Mid-Atlantic/Northeast Visibility Union (MANE-VU)
Years 4 and 5 (2003 and 2004) Grant Application Work Plan

This work plan (for the two-year period starting February 1, 2003 and ending January 31, 2005) is divided into the following sections:

- Monitoring and Data Analysis
- Modeling
- Emissions Inventory
- Regulatory Support
- Communications and Outreach
- Workshops/Technical Meetings
- Program Development and Support
- State/Tribal Travel

MONITORING AND DATA ANALYSIS ($1,000,000: Year 4 $500,000; Year 5 $500,000)

A broad range of enhanced monitoring and data analysis activities are planned for years 4 and 5 in the MANE-VU region. These proposed activities have been prioritized and organized into five project areas: (1) continued support for several ongoing regional and national data collection, archival, analysis and display systems; (2) continuation and expansion of regional enhanced monitoring initiatives; (3) continuation and enhancement of ongoing receptor modeling source attribution analyses; (4) analysis and summarization of various "intensive" haze-related monitoring activities conducted over the preceding year (2002); and ultimately, (5) a series of additional transport-related analyses and summary reports intended to provide "weight of evidence" technical support for regional "contribution assessments" and regional haze State (and potentially Tribal) implementation plan (SIP) submittals.

1. Continue Regional/National Data Collection/Archival/Analysis and Display Systems ($250,000: Year 4 $105,000; Year 5 $145,000)

a. Continued participation in the data archive/access tool
The Northeast States for Coordinated Air Use Management (NESCAUM) staff will continue to coordinate MANE-VU participation in the national effort to develop an online data access and analysis tool (the Visibility Information Exchange Web System, or "VIEWS"). This task is evenly split between years 4 and 5.

b. CAMNET maintenance
CAMNET represents a valuable outreach and education tool that combines visibility scene monitoring with the Internet. Air Resources Specialists maintains and supports CAMNET sites after initial installation. This task is evenly split between years 4 and 5.

c. Contractor-assisted profiler coordination and data management

Radar profiler systems are complex and require experienced technical review beyond what is often available locally to assure proper operation. MANE-VU contracted with Sonoma Technology Inc. (STI) during 2002 to visit 3 profiler sites in the MANE-VU domain that were not part of other networks. The purpose of these site visits was to review the overall operation of the profiler systems, both hardware and software, and to correct major problems.

MANE-VU's experience with the external review and coordination of non-NOAA (National Oceanic and Atmospheric Administration) radar wind profilers in the region during the summer of 2002 by STI demonstrated the critical importance of continuing this oversight if it is expected that data from the Ft. Meade (MD), Rutgers (NJ) and Stow (MA) profilers will be used in any future modeling or analysis tasks. STI produced detailed reports from these visits which indicated several major problems at all three sites. Based on this experience, and given that from March 2003 until the return of AIRMAP (a collaborative New England air quality and climate research effort led by NOAA and the University of New Hampshire) in the summer of 2004, these three State-owned profilers and the NOAA Pease (NH) profiler will be the only systems in operation in the MANE-VU domain, we recommend that similar site visits be performed prior to the 2004 AIRMAP intensive measurement period in the New England region.

Approximately half of the funds are expected to be used for site visits, with the remaining funds used for level 0.5 (automated) and possibly limited level 1.0 (manually screened) data validation. This project will occur in year 5.

2. Continue and Extend Enhanced Air Quality Monitoring (and Data Management) ($250,000: Year 4 $155,000; Year 5 $95,000)

a. Continuous sulfate and sulfur dioxide measurements at rural, high-elevation sites

Much of the enhanced measurements made during the summer of 2002 were the result of Supersite and AIRMAP activities and other leveraged opportunities. For years 4 and 5, year-round continuous sulfate (SO_4) and sulfur dioxide (SO_2) measurements at two rural, high-elevation sites are proposed. One site is Mt. Washington, NH and the second is planned for Dans Ridge, Maryland (about 2800 feet elevation) approximately 80 miles southeast of Pittsburgh. Some additional equipment will be purchased in year 4 to complement purchases made in Year 3 and leveraged equipment and logistical support from the MD Department of the Environment. Operational and maintainance costs for both years 4 and 5 are also included.

