

### 2005 Annual Report Celebrating 15 Years of Regional Collaboration

#### New Resource for Air Quality Planning

On hot, sunny days in the Mid-Atlantic Region, residents stay alert for “code orange” and “code red” air quality forecasts. What causes air pollution episodes? From where is the pollution coming, and why do weather and geography play such critical roles in producing these events? What steps can be taken to make the Region’s air cleaner? MARAMA’s new *Guide to Mid-Atlantic Regional Air Quality* addresses these and other questions to help air quality managers, officials, and the public understand, communicate, and find solutions to the Region’s air quality problems.

The *Guide* focuses on ozone and fine particle pollution, two of the most pervasive and difficult problems in the Mid-Atlantic Region. As the lead author of the *Guide*, Dr. Jeff Stehr of the University of Maryland College Park provides a solid foundation for understanding the nature of air pollutants, transport mechanisms, and regional meteorology.

Features throughout the *Guide* highlight key research studies and activities that have laid the groundwork for improved regional air quality management. The *Guide* will help MARAMA members fulfill the State Implementation Plan (SIP) requirements for a conceptual model of air quality.

#### Two Initiatives Take Shape

MARAMA and EPA Region III established the Mid-Atlantic Diesel Collaborative. The goals of the Collaborative include raising awareness about the need for diesel emissions reductions, providing a forum for discussion among diverse stakeholders, promoting voluntary projects, and implementing cost-effective regional strategies. Additional information about this exciting new initiative is available online at [www.dieselmidatlantic.org](http://www.dieselmidatlantic.org).

Another new project now underway is the Refinery Emissions Control Project. This project will quantify and analyze emissions from refinery processes, identify potential control measures, and develop model rule provisions for refineries.

#### A Snapshot of FY2005 Events

##### Training Events

MARAMA offered 12 courses to provide technical and policy training.

##### Regional Coordination Events

MARAMA organized 14 meetings and workshops to bring together member agency staff and other professionals from across the United States.

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# Moving Ahead with Training

## New Approaches Reduce Travel Expenses

MARAMA hosted four conference call presentations during which experts provided state and local agencies with technical information on PM<sub>2.5</sub> and speciation data analysis.

MARAMA also organized an on-line training event about the Combined Aerosol and Trajectory Tool (CATT) that involved participants from the Mid-Atlantic/Northeast Visibility Union (MANE-VU) and other agencies across the United States. For more information on CATT, see page 7.

### FY2005 Event Participant Summary

Jurisdiction	Training Course Attendees	Regional Coordination Meeting Participants	Members Supported at National Conferences
Allegheny County	3	16	2
Delaware	16	21	7
District of Columbia	7	9	9
Maryland	24	30	7
New Jersey	17	22	8
North Carolina	28	9	8
Pennsylvania	67	22	4
Philadelphia	4	19	2
Virginia	110	19	6
West Virginia	18	15	5
Others	32	196	5
<b>Total</b>	<b>326</b>	<b>378</b>	<b>63</b>

## Continuous Monitoring Instruction Gets Hands-On

MARAMA and the Northeast States for Coordinated Air Use Management (NESCAUM) hosted a workshop on the operation of two types of PM<sub>2.5</sub> continuous monitors, the Met One Beta Attenuation Monitor (BAM) and the Filter Dynamics Measurement System (FDMS™) Tapered Element Oscillating Microbalance (TEOM).

The workshop provided state and local agency staff with hands-on instruction on how to operate and maintain BAMs and FDMS™ TEOM monitors. Having the most precise and accurate data possible improves the capabilities of MARAMA forecasters to predict next-day air quality. Developing skills in the operation of continuous monitors is important since the PM<sub>2.5</sub> monitoring program will increasingly rely on these instruments.

## 2006 Training Planned

A frequently updated training schedule is available on our website at [www.marama.org/calendar](http://www.marama.org/calendar). Thanks to the MARAMA training committee for their help in assessing training needs and developing the schedule.

