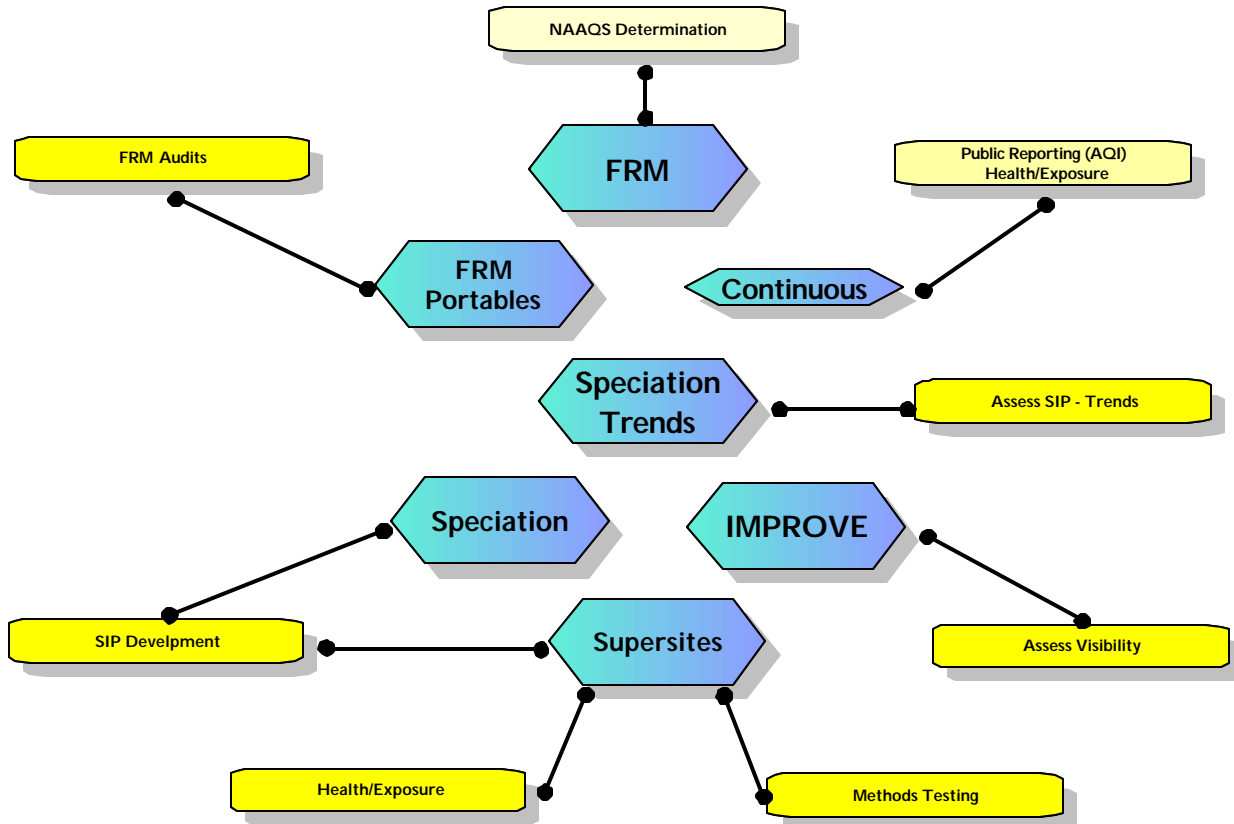


Attachment 1. PM_{2.5} Network Overview

The PM_{2.5} monitoring program has been implemented to meet a variety of monitoring objectives. The most recognized monitoring objectives are: protection of public health - which requires comparing FRM or FEM mass data to the National Ambient Air Quality Standard (NAAQS); timely public reporting - as part of the Air Quality Index (AQI), which requires use of a continuous monitor; assessing the components of PM - which requires use of speciation or IMPROVE monitors, and independent performance evaluations - which requires use of a portable FRM sampler. Most other monitoring objectives can be accomplished in combination with one of the objectives listed above. Other monitoring objectives specific to continuous monitoring include assessing diurnal variation in PM, sector sampling, model evaluation, and assessing peak short term exposure. The need to perform each of these monitoring objectives to meet regulatory and non-regulatory needs has been well established in other documents. If the network elements identified in the middle of the illustration can accomplish multiple monitoring objectives identified on the perimeter, then the most cost effective network element can be chosen to accomplish the monitoring objective required. Since no PM_{2.5} continuous monitors are currently approved for use as a FEM, they cannot fulfill the monitoring objective of NAAQS determinations at this time. This section outlines the network design of the current PM_{2.5} monitoring network. Also, a potential new network design is presented based upon the “hybrid” approach of using both FRMs and continuous monitors for regulatory decision making.

