Designations for the 2006 PM2.5 Standards: Evaluating the Nine Factors in Setting Nonattainment Area Boundaries

Part 1 – Overview

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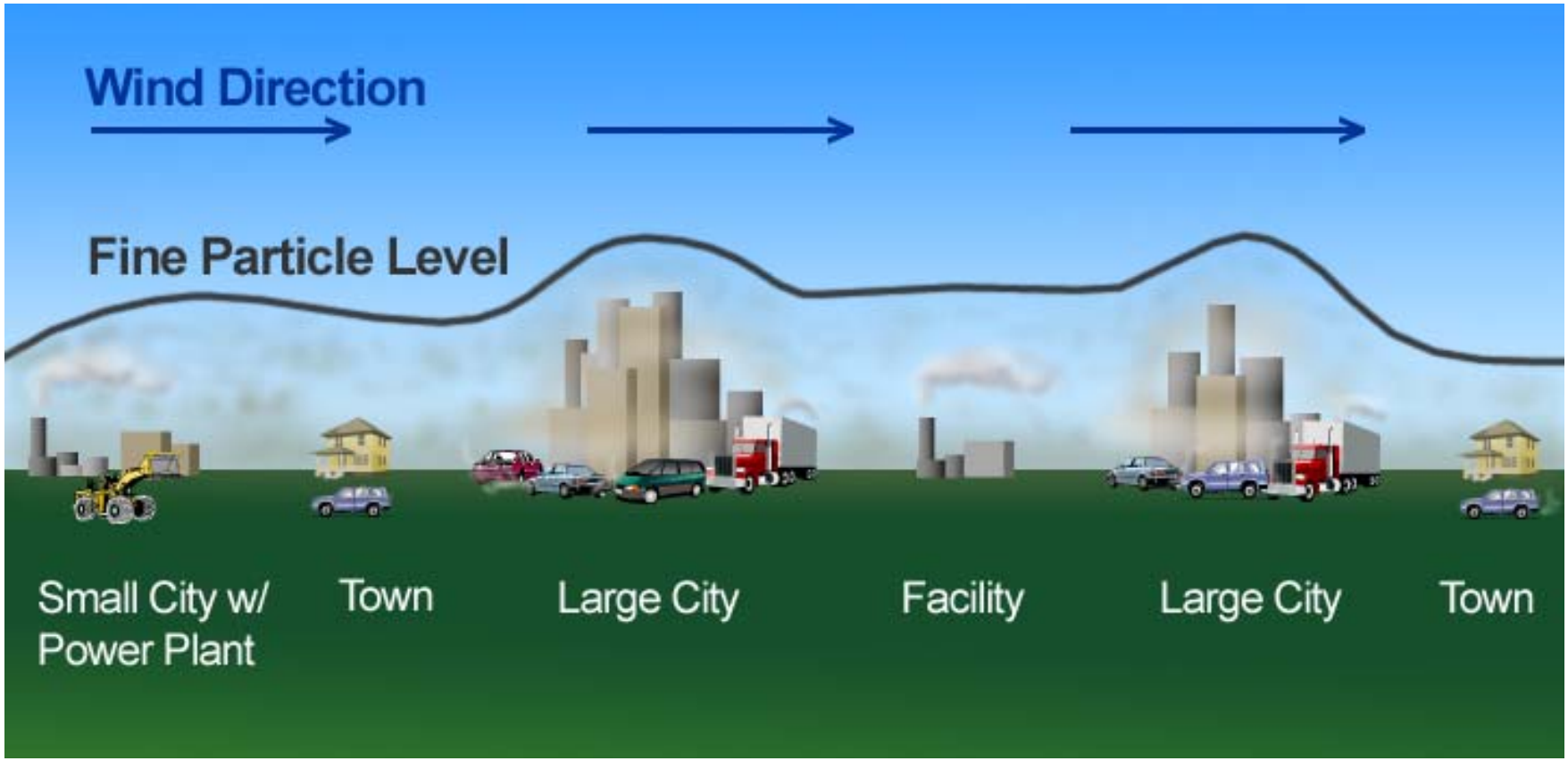
Statutory Requirement

- "Nonattainment area" is defined in section 107 of the Clean Air Act as:

"…any area that does not meet (<u>or that contributes</u> to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant."