## Co-sponsored Course is Win-Win

The Virginia Department of Environmental Quality teamed up with MARAMA to co-sponsor the popular BACT (Best Available Control Technology) determination course in Richmond, Virginia. By co-sponsoring the event, Virginia was able to offer the course to more of its staff members, while MARAMA could make the course available to other member agencies. MARAMA welcomes the opportunity to co-sponsor future training events to help members satisfy their training needs.

### 1990

Following discussions led by Bob French of Delaware, nine Mid-Atlantic state and local governments create MARAMA.



### 1991

George Ferreri of Maryland obtains funds for MARAMA from EPA.



### 1992

After retiring from Pennsylvania, James Hambright becomes MARAMA's first Executive Director.



# Message from the Executive Director

It is an honor to be part of MARAMA as it celebrates its 15<sup>th</sup> year of service to the region. MARAMA's record of success has been built on the technical and financial support of the MARAMA Board and EPA plus the dedication of MARAMA staff to member service.

Over the years, every member organization has taken a turn at chairing the MARAMA Board, and agency staff members have stepped up to lead committees and work groups. Sharing leadership responsibilities and working together has brought great success. In addition to developing an ongoing program of training and technical assistance, MARAMA has helped

members launch the ozone map, develop model NO<sub>x</sub> trading rules, present information about the region's air quality, improve regional emissions inventories, and develop tools to help forecast air quality.

In 2005, MARAMA focused increased resources on supporting State Implementation Plan (SIP) development. MARAMA completed the 2002 regional modeling inventory and initiated projects to assess control measures for refineries and residential wood combustion. At our 15<sup>th</sup> Annual Meeting in Williamsburg, MARAMA brought together states, EPA, and other experts to spark awareness of SIP

approaches and focus attention on key strategies. Again in September, MARAMA's SIP Control Strategies Workshop provided a means to share ideas and develop common approaches.

The next few years will be busy for MARAMA members as they seek strategies to meet the ozone and fine particle standards, reduce regional haze, and minimize risks from toxic air pollutants. Regional collaboration will continue to be a firm foundation for progress.

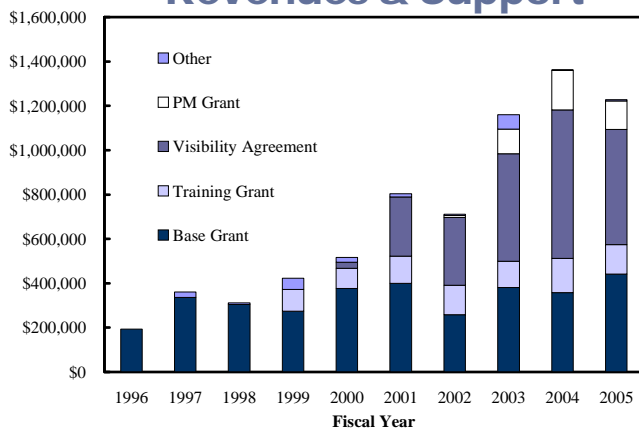
Thank you for your support.

*Susan S.G. Wierman*

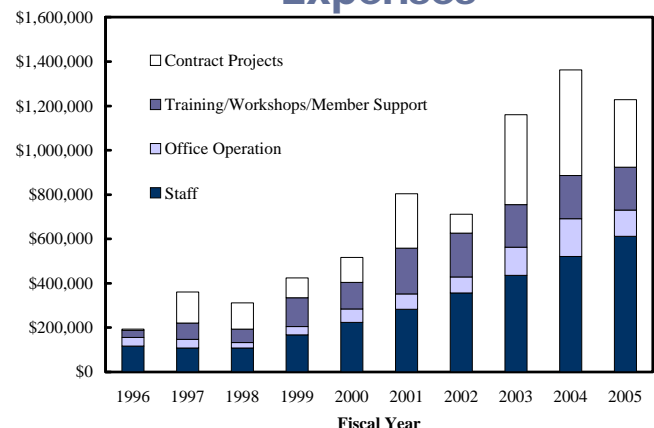
Executive Director

## Financial Trends

### Revenues & Support



### Expenses



MARAMA members provide financial support to MARAMA through EPA grants, including the ongoing base grant and additional training grants (since 1999), visibility grants (since 2000), PM grants (since 2003), and other funding. Grants generally support activities that span more than one fiscal year. Total FY2005 expenses were nearly \$1.23 million, down from over \$1.36 million in FY2004. Compared to the previous year, FY2005 had increased support for staff and lower expenses for contracts. Full-time staff remained at nine with one additional half-time position.