b. FRM (XRF) filter analysis and data analysis

In 2000, NESCAUM States sent Federal Reference Method (FRM) filters to RTI for speciated analysis under the CARAPACE project. The filters covered over 50 sites and two regional episodes (July 1999 and February 2000). Analysis of these data could identify regional signatures impacting the Northeast and Mid-Atlantic. The results of this study, to be reported in a technical memo, will aid in selecting other episodes during the baseline period (2000-2004) for which archived filters are available. This task is expected to be evenly split between years 4 and 5.

c. Upper atmospheric chemical measurments

Very little data is available on the size distribution or chemical properties of fine particles above ground level. MANE-VU conducted limited summertime aerial sampling during Year 3 from an instrumented aircraft operated by the University of Maryland. During Year 4, MANE-VU proposes to complement these measurements with additional wintertime measurements. We are considering a variety of platforms including tethered balloons, kites or additional aircraft measurements.

3. Continue and Extend Source Apportionment/Receptor Model Analyses ($150,000: Year 4 $75,000; Year 5 $75,000)

a. Source apportionment phase 2 projects contract management, user group support and external peer review

Continued MANE-VU funding is needed to support Mid-Atlantic Regional Air Management Association (MARAMA) staff for various aspects of the contractual and technical management of phase 2 source apportionment projects (including 2a, which will include more refined receptor model analyses for four eastern IMPROVE sites and 2b, to develop a "paired aerosol/trajectory database and query tool), to facilitate the multi-State "user group" process through which the projects will be guided, and to support an external peer review of the results. This task will be completed in year 4.

b. Source apportionment phase 2 projects summary reports

Experience from the phase 1 projects indicates that the results are both technically informative, but also technically complex. Substantial additional effort is needed to summarize and communicate these results in clear, simple terms to decision-makers, stakeholders and the public. Individual State and Tribal users of the tools will contribute, but a substantial measure of staff support is needed to facilitate these efforts and to develop the needed "communicable" summary reports. This task will occur primarily in year 5.

c. Phase 3 contract(s) and inter-RPO coordination

Given the progress achieved in phase 1, the productive nature of interest among regional planning organizations (RPOs), inter-RPO funding support, and the resultant generation of many questions in addition to answers, it can be anticipated that a substantial "phase 3" receptor modeling effort will flow directly from the ongoing phase 2 projects. This task will likely occur in both years 4 and 5.

4. "2002 Intensive": Data Synthesis, Analysis and Summary Report(s) ($150,000: Year 4 $90,000; Year 5 $60,000)

Subtask a and b of this task involve the analysis, coordination and synthesis of data from multiple observing platforms across the region that was collected during 2002. Subtask c describes a report which is intended to draw upon the data and analyses conducted in subtask a *and* b. MANE-VU will conduct a thorough examination of the data during year 4 and anticipates completing the report in the early part of Year 5.

a. Analysis of summer 2002 aircraft data (contracts and management)

Year 3 funds covered 56 flight hours over eight different days, but were insufficient to support anything much more than a cursory examination of the data. Year 4 funds will be used to examine the data in depth. Data collected include particle counts and size, aerosol absorption, scattering and chemistry (PIXE), meteorological parameters (relative humidity (RH), pressure, and temperature), trace gases (carbon monoxide (CO), SO_2, and ozone (O_3)). The data cover both horizontal transects and vertical profiles and may be compared to surface and satellite data. This task will be completed in year 4.

b. Acquisition, management and distribution of other regional 2002 data
This project will focus on the acquisition of monitored data collected by IMPROVE, Speciation Trends Sites, Supersites, University of Maryland, AIRMAP, the PM Health Centers and other available data networks operational during 2002. A database(s) incorporating the various datasets will be developed and made available for interested parties. This task will occur primarily in year 4.

c. Analysis and summary report of 2002 regional PM and haze data
The MANE-VU long range strategy points to an increased emphasis on data analysis activities in years 4 and 5 as monitoring becomes deemphasized after the base year 2002. In coordination with other data analysis efforts, a detailed analysis of the 2002 dataset will be conducted. This analysis will cover the entire calendar year, but will make use of specialized, shorter-term measurements, such as the aircraft data and AIRMAP campaign. The final product of this analysis will be a comprehensive report that will investigate the conditions and factors contributing to the twenty percent worst and twenty percent best visibility days. This task will be completed in year 5.

