Urban Community Air Toxics Monitoring Project, Paterson City, NJ

UCAMPP

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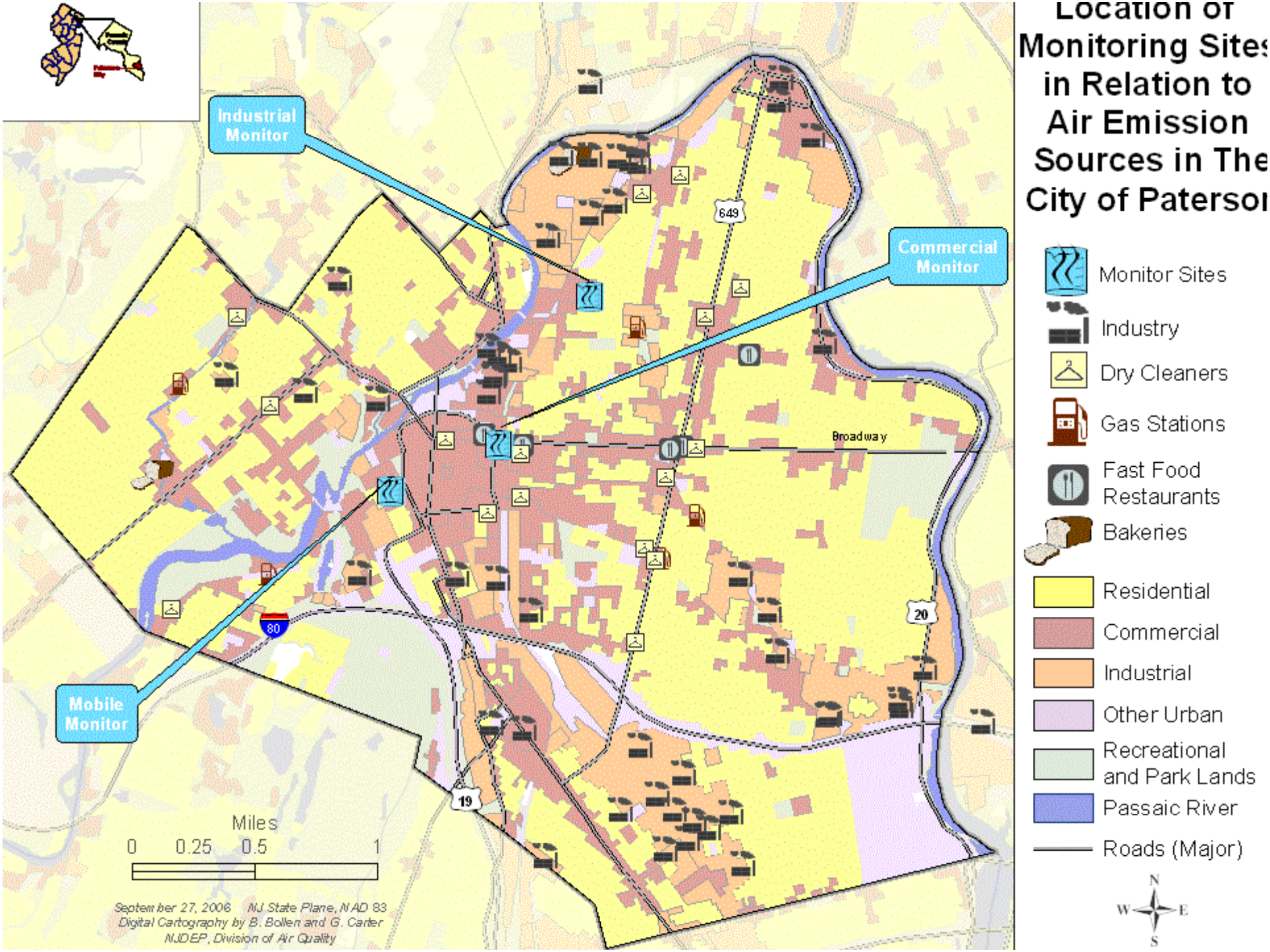
Why was this study conducted?

