

DRAFT RECOMMENDATIONS

Vision Statement: The air quality management system can be improved by moving towards a more performance-oriented approach, which seeks to track air quality achievements and evaluate air program results. To support this transition, technical data need to be improved (especially, emissions inventories and ambient measurements), an overarching accountability framework needs to be established, and new procedures for developing SIPs and tracking progress need to be defined and implemented.

NAS Recommendation 1: Strengthen the scientific and technical capacity of the AQM system to assess risk and to track progress

- 1. To enhance emissions data bases for more accurate air quality assessments and tracking of progress, EPA, in conjunction with S/L/Ts and affected stakeholders, should improve emissions measurements and reporting.¹***
2. Where emissions measurement-based information is impractical to obtain for air quality assessments, or where improved projections are needed, EPA, in conjunction with S/L/Ts and affected stakeholders, should improve emission factors and emission estimation methods.
3. To improve the usefulness and acceptance of technical information for planning and decision making, EPA, in conjunction with S/L/Ts and affected stakeholders, should quantify and take actions to reduce uncertainty in emissions inventories and air quality modeling applications, provide guidance for incorporating uncertainty assessments into SIP planning, and improve communication of uncertainty to decision-makers.
4. In order to provide more scientifically relevant and responsive air quality information, and to provide a more robust and spatially complete basis for current and future air quality planning, EPA, in conjunction with S/L/Ts and affected stakeholders, should promote and improve integrated, multi-pollutant monitoring.
- 5. To promote understanding and characterization of the impacts of air quality changes on health and ecological outcomes, and to improve the scientific basis for more informed policy decisions, including the need for and nature of air quality standards, EPA, in conjunction with health and ecosystem experts, S/L/Ts, and affected stakeholders, should undertake a systematic effort to track air quality achievements and evaluate air program results. This effort should begin by focusing on the progression and associations of air emissions as they interact and ultimately affect health and the environment. In order to move beyond the current approach of relying predominately on air quality measurements, we need to further develop and apply the capacity to monitor, assess, and report on how changes in emissions impact air quality, atmospheric deposition, exposure, and effects on human health and ecosystems. Emphasis should be placed on developing and enhancing appropriate health-and ecosystem indicators, benchmarks, and subsequent analyses within this overarching accountability framework.***

¹ The recommendations highlighted in bold italics reflect activities that USEPA is currently not doing (see table) and, as such, might be appropriate to emphasize.

NAS Recommendation 2: Expand national and multi-state, performance-oriented control measures to support state, local, and tribal efforts

6. ***EPA, in conjunction with S/L/Ts and affected stakeholders, should prepare guidance for local (urban-scale) control measures to support the upcoming round of ozone and PM2.5 SIPs, and, if possible, optimize multi-pollutant control benefits and opportunities for criteria and hazardous air pollutants.***