5. Contribution Assessment Analysis and Regional Summary Report ($200,000: Year 4 $75,000; Year 5 $125,000)

a. Update of MANE-VU trajectory analysis
Previous studies have identified the twenty percent worst and best days between 1997 and 1999 and associated these days with a set of back trajectories that cover a wide portion of the Eastern U.S. MANE-VU plans to update and expand on this work in several ways:

- Include 2000 and 2001 data
- Include Dolly Sods, Shenandoah, and James River Face Class I areas (outside of MANE-VU)
- Include trajectories for middle 60% of days (not just focused on best and worst visibility conditions)
- Perform residence time analysis on the data allowing the calculation of incremental probabilities associated with the 20 percent best/worst days.

This task will be completed in year 4.

b. Trajectory cluster analysis
While the worth of updating the more traditional back trajectory analysis is self explanatory (in terms of increasing statistics, extending the temporal and spatial range, etc), the addition of trajectory cluster analysis will provide an independent and complementary means of assessing the role of transport in visibility degradation. Cluster analysis necessarily requires one look at a random or unbiased collection of back trajectories in order to categorize the general patterns of meteorological transport. Once clusters have been calculated and general patterns of transport have been established,

more interesting analyses can be performed to determine the relative frequency of a particular cluster being associated with good or poor visibility conditions.

It is also desirable to better understand meteorological conditions that result in average visibility conditions. This will allow us to look for meteorological contrasts between average conditions and good or poor conditions. This may put us in a better position to understand factors that significantly differ on those days when visibility exhibits extreme behavior.

The cluster analysis will build off the development of the large trajectory database in the previous project. The HYSPLIT trajectory database which has been generated and the ATAD trajectory database (developed independently by the National Park Service) serve as the basis for the identification of predominant meteorological pathways that affect MANE-VU Class I areas more generally (as opposed to just on the best or worst visibility days). The clustering algorithm can be used in a variety of analyses including:

- Calculation of cluster-specific percentage contribution to 20% worst or best days
- Calculation of cluster-specific percentage contribution to "high" and "low" days associated with receptor model source profiles
- Trends in cluster contribution to worst visibility days/"high" source profile days

This task is expected to be evenly split between years 4 and 5.

c. Comparison and synthesis of gridded, receptor and trajectory model results

A variety of analytical techniques have been (or will be) applied to understanding the nature and extent of visibility impairment in the MANE-VU region. This project aims to examine several tools, including Eulerian grid models, Lagrangian trajectory models, and receptor-based techniques, and then compare the results against one another. Understanding the differences in available modeling results and whether they can be explained in the context of each model's uncertainties will be a key component to building a weight of evidence argument in support of visibility protection. This task will occur in year 5.

d. Summary report on inter-State and inter-RPO transport

MANE-VU is the most transport-affected of the RPOs (i.e., impacts on MANE-VU Class I areas from sources external to MANE-VU). However, the haze regulations and associated U.S. Environmental Protection Agency (EPA) guidance are vague on the degree of specificity required to identify (and subsequent mechanisms to reduce) inter-RPO transport from specific upwind RPOs, States or sources. A number of factors have made this concern of increasing importance in the short-term. NESCAUM will explore the transport issue using a number of techniques building off of the work in preceding projects, with the final objective to build a weight of evidence argument that reflects the results of modeling, monitoring and available emissions inventory information. This will be incorporated into an accessible format and published as a MANE-VU report on inter-State and inter-RPO transport. This task will occur in year 5.

MODELING ($300,000: Year 4 $150,000; Year 5 $150,000)

Year 3 modeling efforts with REMSAD have produced platform inter-comparisons as well as some control scenario modeling (using preliminary data that have not been quality assured). NESCAUM, on behalf of MANE-VU, has developed sufficient proficiency in using the REMSAD platform to enable turning to sensitivity analyses and evaluations of REMSAD version 7.0 during years 4 and 5.