- 2003 USEPA's competitive grant program "National Air Toxics Monitoring Program - Community Assessment"
  - **To fund pilot projects to help governments and communities develop tools to characterize, track and reduce air toxics**

Main Objectives

- Provide information & develop tools so that the NJDEP and communities can better address exposure and risk issues related to air toxics.
- Characterize local air toxics related to different land use patterns in a highly industrialized urban community
- Placement of air toxics monitoring stations in community-oriented locations to capture industrial, commercial, and mobile source-dominated emissions


Location of Monitoring Sites in Relation to Air Emission Sources in The City of Paterson
Industrial Monitor
Commercial Monitor
Mobile Monitor
649
Broadway
80
20
19
Miles
0 0.25 0.5 1
September 27, 2006 NJ State Plane, NAD 83
Digital Cartography by B. Bollen and G. Carter
NJDEP, Division of Air Quality
Monitor Sites
Industry
Dry Cleaners
Gas Stations
Fast Food Restaurants
Bakeries
Residential
Commercial
Industrial
Other Urban
Recreational and Park Lands
Passaic River
Roads (Major)
N
W
E
S

Industrial

Mobile

Commercial

Not Cite

Background

Why Paterson?

- Mixed commercial, industrial, mobile & residential land use
- Paterson was **not chosen due** to explicit environmental concerns or in response to any specific activities

What was measured?

- NJDEP set out to measure 132 different air toxics at three locations in Paterson (urban location) and one background site (Chester, NJ- rural)
- Sampling occurred about every six days
  - to coincide with the four NJDEP air toxics monitoring locations around the state
- November 2005 through December 2006

No long-term (70yrs) noncancer risk

No short-term (24-hr) noncancer risk

How does the air in Paterson compare to other locations around the state?

- Some chemicals were found to be elevated above the NJDEP cancer health risk guidelines. Similar elevations were observed at the four comparison locations around the state.
  - Camden (urban residential), Chester (rural), Elizabeth (mobile) and New Brunswick (suburban)

Cancer risk (# in a million)

	Benzene	1,3-butadiene	Ethyl benzene
Background	4	<1	<1
Industrial	10	4	1
Mobile	9	6	1
Commercial	14	9	3
Elizabeth	10	5	<1
Camden	9	4	<1
New Brunswick	5	2	<1

Cancer risk (# in a million)

	Carbon tetrachloride	Chloromethane
Background	9	2
Industrial	9	2
Mobile	9	2
Commercial	9	2
Elizabeth	9	2
Camden	9	2
New Brunswick	9	2