Fine Particle Concentrations are Affected by Nearby Sources and Transported Emissions



Analytical Challenge in the Designations Process:

- ***Identifying the nearby areas and sources that contribute to PM2.5 violations***

The 9 Designation Factors

To Help Determine Nearby Area of Influence for 24-hr NAAQS Violations

Overall Approach

- All factors are taken into consideration in making nonattainment decisions
  - Decisions based on the weight of evidence of the nine technical factors.
- No bright lines are used for evaluating factors across all areas. Counties in a metro area are evaluated in relative terms, on a case-specific basis.
- Designations are to be based on best available current data for air quality, emissions, other factors
- In general, if a county in a metro area has a violating monitor, designate the full county.
  - Possible exceptions due to topography, size of county

Overall Approach (cont.)

- Nonattainment problems are caused by a combination of regional and local emissions
  - For purpose of designations, focus evaluation on counties within the metro area and counties adjacent to the metro area.
- Emissions: direct PM2.5 (carbon and crustal material), SO2, NOx, VOC, ammonia
- “Speciation monitoring” techniques can be used to help identify chemical components of PM2.5 mass as well as sources of emissions
- Goal is to maintain national consistency and fairness in decision making.

Sources of Information

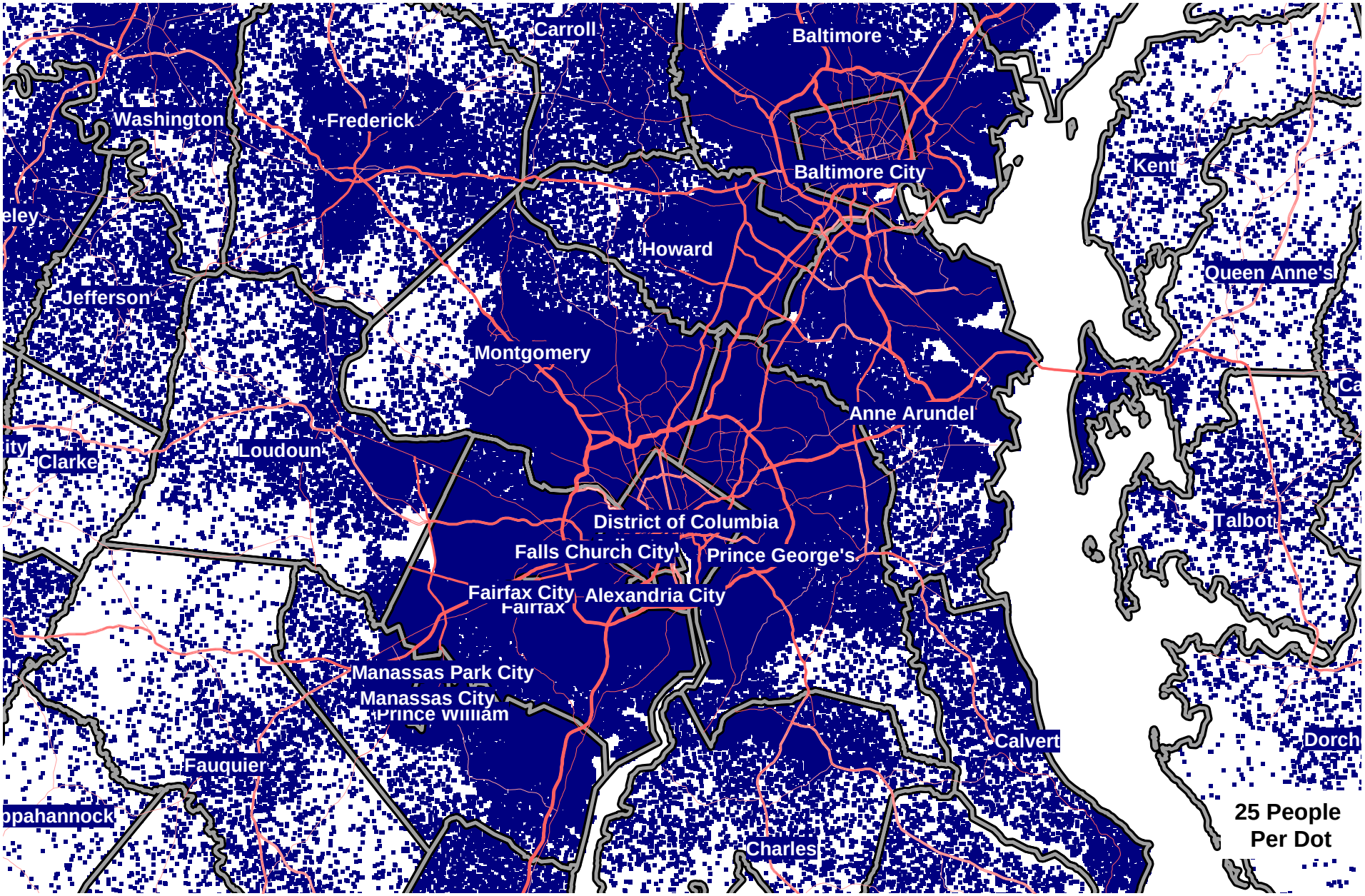
- EPA Air Quality System - national PM2.5 monitoring network
  - Federal Reference Method monitors
  - Speciation Trends Network, IMPROVE
- 2002 National Emissions Inventory (version 3)
  - Direct carbon and crustal emissions are estimated from total PM2.5 emissions with the SMOKE emissions processor
- 2000 US Census population data and population growth data
- 2000 US Census, Journey to Work database
- Vehicle miles traveled
  - Estimates obtained from FHWA Highway Performance Modeling System
- NOAA weather and meteorological data
- NOAA HYSPLIT back trajectory model
- OMB 2003 metro area definitions
- USGS topographic information
- Satellite imagery – Google Earth