The Year 4 and 5 modeling efforts will provide the foundation for carrying out the modeling tasks identified in the MANE-VU technical support work plan, which is currently being drafted with the input of the Technical Support Committee. By the end of year 5, MANE-VU anticipates being in a position to start conducting SIP quality comprehensive model evaluations, perform detailed model evaluations between competing PM models and perform modeled simulations to demonstrate the sensitivity to various parameters and control scenarios. In order to achieve this state of readiness, a great deal of "practice modeling" needs to be coordinated and carried out. This will involve further building of modeling capacity at MANE-VU organizations using currently available analytical tools and data sets. In some cases, these data will not have been quality assured to the level required for "SIP quality" simulations, but are adequate for preliminary purposes while superior input data sets are developed and chemical transport models are further refined.

Year 4 efforts with REMSAD will include simulations of the type that will eventually be used in contribution assessments, such as "zero-out" runs. Work will also focus on developing the methodologies to perform tagged species runs with REMSAD. NESCAUM will also begin developing in-house capacity to run the SMOKE emissions preprocessing system and to expand modeling work to other computer platforms, such as CMAQ/Models-3. Emissions modeling performed at NESCAUM may be compared with other emissions modeling results as available. VISTAS (the RPO south of MANE-VU) has plans to develop modeled emissions results. An inter-comparison with NY State Department of Environmental Conservation, or University of Maryland may also be possible. CMAQ/Models-3 will be installed at NESCAUM and tested during year 4. This will build off of the year 3 model inter-comparison with University of Maryland, which currently runs CMAQ and SMOKE.

Year 5 will focus on performing tagged species runs and performing more detailed model comparisons between REMSAD, CMAQ, CAMx-PM or other similar PM grid models in preparation to select final modeling platforms for specific tasks in the MANE-VU technical work plan. Emissions modeling work in year 5 will focus on supporting these preliminary modeling efforts.

In addition to these technical tasks, NESCAUM will continue to facilitate the editorial process associated with drafting the MANE-VU technical support work plan developed in year 3. This technical support work plan now also includes sections on data analysis, monitoring and emissions inventory. Modeling staff will coordinate with staff from other technical specialties.

EMISSIONS INVENTORY ($600,000: Year 4 $300,000; Year 5 $300,000)

1. Special Studies of Emissions Sources ($205,000: Year 4 $155,000; Year 5 $50,000)

a. Revise emissions inventory for residential wood combustion

According to the National Emissions Inventory (NEI), emissions from residential wood combustion are a significant fraction of $PM_{2.5}$ emissions in the Northeast and Mid-Atlantic. However, MANE-VU's March 2001 assessment of the NEI indicated significant uncertainty in this part of the inventory. To help MANE-VU States and Tribes meet future emissions inventory needs, MARAMA plans to work with a contractor to develop an improved residential wood combustion inventory. The preferred Emissions Inventory Improvement Program (EIIP) emissions calculation method for residential wood combustion requires a survey to gather activity data. A test of a survey instrument is being done in year 3 to ensure the survey will produce accurate results. In year 4, a full activity survey and inventory development is scheduled.

b. Develop improved understanding of ammonia emissions for miscellaneous point sources

Significant sources of ammonia (NH_3) include wastewater treatment plants, petroleum industry operations, some types of fuel combustion and chemical manufacturing, specifically fertilizer manufacturing. In the NEI, wastewater treatment facilities represent a high percentage of NH_3 emissions for MANE-VU States. Emissions from miscellaneous point sources have a high degree of uncertainty. MARAMA will coordinate with RPOs, EIIP, and State/Tribal agencies to collect and assemble information on selected miscellaneous ammonia point sources and to develop calculation sheets describing preferred methods and data sources. This task is planned for both years 4 and 5.

c. Review the revised open burning inventory and integrate it into the NEI

In year 3, a contractor completed a survey on yard waste and municipal solid waste burning. Emissions from these activities are a significant fraction of $PM_{2.5}$ emissions in the Northeast and Mid-Atlantic and significant uncertainty exists in this part of the inventory. In year 4 MANE-VU expects to assist States/Tribes in integrating the results of the survey into the emissions inventory.