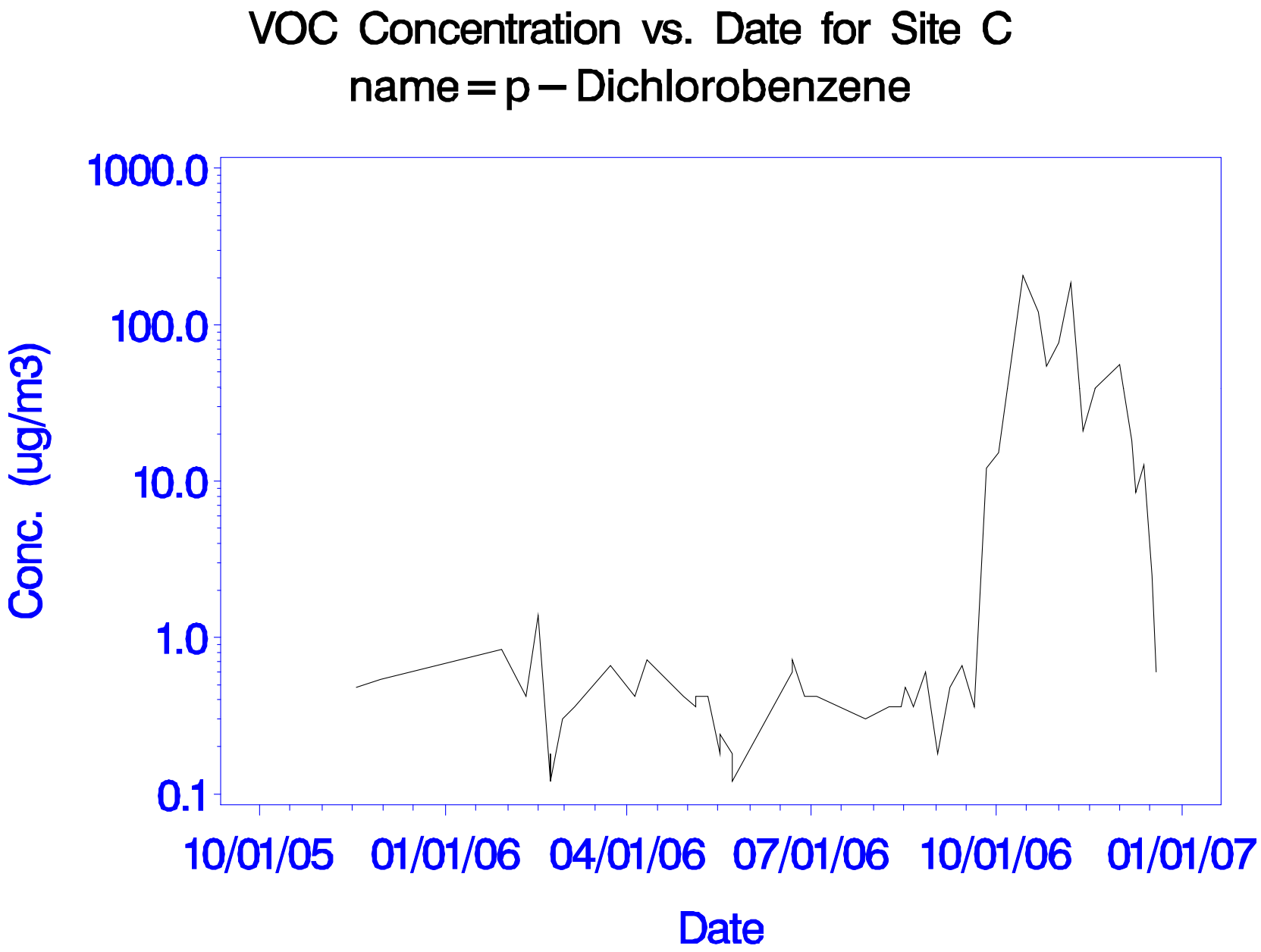
Cancer risk (# in a million)

	p-Dichlorobenzene
Background	<1
Industrial	4
Mobile	3
Commercial	205*
Elizabeth	2
Camden	2
New Brunswick	<1

* This number is driven by increase and then decrease in concentration Oct Dec 2006. Levels returned to typical levels measured during the other 12 months and at the other NJDEP monitoring locations

What about p-dichlorobenzene?