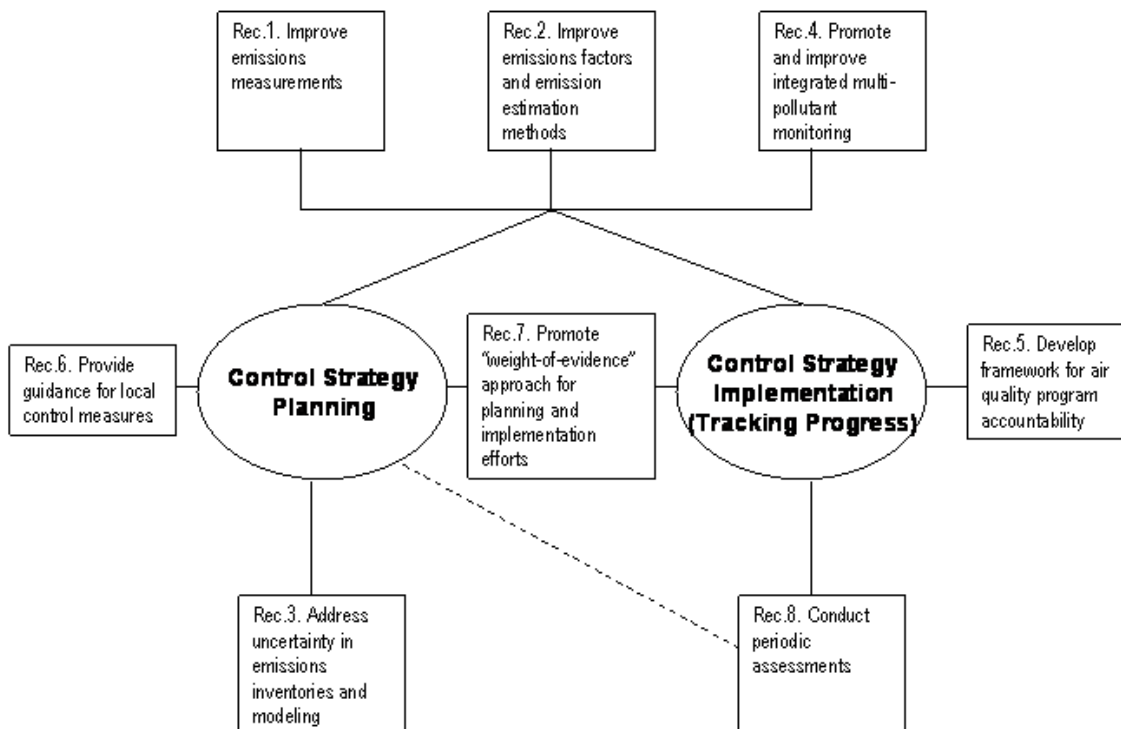
NAS Recommendation 3: Transform the SIP process to meet future air quality challenges

7. In order to move beyond the current approach of relying on air quality modeling, EPA, in conjunction with S/L/Ts and affected stakeholders, should modify its guidance to promote weight-of-evidence (WOE) demonstrations for both planning and implementation efforts. In particular, these demonstrations should reduce reliance on modeling data as the centerpiece for SIP planning, and should increase use of monitoring data (and analyses of monitoring data) especially for tracking progress.
8. S/L/Ts and EPA should conduct periodic assessments to ensure that areas are on track to meet NAAQS, HAP, and visibility goals, and make mid-course adjustments, as necessary.

NAS Recommendation 4: Develop an integrated program for criteria pollutants and HAPs
[See recommendations provided in #4 and 6 above]

NAS Recommendation 5: Enhance the protection of ecosystems and other aspects of public welfare

[See recommendations provided in #1, 4, and 5 above]



Graphical Representation of S&T Recommendations

Recommendation	EPA not doing now	Short-Term: Need now for upcoming O3/PM SIPs	Longer-term: Need for where we want to be in five years
1. Emissions Measurements			
1. Measurement study	x		x
2. Regs to require measurements	x		x
3. Regs to require reporting	x		x
2. Improve Emis Est. Methods			
1. Improve EFs			x
2. Improve source profiles			x
3. Reconciliation study and subsequent inventory improvements			x
3. Emissions/Modeling Uncertainty			
1. Uncertainty study			x
2. Provide uncertainty guidance			x
4. Improve Monitoring			
1. Finalize National Mon. Strategy			x
2. Implement NMS (Level I, II sites)			x
3. Improve monitoring methods			x
4. Policies to avoid disincentives			x
5. Promote deposition monitoring			x
5. Framework for Accountability			
1. Develop measures to assess health impacts, and track progress	x		x
2. Develop benchmarks to assess ecological impacts, and track progress	x		x
3. Determine metrics to track progress	x		x
6. Local Control Measure Guidance			
1. Determine appropriate local strategies and issue guidance	x	x	
2. Issue guidance now for select categories	x	x	
7. Promote Balance Between SIP Development and Implementation, and Between Modeling and Data Analysis			
1. WOE for SIP planning		x	
2. WOE for tracking progress			x
3. Provide guidance			x
8. Conduct Periodic Assessments			
1. Track progress			x
2. Take corrective action, as necessary			x
3. Annual reporting			x
4. Provide guidance			x

DRAFT IMPLEMENTATION PLAN

The purpose of this section is to summarize the schedule, major activities, and costs associated with the draft recommendations by the S&T Subgroup. In particular, the document focuses on the work to be conducted over the next few years. Additional work will be needed beyond then to implement fully all of the draft recommendations.