NAAQS Determinations using FRMs

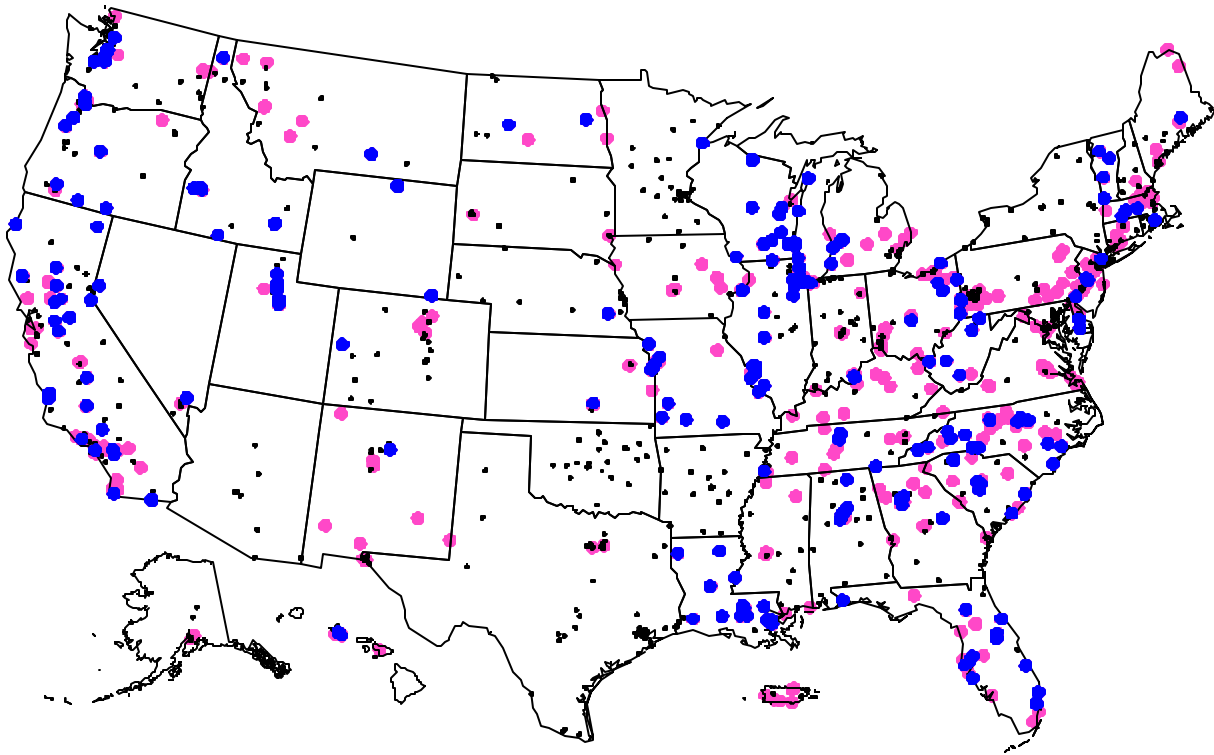
In the current FRM network most monitoring sites were deployed as a function of population



with additional monitors placed to support assessment of background and transport. This network design criteria uses Monitoring Planning Areas (MPAs) which correspond to MSAs over 200,000 and all other areas determined to be in violation of the $PM_{2.5}$ NAAQS as the backbone of the network. Most of the FRMs sited in these urban areas are identified as community-orientated (core) monitoring stations for $PM_{2.5}$, which are sites that are determined to represent community wide air quality. These core monitoring sites are to represent neighborhood or larger spatial scales. A neighborhood scale should provide measurements with some reasonably homogeneous urban subregion having dimensions representing a few kilometers. Since monitors cannot be expected to be placed every few kilometers, a location is carefully chosen to represent not only the immediate neighborhood but also neighborhoods of the same type in other parts of the city. Urban scales may also be used for siting of core $PM_{2.5}$ sites.

These urban scales would be used to characterize the $PM_{2.5}$ concentration over an entire metropolitan or rural area ranging in size from 4 to 50 km. The figure below provides an illustration of the $PM_{2.5}$ FRM sites sited in the United States as of Summer 2001. As may be expected their appears to be a high density of FRM sites in urban areas with a reasonable density of sites in some rural areas and poor density in others.

PM_{2.5} FRM Sites and Data Completeness for '99 and '00



- = complete in all 8 Q's (216, where "complete" = 75% or better data capture)
 - = 11+ samples in each quarter, but < 75% complete (290)
 - = other sites with less complete data (637)
- Individual maps for 1999 and 2000 are in briefing appendix.*

July 11, 2001

Public Reporting

The network design criteria for PM_{2.5} has a provision to use a fine particulate continuous monitor at a core monitoring site in each metropolitan area with a population greater than 1 million. The purpose of these analyzers are to provide improved temporal resolution to better understand the processes and causes of elevated PM_{2.5} concentrations and to facilitate public reporting of PM_{2.5} air quality. Additionally, according to Appendix G to Part 58, which provides the Uniform Air Quality Index (AQI) and Daily Reporting Requirements, MSAs over 350,000 must report the AQI unless the pollutant concentrations remain below an index of 50 for a season or year. This index of 50 corresponds to a PM_{2.5} concentration of 15.4 ug/M³. In addition to the use of continuous monitors in large MSAs and for the AQI, some agencies have implemented a larger network of continuous monitors to provide better spatial coverage both within large MSAs and across their network to include smaller cities.