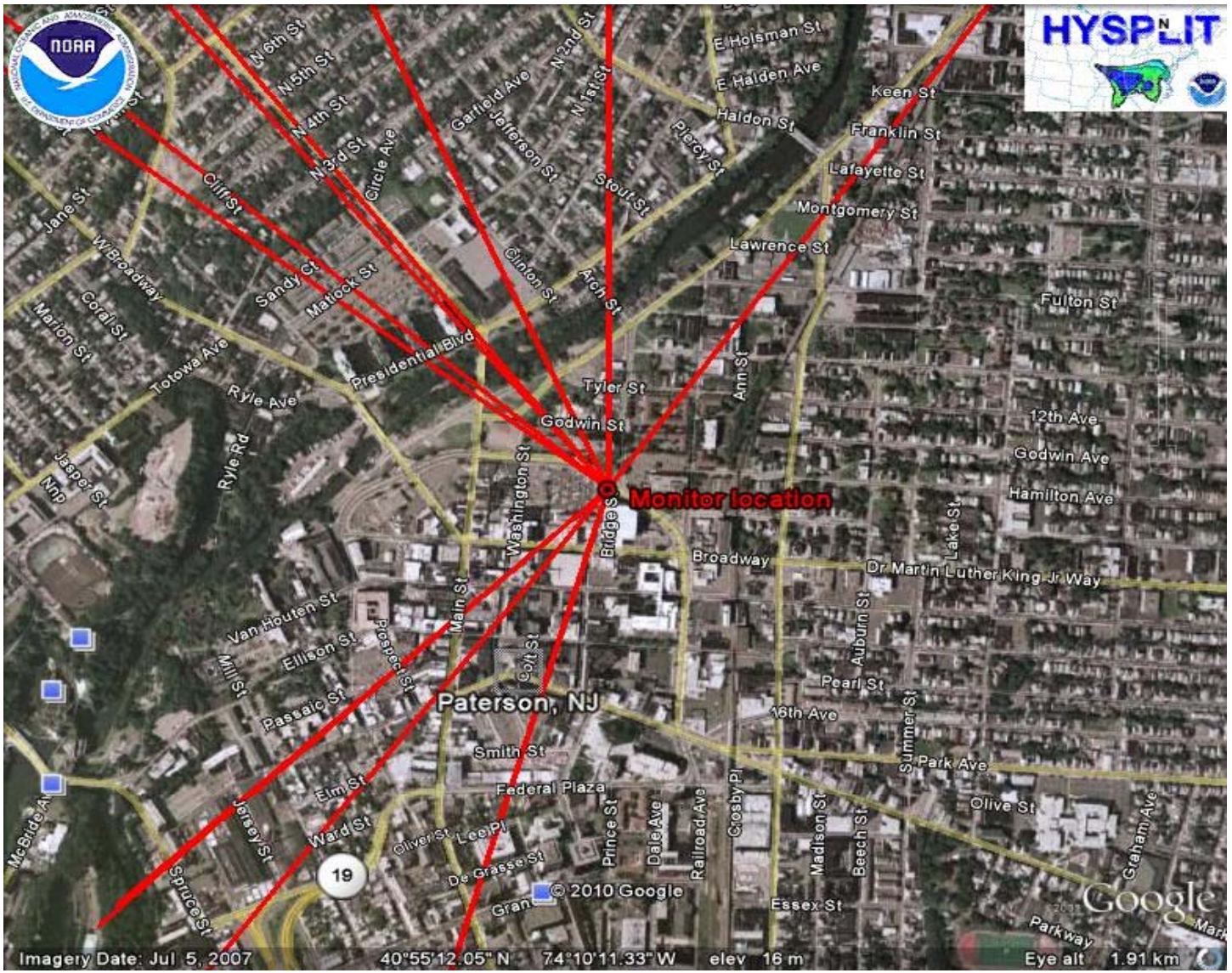
- Out of the 132 air toxics, only p-dichlorobenzene, at one location in Paterson, was observed to be elevated above the other monitoring locations, in Paterson and around the state
- Concentrations increased and then decreased to levels observed at other locations over a 2 month period
- If levels had indicated an immediate health concern, NJDEP and EOHSI would have notified the local community


VOC Concentration vs. Date for Site C
name = p – Dichlorobenzene
1000.0
100.0
10.0
1.0
0.1
Conc. (ug/m3)
10/01/05
01/01/06
04/01/06
07/01/06
10/01/06
01/01/07
Date

What has NJDEP done so far to address p-dichlorobenzene levels?