Population / Degree of Urbanization

- What type of area is it?
  - Large metro area
  - Moderate-sized city
  - Small town / township
- How many counties make up the metro area?
  - Core Based Statistical Area (CBSA) and Consolidated Statistical Area (CSA)
- How do the counties in the area compare in terms of population density?
- Is the area affected by urban sprawl?

Population Density

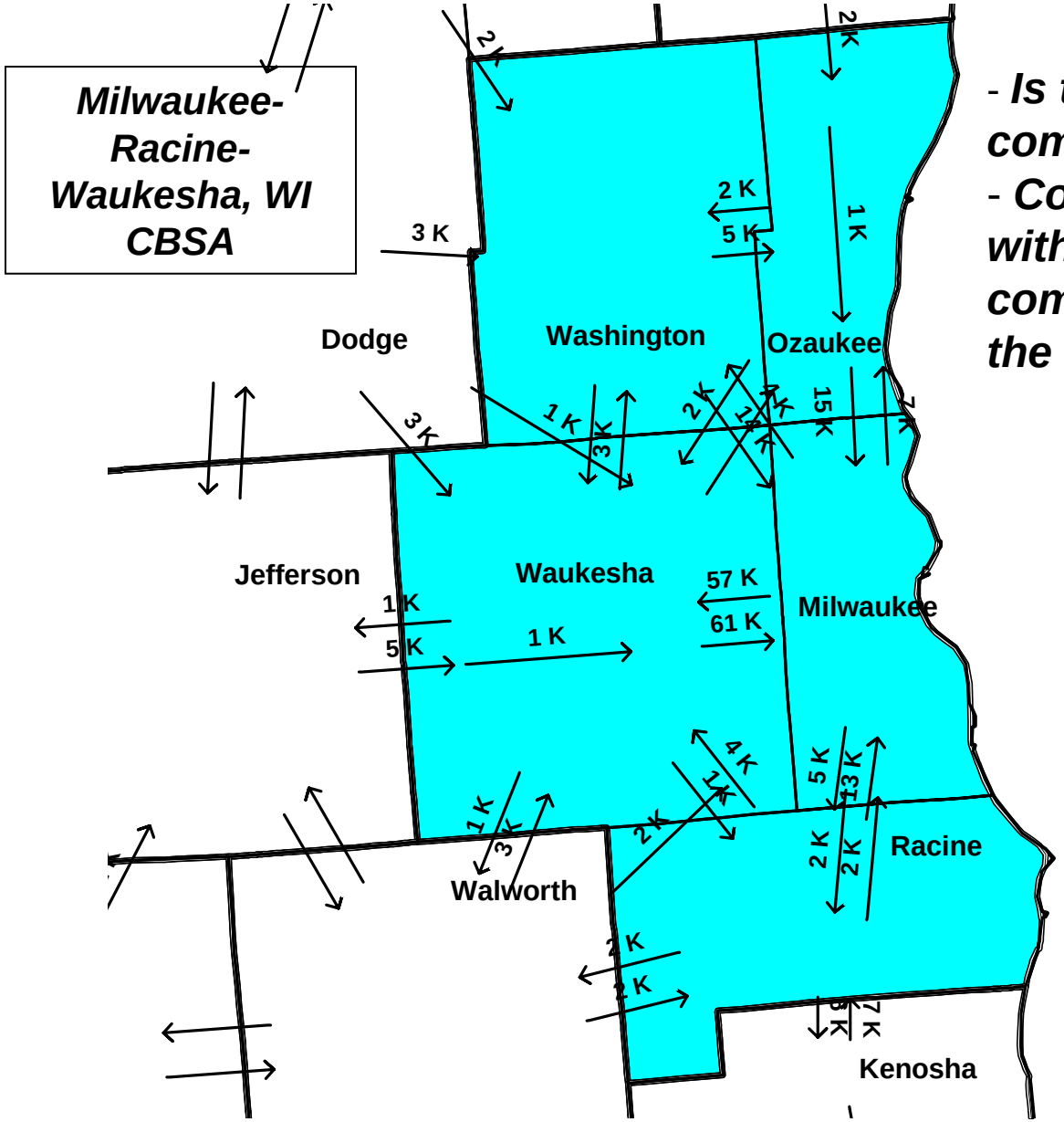
Washington, DC



Growth Rates

- What has been the population growth rate in the area in recent years?
- Which counties have the highest rates?
  - The counties with highest population density may differ from those with the highest growth rates.
- Is growth expected to continue?

Traffic and Commuting Patterns



- ***Is there a high degree of commuting in the metro area?***
- ***Consider inclusion of counties with significant level of commuting to counties within the city or metro area***

Percentage of workers who commute to other counties in the metro area

Source: 2000 US Census, Journey to Work data

Jurisdictional and Other Boundaries

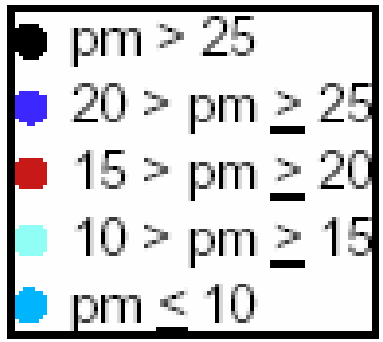
- County and metropolitan area boundaries
  - Including multi-state areas
- Metropolitan planning organizations
- Existing nonattainment area boundaries
- Air pollution control districts
- Tribal lands