2. Emissions Inventory Workgroup Coordination and Quality Assurance ($355,000: Year 4 $130,000; Year 5 $225,000)

a. Analyze and correct emission files

To support NESCAUM and State/Tribal efforts and promote regional consistency and accuracy in years 4 and 5, MARAMA staff will prepare emissions inventory maps, charts and files to assist with quality assurance/quality control (QA/QC) analysis. Anticipated work products include inventory summaries (tabular and graphical), and corrected data files.

b. Coordinate emissions inventory work group and update work plan

As 2002 base-year inventories are developed, the continued improvement of activity data and resolution of issues resulting from prior work will be key in obtaining accurate inventories. MARAMA's coordination duties for regional consistency will continue under this task in years 4 and 5. Current emissions inventories are inadequate for regional haze modeling, and many emission factors may need improvement. Funds available under this grant are

inadequate to remedy all inventory problems. Priorities for projects are based on recommendations from MANE-VU's emissions inventory workgroup. MARAMA will work with that group to update the MANE-VU emissions inventory work plan and to integrate that plan with plans developed by the modeling workgroup and the monitoring and data analysis workgroup. MARAMA will work with other RPOs to increase cost efficiencies and promote consistencies, and will participate in the inter-RPO emissions inventory discussion group, providing staff support to the MANE-VU lead and members.

MARAMA has hired a contractor (E.H. Pechan and Associates) to assist MANE-VU members with their emissions inventory work. The contractor will work in conjunction with the States/Tribes to improve the NEI in a regionally consistent manner. This effort may be especially important in regard to mobile and area sources, as these areas currently contain a great deal of uncertainty. MARAMA will develop details of work assignments and manage projects with the advice of State and Tribal participants.

c. Compile the 2002 MANE-VU point, area, mobile (on-road and non-road) source inventories
The objective of this project is to produce a comprehensive 2002 base-year emissions inventory (EI) for the MANE-VU region to support the modeling and assessment of speciated $PM_{2.5}$ and haze. For purposes of review by States and Tribes, the emissions will be reported by emissions inventory source category (i.e., point, area, highway mobile and off-road mobile) by county. This inventory will be used in creating a modeling inventory under other work tasks.

The goal is for the EI to consist of all primary and precursor emissions necessary to accurately model haze and PM, including primary $PM_{2.5}$ and PM_{10}, NH_3, oxides of sulfur (SO_x), volatile organic compounds (VOCs), nitrogen oxides (NO_x) and CO for the point, area, and mobile source categories. The final scope of this project will depend on costs, available funds, and relevant work produced by MANE-VU members, other RPOs and EPA.

Assuming that the first draft of the 2002 NEI is available late in year 4, preliminary work will include setting the scope of work and beginning to obtain available data. The bulk of the work on this project will be in year 5.

d. Complete development of emission calculation sheets
In an effort to assist States and Tribes in SIP development, in year 3 MARAMA began an in-house calculation sheet development project. The project involves researching methods to calculate emissions for the top area source categories and three non-road categories in the MANE-VU region and developing calculation sheets using the preferred calculation method. This project would essentially complete the calculation sheets in year 4.

3. Collaboration with other RPOs ($40,000: Year 4 $15,000; Year 5 $25,000)

Several options are under consideration for projects in collaboration with other RPOs. The final scope of this task will depend on available funding and partnerships. The following paragraphs describe potential projects. The choice of inter-regional projects will be guided by advice from MANE-VU's emissions inventory work group.

a. Improve activity data for non-road sources

Non-road vehicles represent significant sources of $PM_{2.5}$, SO_2, VOCs and NO_x in the MANE-VU region. The primary types of non-road equipment include construction equipment, agricultural equipment, recreational vehicles, and yard care equipment. Locally representative methodologies to estimate activity data, and the specific locations where these equipment are in use would significantly improve the inventories. A project to gather activity data for non-road sources may be possible in collaboration with other RPOs.

b. Begin to gather improved activity data for agricultural ammonia sources in collaboration with other RPOs

MARAMA plans to work with States/Tribes to document sources of activity data, identify and organize one or more data gathering projects, and help States/Tribes utilize the best activity data and emission factors available.

c. Implement results of the data exchange protocol

In year 3 the inter-RPO discussion group started a process to generate data exchange protocols for the many types of data the RPOs will share. The intent is to create a common format for emissions inventory exchange. With further funding, additional work can be done to implement the agreed methods.

d. Gather improved activity data for key natural sources

Some research has suggested biogenic sources may be a significant source of NH_3, secondary organic aerosols (SOAs), VOCs and NO_x. Further research, such as gathering of biomass distributions, is needed before a meaningful estimate of the contributions of natural sources can be developed. These data, although not expected to be part of a control strategy, are necessary to enable modelers to properly evaluate existing and future conditions.