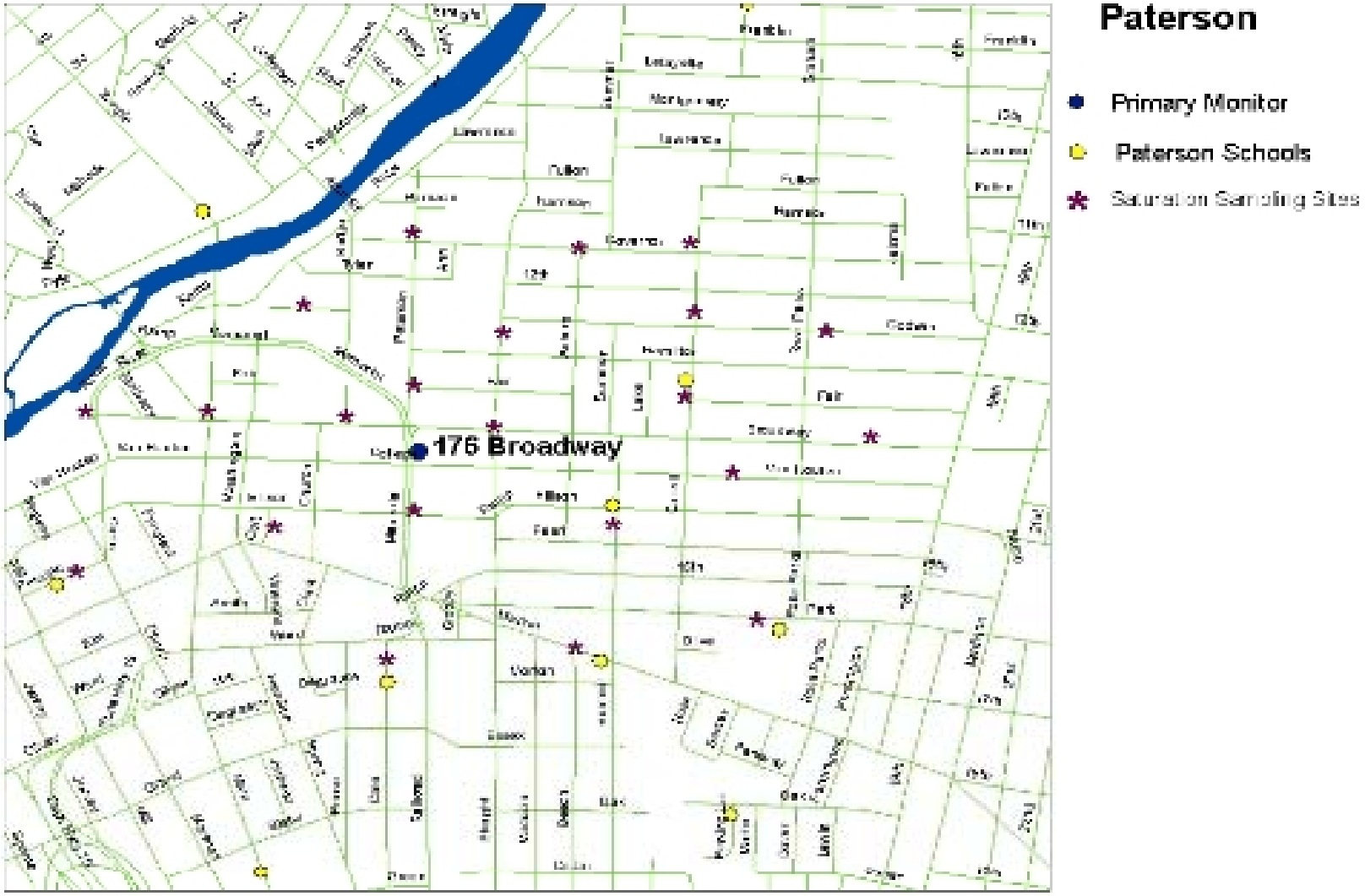
- Review of emissions inventory, TRI, RPPR data
- Discussion with enforcement for potential sources
- Any other compounds with same pattern?
  - No
- Pesticide Use
  - Unlikely
- Modeled using Hysplit
  - Many different directions