CY2005

- April (Rec. #1 - 1) Begin emissions measurements study
- (Rec. #6 - 1) Begin evaluation of local strategies and technologies
- July (Rec. #2 – 1 and 2) Conduct workshop to address emission factors and source profiles (Est. Cost: \$25K)
- (Rec. #2 - 3) Begin inventory–monitoring reconciliation study (Est. Cost: \$50K)
- (Rec. #3 - 1) Begin uncertainty study
- (Rec. #5 – 1c) Conduct workshop to overarching accountability framework for air quality accountability – public health and ecosystem protection, including development of metrics and benchmarks (Est. Cost: \$25K)
- (Rec. #5 – 2) Determine how to best expand on-going efforts into public health and air quality accountability
- October (Rec. #2 – 1 and 2) Begin work on improving emission factors and source profiles (Est. Cost: \$250K)
- (Rec. #4 - 3) Conduct workshop to identify ambient measurement method improvement needs and plans (Est. Cost: \$25K)
- (Rec. #5 – 1a) Issue summary report on air quality and health accountability (Est. Cost: \$50K)
- (Rec. #5 – 3a) Initiate intervention studies
- (Rec. #5 – 6) Pursue collaboration with other organizations on ecosystem integrated assessments
- (Rec. #5 – 7a) Conduct workshop involving multiple stakeholders on the state-of-the-science and tools to develop benchmarks for ecosystem protection (Est. Cost: \$25K)
- (Rec. #6 - 2) Issue first round of guidance for local (urban-scale) strategies and technologies for a few source categories (Est. Cost: \$75K)
- (Rec. #6 - 1) Complete evaluation of local strategies and technologies (Est. Cost: \$50K)

- December (Rec. #1 - 1) Complete emissions measurements study (Est. Cost: \$50K)
- (Rec. #2 - 3) Complete inventory – monitoring data reconciliation study, along with recommendations for improving emission estimation methods (Est. Cost: \$50K)
- (Rec. #4 - 4) Issue policies to avoid disincentives for monitoring
- (Rec. #5- 7b, 4a) Provide synthesis of ecosystem workshop on benchmarks, including suite of air quality–ecosystem indicators, and plan for tracking and reporting these indicators in various EPA reports (Est. Cost: \$50K)

CY2006

- April (Rec. #2 - 3) Begin work to improve emission estimation methods (Est. Cost: \$250K)
- (Rec. 5 - #4b,c) Develop long-term ecosystem monitoring and assessment plan
- (Rec. #6 - 1) Issue second round of guidance for local strategies and technologies (Est. Cost: \$75K)
- (Rec. #7 – 3a) Provide guidance for estimating statistically significant trends (Est. Cost: \$50K)
- (Rec. #7 – 3b) Provide generic protocol for WOE approach (Est. Cost: \$50K)
- (Rec. #8 - 1) Provide guidance for conducting periodic assessments (Est. Cost: \$50K)
- July (Rec. #1 - 2 and 3) Issue decision on need for regulations to require emissions measurements and reporting. If necessary, then begin rulemaking process
- (Rec. #3 - 1) Complete uncertainty study (Est. Cost: \$100K)
- (Rec. #8 - 1) Initiate pilot project by one or more states to implement guidance for periodic assessments
- (Rec. #8 – 4) Provide guidance on determining “background” concentrations (Est. Cost: \$50K)
- October (Rec. #5 – 3a) Complete intervention studies (Est. Cost: \$100K)
- December (Rec. #8 - 1) Complete pilot project on periodic assessments (Est. Cost: \$50K)

CY2007

- July (Rec. #4 – 2a) Establish six Level I NCore sites (Est. Cost: \$3M/year)
- (Rec. #4 – 2b) Establish Level II NCore sites (Est. Cost: reallocate existing resources, as determined by national/regional monitoring strategy)

HIGH PRIORITY RECOMMENDATIONS

Recommendation #4: In order to provide more scientifically relevant and responsive air quality information, and to provide a more robust and spatially complete basis for current and future air quality planning, EPA, in conjunction with S/L/Ts and affected stakeholders, should promote and improve integrated, multi-pollutant monitoring.