REGULATORY SUPPORT ($295,000: Year 4 $147,500; Year 5 $147,500)

1. Policy Analysis for Control Strategy Development

This task will involve examining potential control strategies that should be considered in modeling exercises. This analysis will look at the effect of trading and other options for achieving emissions reductions and reasonable progress goals. This will include effects of reduced emissions at BART-eligible facilities identified in years 3 and 4. Policy implications will be examined, and a report will result from this activity.

2. Assessment of Control Technologies and Costs

This task will involve assessing and summarizing the technical feasibility and cost of best available retrofit technologies/approaches for BART-eligible sources. This will include an update on power plant controls and an evaluation of control technology for other industrial sectors covered under the BART provisions of the regional haze rule. This effort will be coordinated with that of other RPOs. The results of this assessment will be summarized in a report.

3. Strategic Planning for SIP Development

This task will involve coordinating with States and Tribes to identify and begin developing the specific work products and timetable to put together SIPs. This effort is expected to include: (1) consensus building for developing baseline and natural visibility conditions; (2) approaches for developing reasonable progress and uniform rate of improvement goals for each Class I area; (3) an approach for demonstrating no degradation of least impaired days; (4) means for addressing MANE-VU member contributions to Class I areas outside of MANE-VU; (5) developing a template for State/Tribal monitoring strategies; (6) strategies for the development of appropriate SIP inventories; and (7) developing a list of specific modeling runs needed to support SIPs in conjunction with other weight of evidence analyses. This effort is intended to focus and guide future RPO work.

COMMUNICATIONS AND OUTREACH ($600,000: Year 4 $300,000; Year 5 $300,000)

The goals of MANE-VU communications efforts are to reach out to the public, stakeholders, and decision makers to raise awareness of reduced visibility in the MANE-VU region and to communicate the public health and environmental effects of the contributing air pollutants. States and Tribes, with MANE-VU support, will manage and coordinate communications. The MANE-VU Communications Committee will serve as the coordinating body for the projects described below and as the conduit for input on this effort. Responsible parties for associated tasks will be determined at an appropriate time. (Note that costs associated with supporting the operations of the Communications Committee are covered in a separate work plan item, under Program Development and Support.)

1. Program Development and Education (Year 4) ($300,000)

As outlined below, major tasks to accomplish in year 4 include: developing messages; creating outreach materials for distribution to third-party stakeholders, media and potential partners; conducting background media briefings regarding the issue of haze; conducting outreach to raise general awareness of regional haze in the MANE-VU region; conducting third-party stakeholder briefings.

a. Program refinement, coordination and management, and ongoing MANE-VU member support
Building on the year 3 scoping study results, MANE-VU will develop a communications and outreach strategy and work plan, and provide ongoing management and coordination of the communications and outreach program. MANE-VU will work with State and Tribal members to implement the outreach and communications efforts, and provide support to leverage specific State and Tribal outreach opportunities.

b. Benchmark survey
A benchmark survey will be conducted that will serve as the baseline of current public understanding of the haze/visibility issue. Tracking polls may be considered in future years to assess the effectiveness of the public outreach and communications efforts.

c. Program identity and print and electronic outreach materials
MANE-VU will work with a contractor to develop a unifying logo and tagline for use on all program outreach materials. The identity will be designed in various formats for use in print, video and web site applications. Outreach materials will be developed to educate the media and key stakeholders (such as chambers of commerce, park and outdoor associations, environmental groups, etc.) on regional haze. A guidebook or similar resource will be developed for States and Tribes to conduct background briefings on haze. Initial outreach materials may include: (1) Stakeholder briefing materials, such as fact sheets, backgrounders and talking points for use in meetings; (2) Media briefing materials designed for use in one-on-one meetings with reporters; and (3) Outreach, communications and news pages of MANE-VU web site. Support materials, such as presentations and briefings, may be developed for use in speaking opportunities before business, environmental, public health, and government groups.