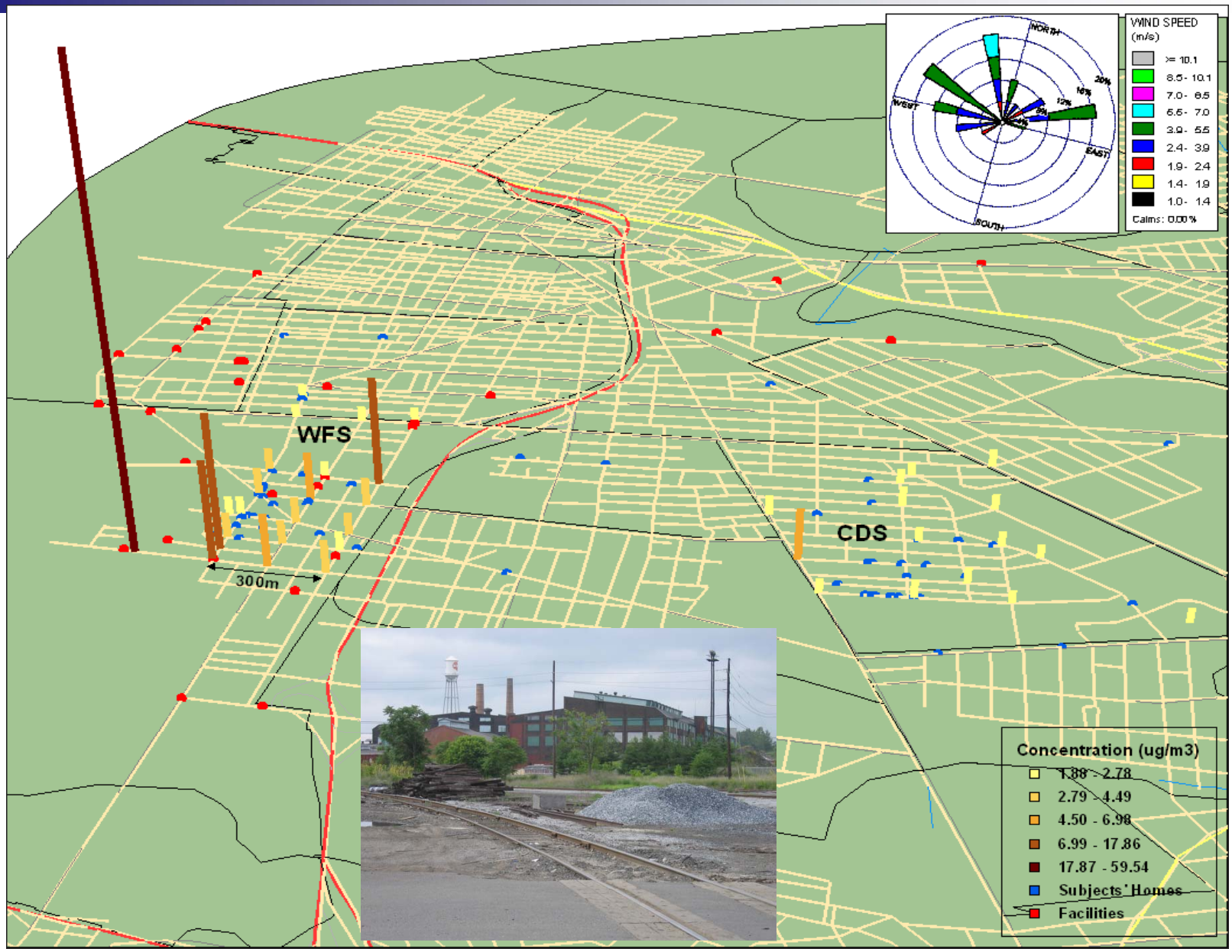
Modeling high p-dichlorobenzene days
Red lines show 24 hr wind direction on those days



Additional Air Monitoring in Paterson Study (AAMPS)

- USEPA funded
- Address concerns of high p-dichlorobenzene concentrations
- 1 yr of monitoring at/ around Commercial site
- 24 sites: TO-15 at C site (60 VOCs), passive badges at rest of sites for chloroform, carbon tetrachloride, benzene, tetrachloroethylene, ethylbenzene and p-dichlorobenzene


Paterson
Primary Monitor
Paterson Schools
Saturation Sampling Sites
176 Broadway



Toluene (2-60 µg/m³)

Zhu et al., 2008, Atmos. Envr.

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  - Retired but still working: Joann Held

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"LOU'S ON FIRST"