Network Assessment Overview

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What is a Network Assessment?

- A review of existing monitoring networks in an effort to optimize the network:
  - Identify and removing “low value” monitors
  - Identify under monitored locations
- An opportunity to look for “found money” to implement new efforts
  - Shift funding from low priority monitoring to high priority monitoring
  - Increase efficiency/reduce costs

What is the Difference Between a Network Plan and a Network Assessment?

- Network Plan
  - Due every year
  - Simple accounting of existing networks and changes expected for that year
- Network Assessment
  - Once every 5 years
  - Detailed evaluation of networks and objectives

Why are Network Assessments Needed?

- Air quality agencies need to re-evaluate and reconfigure monitoring networks because
  - Air quality has changed.
  - Populations and behaviors have changed.
  - New air quality objectives have been established (e.g., air toxics reductions, $PM_{2.5}$, regional haze).
  - Understanding of air quality issues and monitoring capabilities have both improved.
  - Priorities have changed
- Reconfiguring air monitoring networks can enhance their value to stakeholders, scientists, and the general public
- Required by new monitoring rule [40 CFR Part 58.10(d)]
  - Once every 5 years
  - First assessment due July 1, 2010

Elements of Network Assessments

- Re-evaluation of the objectives and budget for air monitoring
- Evaluation of a network's effectiveness and efficiency relative to its objectives and costs
- Development of recommendations for network reconfigurations and improvements
- Note: Network assessments are not "one size fits all"
  - Large networks require more complex assessments than small networks
- EPA guidance document available:
  - http://www.epa.gov/ttnamti1/files/ambient/pm25/datamang/network-assessment-guidance.pdf

Network Assessment Steps

Step	Description	Examples
1	Prepare or update a regional description, discussing important features that should be considered for network design	Topography, climate, population, demographic trends, major emissions sources, and current air quality conditions
2	Prepare or update a network history that explains the development of the air monitoring network over time and the motivations for network alterations, such as shifting needs or resources.	Historical network specifications (e.g., number and locations of monitors by pollutant and by year in graphical or tabular format); history of individual monitoring sites
3	Perform statistical analyses of available monitoring data. These analyses can be used to identify potential redundancies or to determine the adequacy of existing monitoring sites.	Site correlations, comparisons to the NAAQS, trend analysis, spatial analysis, and factor analysis

Network Assessment Steps

Step	Description	Examples
4	Perform situational analyses, which may be objective or subjective. These analyses consider the network and individual sites in more detail, taking into account research, policy, and resource needs.	Risk of future NAAQS exceedances, demographic shifts, requirements of existing state implementation plans (SIP) or maintenance plans, density or sparseness of existing networks, scientific research or public health needs, and other circumstances (such as political factors)
5	Suggest changes to the monitoring network on the basis of statistical and situational analyses and specifically targeted to the prioritized objectives and budget of the air monitoring program.	Reduction of number of sites for a selected pollutant, enhanced leveraging with other networks, and addition of new measurements at sites to enhance usefulness of data
6	Acquire the input of state and local agencies or stakeholders and revise recommendations as appropriate	

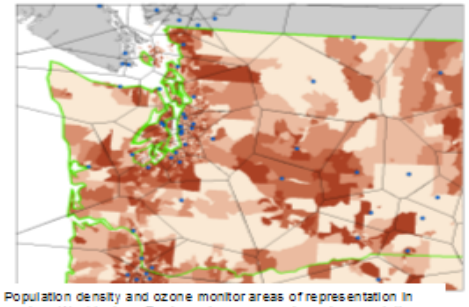
Method Summary Pages

- Site by Site Analyses
  - Site correlations,
  - Comparisons to the NAAQS,
  - Trend analysis,
  - Spatial analysis
  - Etc.
- Bottom-Up Analyses
  - Emission inventory
  - Population density
  - Population change
  - Etc.

Population Served

Overview

Large populations are associated with high emissions. Sites are ranked based on the number of people they represent. Area of representation can be determined using the Thiessen polygons technique or a more sophisticated method (see Area Served). Populations at the census-tract or block-group level that fall within the area of representation of a monitor are assigned to that monitor. This technique gives the most weight to sites that are in areas of high population and have large areas of representation.



Population density and ozone monitor areas of representation in western Washington. Darker colors represent greater population.

Type: Site-by-site analysis
Complexity: ***
Size of network: Moderate or larger
Pollutants: O_3, $PM_{2.5}$, SO_2, some toxics

Objectives Assessed

- Population exposure
- Environmental justice

Resources

	Tools		Data						
	GIS	Statistical Software	Concentrations	Site Locations	Population	Historical Data	Site Information	Emission Inventory	Other
Required	✓			✓	✓				
Helpful									Demographics

Advantages

- Assesses site importance for population exposure, an important regulatory goal
- Flexible (a few possible methods)

Disadvantages

- Does not take into account topography or actual air basins (using basic method)
- Highly resolved population data may be difficult to work with

Similar Analyses (Complexity)

- Area served (**)
- Counties served (**)
- Population change (***)
- Suitability modeling (****)