d. Media briefings and media outreach

Media briefings will be developed to educate and inform the trade, environment, health, science and other targeted media on the issue of haze and visibility. In-depth background stories on the issue could also set the stage for future hard news stories. With this in mind, initial media efforts will include such elements as: one-on-one media briefings, media breakfasts with speakers, creation of a haze media guidebook and resource guide for reporters, and development and placement of special articles, such as by-lined articles, op-eds and guest columns.

e. Stakeholder outreach
MANE-VU briefings will be organized in a way that enables reaching out to stakeholders, including third-party non-profits, environmental organizations, outdoor clubs, park associations, energy companies, etc. Efforts will generate awareness of regional haze and potentially subsequent support for MANE-VU's objectives.

f. CAMNET photo archive
In year 4 a gallery of photos for each site at different ranges of $PM_{2.5}$ concentration will be developed to communicate the complex aerosol/visibility relationships to the public by using the currently available CAMNET photo archive (for those sites with co-located or nearby $PM_{2.5}$ data). The collection of images can demonstrate the influence of varying species compositions or relative humidity (RH) on visibility. For comparison, modeled variations can be produced using Winhaze. Use of actual PM data and associated photos will reinforce the detrimental effects of pollution on the environment.

2. Stakeholder Outreach and Public Awareness (Year 5) ($300,000)

As outlined below, major tasks to accomplish in year 5 include: Conducting market research to refine messaging; developing and implementing third-party partnerships; creating public campaign materials including public service announcements and advertising; conducting extensive outreach to print, radio, broadcast and Internet media outlets; launching an extensive pubic awareness campaign, while continuing outreach to key stakeholders.

a. Program refinement, coordination and management, and ongoing MANE-VU member support
The elements for a broad public outreach campaign will be prepared while continuing to educate press and key stakeholders. Ongoing management, coordination and implementation of the communications and outreach program will be provided. MANE-VU will work with State and Tribal members to implement the outreach and communications efforts.

b. Market research
Focus groups, as one means of market research, may be conducted to refine and test messages that will be used for public service announcements (PSAs), outreach materials and public relations efforts targeted to the general public.

c. Public outreach work plan
A detailed public outreach and communications work plan will be developed, including all of the specific communications, outreach and media components for MANE-VU members and associated partners. The plan will then be refined, leading to the subsequent adoption of a final detailed plan incorporating the research findings and related public policy issues.

d. Public service announcements and ad development

MANE-VU will work with a contractor to develop and produce print, radio and transportation public service announcements (PSAs) to raise public awareness regarding haze and visibility issues. PSAs may be used to direct the public to additional resources, such as the web site. Securing a celebrity spokesperson for the PSAs may be explored with the Environmental Media Association or similar organization. Given the high cost media markets in the region, radio and print PSAs are likely to be preferred rather than television spots. The print PSAs could be configured to also serve as transportation cards on buses, trains and other public transportation. MANE-VU may also produce paid print and radio advertisements in order to leverage the placement and airing of the PSAs. In addition, to maximize placement of the PSAs, media partnerships in key markets may be pursued.

e. Media relations

MANE-VU plans to develop a comprehensive press kit including fact sheets, backgrounders, ongoing press releases and visual elements for distribution to a spectrum of general, trade and targeted broadcast and print media outlets during the public outreach campaign. Media outreach should be designed to educate and inform the general public about regional haze and its effects. It will be important to pursue high profile media opportunities, such as speaking at the annual Society of Environmental Journalists conference.

f. Third-party outreach

MANE-VU will strive to establish program partnerships to leverage the multitude of organizations and entities with an interest in the air quality and public health issue. MANE-VU will explore specific program partnerships with various entities, in addition to the Federal Land Managers represented in MANE-VU, to contribute to the outreach and visibility efforts. By soliciting appropriate third-party support for the program, MANE-VU anticipates vastly extending the outreach and visibility of the program in a cost-effective manner. Engaging the private sector through such methods as public/private sector alliances may also be evaluated. Based on market research results, retail partnerships to encourage, for example, consumer purchases of energy efficient products may also be explored.

