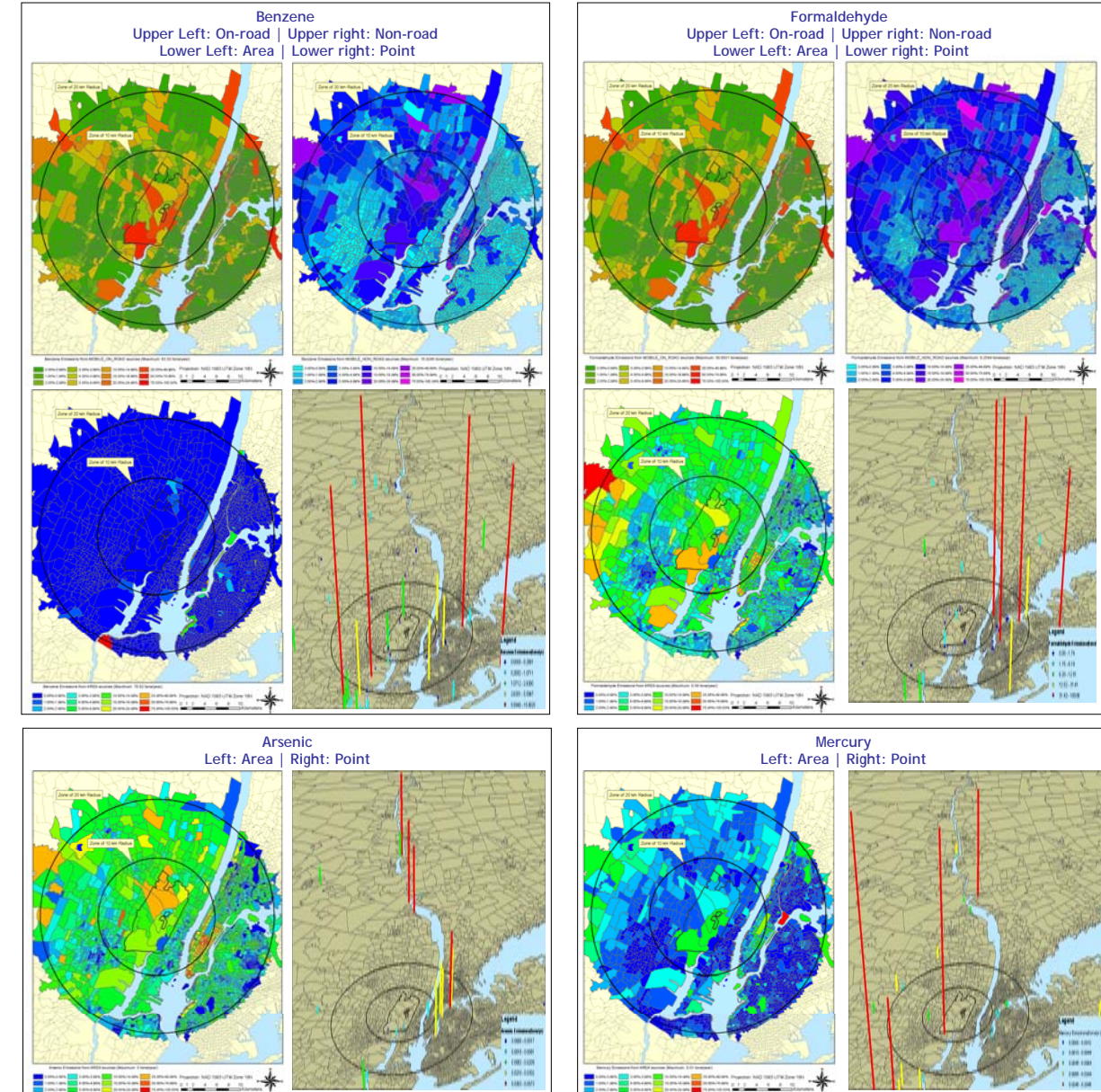
Landfill Areas



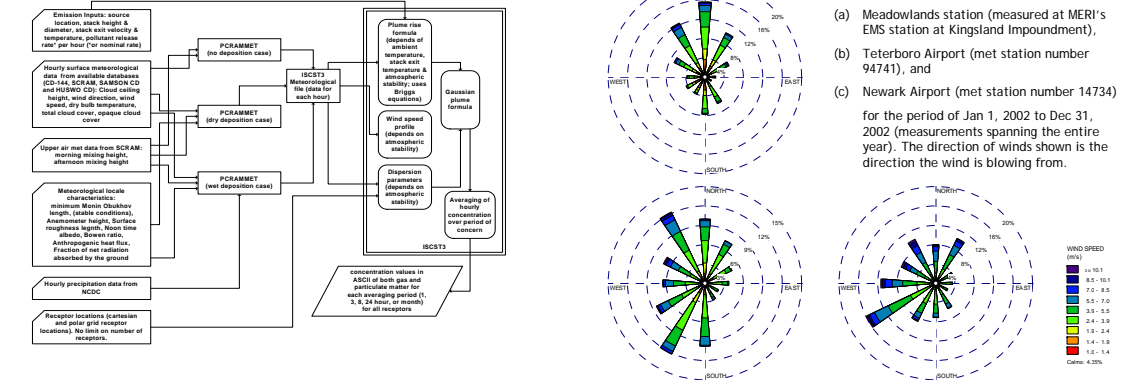
Fine-scale Emission Modeling Utilizing USEPA's EMS-HAP* V 3.0 and Specialized Models (such as LANDGEN)