Speciation Program

The speciation network is a combination of a few different monitoring networks where chemical analysis is to be performed. Although not explicitly required here, CAC and REM continuous monitors are expected to be collocated with speciation methods to determine performance by species. Additionally, the collocation of continuous mass and speciation methods will provide a signal to determine the diurnal variation as well as the mass data on the non-sample days of the speciation monitors. The sub-components of this network are described below:

Speciation Trends

The speciation trends network was designed to provide the baseline and temporal speciated data for a number of urban locations to track long term changes in aerosol composition. This network has been deployed with commercial multi-channel filter based samplers that require laboratory analysis in order to determine chemical composition.

Supplemental Speciation

This element of the speciation network is a flexible component for State and local agencies to implement based upon the needs for speciation data within those organizations. There are no constraints on the selection of sampler type or the protocols for laboratory analysis. Even though there is much more flexibility in how this part of the speciation network may be implemented many State and local agencies are choosing to adopt much of the protocols of the speciation trends network in order to assure that data is comparable.

Supersites Program (SS)

The supersites program is a research program with no constraints on the selection of

technology. This program provides an opportunity for researchers to implement a number of proven and experimental monitoring technologies.

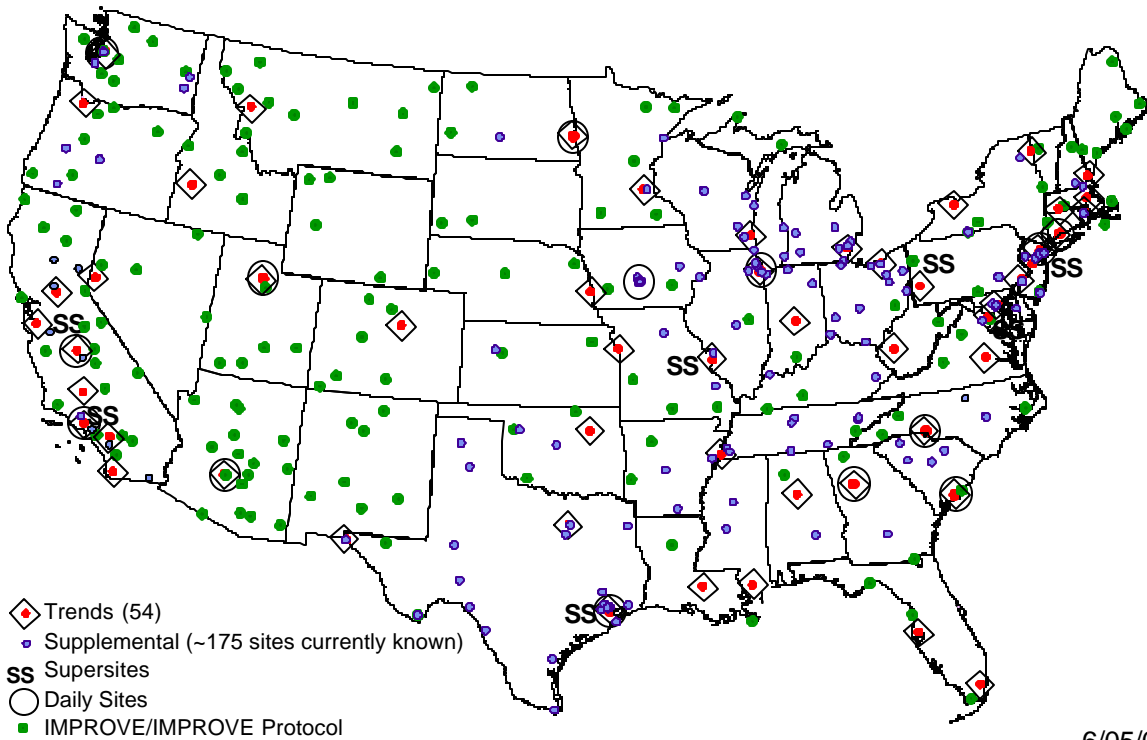
Daily Speciation Sites

Daily speciation sites are expected to use a combination of both filter based commercial grade speciation samplers and continuous speciation monitors. The filter based samplers would be operated on a 1 in 3 day schedule. Continuous monitors would be run every day. These monitors would provide the speciation signal on the off days as well as an understanding of the diurnal variation every day. Continuous speciation samplers are expected to be available for carbon, sulfate, and nitrate. Additionally, a diesel signal may also be measured by use of the Aethelometer.

IMPROVE

The Interagency Monitoring of Protected Visual Environments (IMPROVE) is a monitoring program that employs use of multichannel filter based samplers to determine chemical species. As with the filter based speciation program the IMPROVE program requires use of post sampling laboratory analysis to determine both gravimetric and speciated data. The monitoring methods used in this program are resource intensive as are other filter based speciation methods. Deployment of this network is primarily confined to Class I areas and National Parks. 6 sites are scheduled to be collocated with both Speciation and IMPROVE samplers, 3 each at urban and rural sites.

Current/Planned Urban & Rural PM_{2.5} Speciation Networks



6/05/01