WORKSHOPS/TECHNICAL MEETINGS ($165,000: Year 4 $82,500; Year 5 $82,500)

MARAMA will organize and support training for member agency staff and facilitate regional coordination meetings. Approximately ten meetings/workshops/training opportunities will be supported during the two-year period. The total number will be determined based on need, cost, and availability of training opportunities. Workshop and meeting topics may include emissions inventory coordination, emissions modeling, monitoring, data analysis, modeling, or other topics as needed. The schedule of events may include a separate public meeting to brief stakeholders. MARAMA will coordinate and conduct the training activities, and will facilitate technical meetings including logistics, assisting in agenda development, and timely distribution of materials.

The overall goals for MANE-VU workshops and specialty meetings include:

- Provide basic training opportunities for new staff at MANE-VU member agencies
- Provide targeted, advanced training for MANE-VU members in needed modeling, data analysis, and emissions inventory skills
- Provide forums for technical work groups and stakeholders to interact, share and develop information
- Facilitate coordinated SIP development
- Encourage knowledge and use of best science
- Collaborate with other RPOs and other multi-State organizations to create maximum opportunities and most economical approaches

Costs will cover facilities, instructors/speakers, materials, MANE-VU member travel costs (partial support consistent with MANE-VU and EPA policies), and MARAMA staff time.

PROGRAM DEVEOPMENT AND SUPPORT ($390,000: Year 4 $195,000; Year 5 $195,000)

This task includes evaluation of possible scenarios for MANE-VU's overall program, periodic revision of the long range strategy, support of the Board and committees, coordination with other RPOs, interaction with EPA on policy issues and program requirements, and grant management.

1. Management and Facilitation of the Operations of the Board and the Two Committees

This category includes the development of all briefing materials for conference calls and meetings of the Board (including the briefing binders) and the two committees, and covers all conference call, meeting, and travel costs for Ozone Transport Commission (OTC), NESCAUM, and MARAMA staff to participate in those meetings. It also includes specific initiatives identified by the Board. Support includes one Board meeting per year, and two meetings for each of the two committees. It also includes annual reports of both committees to the Board.

2. Inter-RPO Activities

This covers regular interactions with the other RPOs on a program management basis. It also covers the effort to support joint RPO approaches wherever possible, such as the joint RPO approach to EPA regarding EPA's responsibilities regarding emissions inventory support to States and Tribes. Specific inter-RPO technical interactions are covered in the technical tasks.

3. Program Planning and Management

This includes updating the revised long range strategy, crafting of alternative scenarios for responding to MANE-VU's needs (including providing support to member States and Tribes, and responding to EPA requirements), program planning meetings and conference calls, and interactions with EPA, including grant documentation, and grant management. Interactions with EPA may include presenting MANE-VU analyses and positions to EPA and others. This category covers all the related costs for OTC, NESCAUM, and MARAMA.

STATE/TRIBAL TRAVEL ($50,000: Year 4 $25,000; Year 5 $25,000)

OTC will be responsible for coordinating the reimbursement of travel expenses for staff of MANE-VU State and Tribal members. The process will follow the principles described below. Reimbursement will be for transportation only (i.e., not lodging, meals, etc.), except in special circumstances at the discretion of the OTC Executive Director. The highest priority will be to support the inter-RPO coordination efforts, followed by MANE-VU committee meetings, and MANE-VU Board meetings. Transportation reimbursement will not be provided for workshops/technical meetings arranged by MARAMA for which MARAMA is providing partial travel cost reimbursement for lodging, except in special circumstances at the discretion of the OTC Executive Director. Those submitting requests for reimbursement shall not receive reimbursement for the same expenses from another source. For any given event, reimbursement will be provided to one representative per State/Tribe. The OTC Executive Director will have the discretion to make exceptions to the above principles, and develop policies and procedures to implement them with the goal of maximizing MANE-VU member participation in the regional haze planning process and optimizing the use of financial resources.