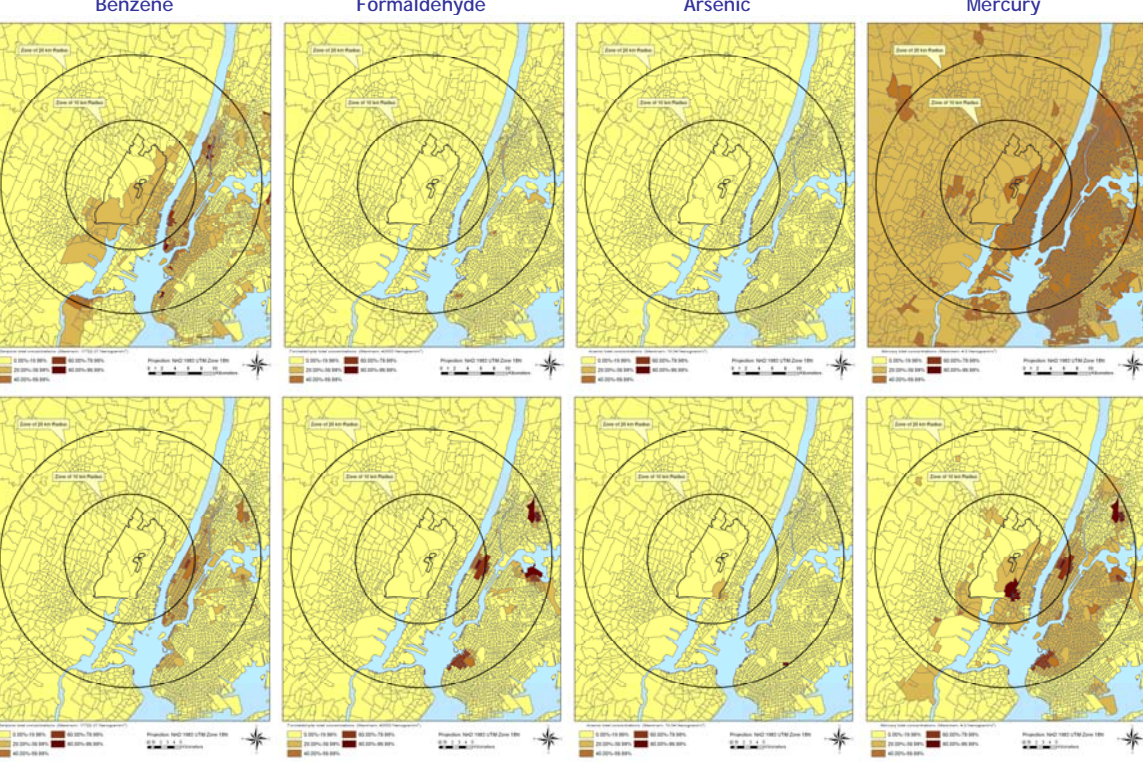
Annual Emission Patterns



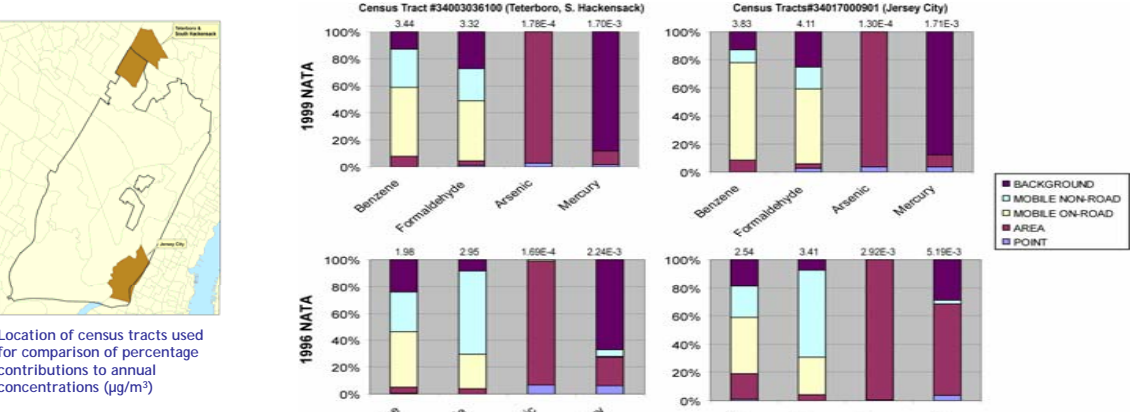
Local Scale Air Quality Dispersion Modeling



Annual Ambient Average Concentration Patterns



Percentage Contributions to Annual Total Average Concentrations ($\mu\text{g}/\text{m}^3$)



Acknowledgements

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