## 1996

MARAMA reports on the potential impacts of adopting the California Low Emission Vehicle Program.

MARAMA and NESCAUM complete a NO<sub>x</sub> Budget Model Rule to help states implement the 1994 Ozone Transport Commission (OTC) Memorandum of Understanding on NO<sub>x</sub> Reductions.

MARAMA hires Susan Wierman as its second Executive Director, and offices move to Baltimore, MD.



# Facilitating a Coordinated Approach

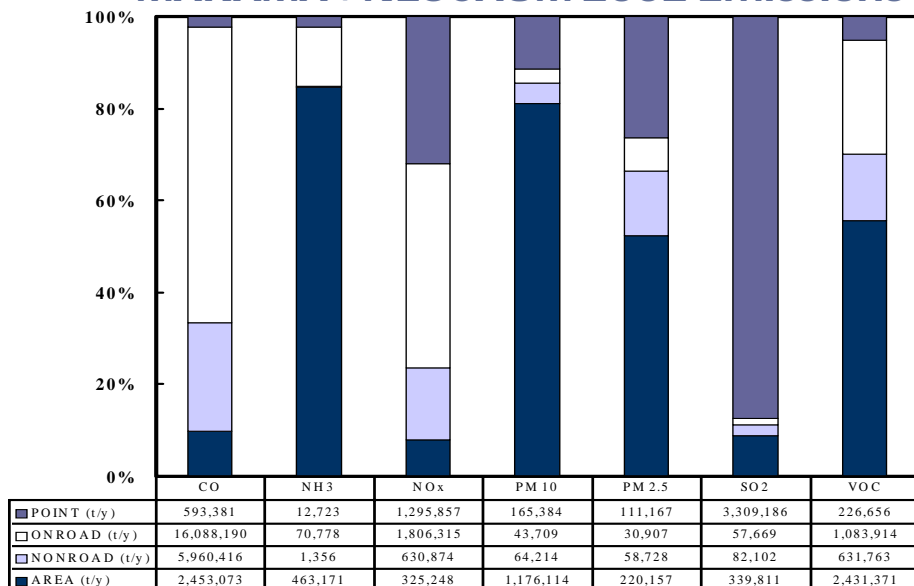
## Completing the 2002 Modeling Inventory

MARAMA developed a regional emissions inventory for the Mid-Atlantic/Northeast Visibility Union (MANE-VU) for use in State Implementation Plan (SIP) modeling. MARAMA commissioned E.H. Pechan and Associates, Inc. (Pechan) to prepare a modeling inventory for criteria pollutants and ammonia for 2002. The inventory reflected significantly more state involvement than the national inventory being prepared by the U.S. EPA on a later schedule.

MARAMA coordinated work done by MANE-VU states to expedite their review and approval. State-specific spatial and temporal profiles were compiled where available. Pechan delivered data files to MARAMA in formats readily useable by modelers. All of the data included in the modeling inventory was approved by the respective states.

Revisions and improvements to the 2002 inventory are ongoing as states continue the quality assurance process. Summary maps and charts, such as those shown below and to the right, posted on MARAMA's website have helped this process.

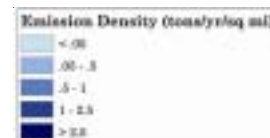
### MARAMA + NESCAUM 2002 Emissions



This chart summarizes emissions by source category in tons per year (t/y) for Mid-Atlantic and Northeast States in 2002. The relative importance of point, onroad mobile, nonroad mobile, and area source emissions varies by pollutant.

## Assuring Em

### An Example of an Em



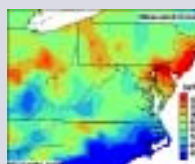
MARAMA developed the in-house emissions and other information area source ammonia emissions. This helps states understand, in emissions data.