Background: Ambient monitoring data are an essential part of the nation's air quality program. Monitoring objectives include determining compliance with federal air quality standards, developing emission control plans, tracking effectiveness of these plans, and providing information for the public, regulators, and affected stakeholders on the quality of the air. Over the past 30 years, the air pollution situation has changed significantly, as control programs have reduced emissions of many pollutants and as science has identified emerging issues of concern. Accordingly, it is important that air monitoring efforts be dynamic and responsive to meet the current and future public, regulatory, and scientific needs.

Recommended Actions: The Subgroup recommends the following actions to promote and improve monitoring:

- 1) EPA should finalize its proposed national ambient monitoring strategy, and S/L/Ts should, as appropriate, work together on a regional-scale to consider the need for, and, if appropriate develop, regional monitoring strategies. The existing monitoring networks are top-heavy on determining attainment/nonattainment and light on addressing other monitoring objectives, especially control strategy development and tracking progress. An assessment of the existing networks, either through a national or regional monitoring strategy, is needed to support redistribution of monitoring resources to address current policy- and program-relevant objectives. In the longer term, EPA should consider adopting a more inclusive and holistic national monitoring strategy which considers all types of monitoring pursuant to health and non-health (e.g., ecosystem) objectives.
- 2) As initial efforts in implementing the national monitoring strategy, EPA should:
 - (a) Establish six Level I (research-grade) NCore sites with reasonable geographic coverage (e.g., one each in the NE, SE, MW, and S, and two in the W). Additionally, EPA should work with the Level I researchers to prepare and implement a data management and analysis plan. Funding for the operation and maintenance of these sites, and the data management and analysis work, should be provided by EPA (ORD). EPA should also sponsor a workshop every three years to report on the lessons learned and to promote technology transfer from the Level I sites.
 - (b) Establish, in conjunction with S/L/Ts, the Level II (multi-pollutant) NCore sites. (The appropriate number and location of these sites should be determined by the S/L/Ts and the respective EPA Regional Offices.) Additionally, EPA should work with the S/L/Ts, to prepare and implement a data management and analysis plan. Any resource savings from network changes provided by a regional monitoring strategy should be directed to help pay for the operation and maintenance of these sites, and the data management and analysis work.

- 3) EPA should support research and development (for example, through the Level I NCore sites) to improve monitoring methods for:
 - (a) PM2.5-mass: Establish a continuous federal equivalent method for PM2.5-mass (i.e., resolve difference between current filter-based FRM for PM2.5-mass and continuous PM2.5-mass methods).
 - (b) PM2.5-species: Establish a consistent filter-based method for measuring and reporting OC and EC (i.e., adopt the IMPROVE methodology for both rural and urban measurements), identify appropriate measurement methods for supporting source apportionment studies for OC, and establish reliable continuous methods for individual PM2.5 species. EPA should recognize and report the uncertainty in these measurements.
 - (c) PM2.5 & PM10: Investigate the potential for over-sampling with the PM10 and PM2.5 FRM samplers in areas where the mass median diameter (MMD) of the PM is larger than the size of interest (10 or 2.5 AED) and determine whether additional research, altered inlets, or implementation guidance should be provided.
 - (d) PM-coarse (PMc): Establish a federal reference method for PMc. Using the difference between PM10 and PM2.5 as measured with PM10 and PM2.5 FRM samplers is not acceptable. The method should be capable of determining the amount of crustal material.
 - (e) Air Toxics: Need reliable methods for acrolein, hexavalent chromium, and other species. A portion (e.g., 10%) of federal funding for the national air toxics monitoring program should be used for methods development.
 - (f) Dry deposition measurements, particularly for mercury species (see Recommendation #5 – 5).