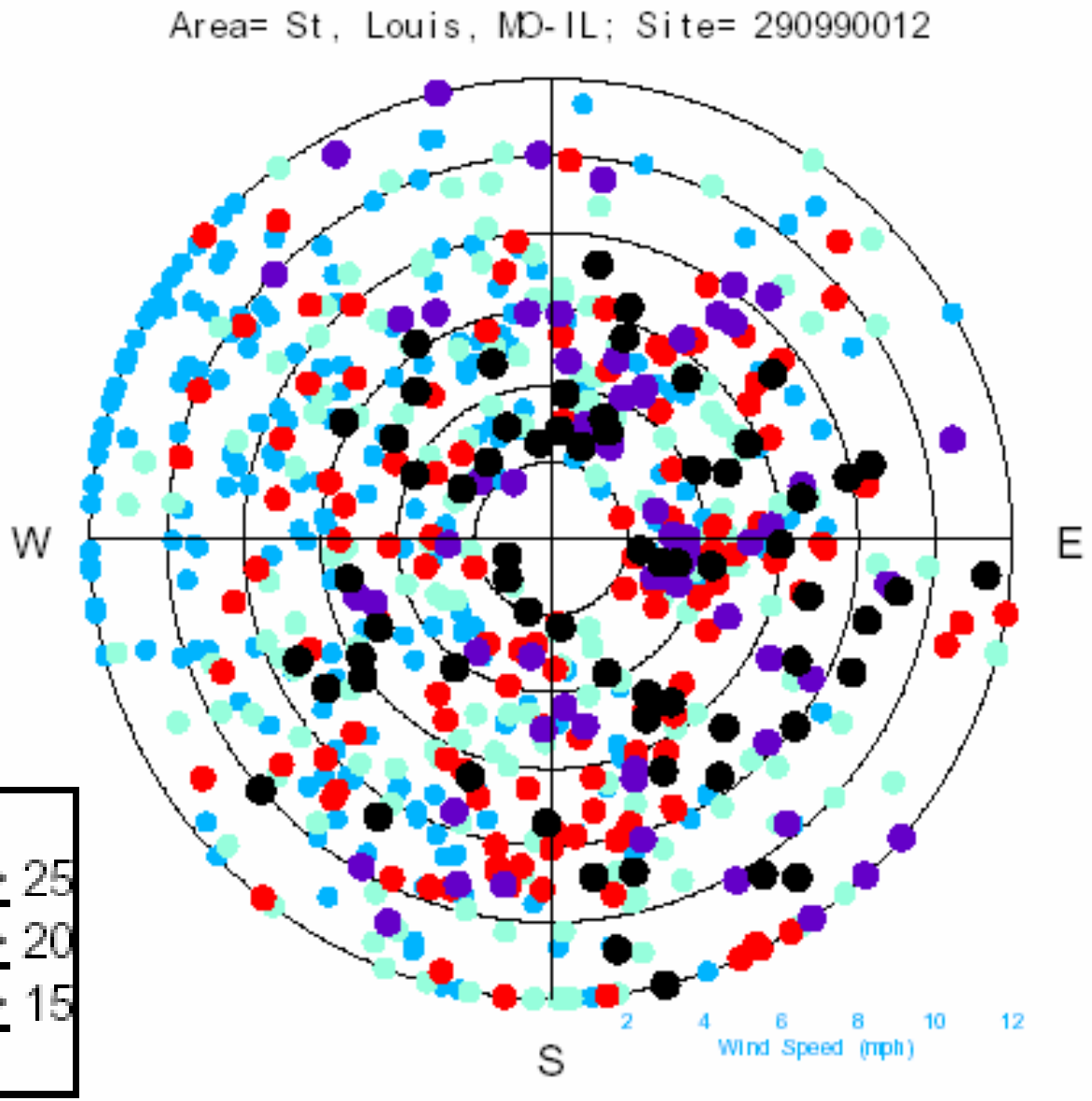
Topography / Geography

- Are there topographic features that defines or affects the contributing source region?
  - Examples: high mountains, narrow valley
- Primarily a western issue

Meteorology

Possible tools:
- Pollution roses based on hourly wind direction data and 24-hour PM2.5 data
- Back trajectories for analysis of high days





Emissions Data

- Where are important nearby emissions sources located?
- What are emissions of PM2.5 and precursors by county?
- Are certain sources key contributors during specific seasons?
  - Speciation data provides important information
  - High nitrate and carbon in winter, sulfate in summer