- 4) EPA should promote policies to avoid disincentives for monitoring. The necessary changes in ambient monitoring networks, as called for by the national and regional monitoring strategies, should proceed without any negative ramifications. Specific actions include:
 - (a) Support concept of performance-based measurement systems (PBMS) in EPA's national monitoring strategy (i.e., monitoring intended for investigative, not compliance, purposes). Although these measurements should meet minimum data quality requirements (developed through the Data Quality Objectives process), these data will not be used to assess attainment or nonattainment with the NAAQS. Note, this concept is similar to the FACA recommendation to "decouple the use of research data for regulatory purposes for a period of several years." Prior to deploying PBMS (including untested, research-grade monitors), states and the EPA regional office should document in writing the non-compliance monitoring objectives and the appropriate response to any measured values in excess of the level of the NAAQS (e.g., deployment of an FRM monitor).
 - (b) Acknowledge EPA's Exceptional Events policy, which avoids counting (for compliance purposes) high pollution events due to certain unusual or extreme conditions.
 - (c) Avoid monitors taking "root" by having state and local agencies specify monitoring objectives for their existing networks (including the expected period of sampling to meet these objectives) in their regional monitoring strategy. For any new monitoring, encourage identification of the monitoring objectives up-front (including expected period of sampling to

- meet objectives). Provide the agencies with discretion in moving monitors upon completion of the intended sampling period.
- (d) Promote the concept of sharing monitoring data in a timely manner with potential sources as a means to help identify and minimize pollution problems rather than a strict enforcement tool. This would require the expansion of real-time monitoring and data transfer capabilities at existing and new monitoring sites. This effort and the resulting data could be utilized, with appropriate input on potential pollution emission activities and sources, for targeting more cost-effect control strategies.
- 5) EPA should, whenever possible, promote co-location of atmospheric dry and wet deposition monitoring with long-term monitoring of ecological conditions (see Recommendation #5 – 5).

Benefits: Implementation of the national monitoring strategy will demonstrate EPA's commitment to a multi-pollutant air quality management framework, given that the developing a measurements infrastructure is a critical component upon which further technical and program adjustments can be based. From a strict technical perspective, the national monitoring strategy will broaden the scope of monitoring services beyond the historical regulatory emphasis and allow for more credible program accountability assessments, air quality model evaluation, support to forecasting venues such as AIRNow, and enhanced support to the research community, especially in the health effects area. Support for Level I sites would demonstrate EPA leadership in bridging the gap between research and applications and engaging the nation's scientific expertise directly into its air program infrastructure.

Feasibility: Implementation of the national monitoring strategy is underway and most components of the Level II NCore sites should be implemented within current resource allocations. There are no currently identified resources for the Level I sites. Failure to fund these sites will jeopardize successful implementation of the strategy.

Timing: EPA could finalize the national monitoring strategy, and S/L/Ts could work together and prepare regional monitoring strategies during CY2005. Assuming the availability of funding, EPA could establish these sites in CY2006. EPA's national strategy implementation plan targets a phased implementation of the NCore Level II sites in 2007.

Resources: A minimum base of \$3M per year would be needed to fund basic operations for six Level I sites. EPA's national strategy implementation plan recommends an outlay of \$10M per year (OAR or ORD) to support these sites. Internal OAQPS funding of approximately \$150K/year for FY05 and FY06 is estimated to be needed to support training needs associated with implementing the strategy.

Priority Level: High

Linkage to NAS Recommendations: Strengthen the scientific and technical capacity of the air quality management system to assess risk and track progress

MEDIUM PRIORITY RECOMMENDATIONS

Recommendation D: EPA and States should work together to increase the number and distribution of air quality monitoring stations

To improve spatial coverage and comprehensiveness in existing state and federal monitoring networks, additional monitoring sites and additional measurements are desired. The first step in making improvements is to conduct spatial analyses of existing monitoring networks and identify “gaps” in coverage. Based on results of the spatial analyses, EPA Regional Offices and States should work together to establish appropriate monitoring sites. Possible enhancements include increased sampling in rural areas (to promote ecosystem goals – see Recommendation #5) and reallocation of PAMS monitoring to ensure a Type II site in as many 8-hour ozone nonattainment areas as possible (to promote tracking progress – see Recommendations #7 and 8). To ensure that monitoring networks are providing usable data, states should conduct a thorough assessment of their monitoring networks every five years.

Recommendation E: States should consider conducting short-term monitoring programs

To complement on-going monitoring efforts (especially, to address particular air quality problems and issues), special (short-term) field programs should be considered. Examples of such field programs include summertime ozone field programs (e.g., SCAQS, LMOS, and NARSTO-Northeast) and investigative studies (e.g., MRPO’s urban organics study).