Precise and accurate emissions inventories are essential for effective air quality management. When data is spatially and temporally and data uncertainty is minimized, states can develop cost-effective strategies to protect health and welfare.

## 1997

The NESCAUM-MARAMA-OTC regional ozone map project produces the first daily ozone maps for the entire Mid-Atlantic and Northeast regions.

MARAMA publishes the *1995 Ozone Atlas for the Mid-Atlantic Region*.



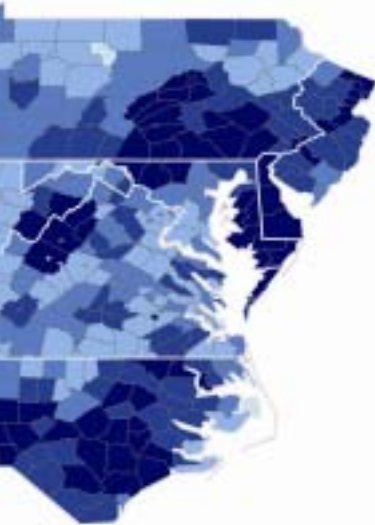
## 1998

MARAMA and NESCAUM release the comprehensive *Status Report on NO<sub>x</sub> Control Technologies and Cost-Effectiveness for Utility Boilers*.

# ... to Regional Emissions Inventories

## Emissions Data

### Emissions Density Map



use capability to produce maps of  
ion. The example shown here is  
ons data for 2002. Maps such as  
interpret, and check the accuracy of

ories provide the framework for  
pollution sources are well characterized  
rtainties are quantified, policy makers  
improve visibility and protect human

## Developing MANE-VU Projection Inventories

MARAMA began working with the states and other Regional Planning Organizations (RPOs) to forecast future emissions for 2009, 2012, and 2018. These inventories are needed for SIP development. MARAMA hired MACTEC Federal Programs, Inc. to help MANE-VU states predict future emissions. Using methods approved by the states, MACTEC created future year inventories for area, non-electric generating unit (EGU), and non-road mobile sources, taking into account growth and planned federal and state controls.

MARAMA helped sponsor a contract to model future emissions from EGUs. In order to predict future year EGU emissions, experts use an economic model that predicts energy supply and demand coupled to an emissions model that allocates emissions among EGUs. MARAMA coordinated discussion among member agencies on the input parameters to be used in the EGU forecasting model.

In addition, MARAMA staff developed a template and compiled on-road mobile source information to be used in projection models. In 2006, MARAMA will compile projection inventories for all source categories for SIP modeling.

## Bringing the Inter-RPO Inventory Warehouse Online

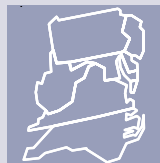
All five RPOs are working to compile emissions inventories for modeling. Since each region needs information about emissions in other regions, the RPOs agreed to share inventories via the Inter-RPO Emissions Inventory Warehouse project. The Warehouse will provide web-based access to the modeling inventories from the entire nation. As the lead agency for this project, MARAMA hired Eastern Research Group (ERG) to develop the Warehouse. Beginning in January 2006, when the Warehouse is on-line, each RPO will upload information to the system, providing access to the most up-to-date emissions inventories.

## Increasing Public Understanding

MARAMA prepared the first two MANE-VU newsletters to encourage informed participation in the regional haze planning process. MARAMA also updated MANE-VU's SIP Timeline, designed MANE-VU's brochure and media guide, and prepared a tabletop display to help explain regional haze.

### 1999

West Virginia, under the leadership of Skipp Kropp, becomes MARAMA's 10th member.



MARAMA initiates a series of reports analyzing ozone precursor data.

### 2000

MARAMA agencies work together to design a database for collecting PM<sub>2.5</sub> data and submitting it to EPA.

# Advances in Forecasting

## PM<sub>2.5</sub> Forecasting Tool Developed for Allegheny County

Systems Application International (SAI) developed a forecasting tool for MARAMA to help forecasters predict PM<sub>2.5</sub> concentrations in Allegheny County, PA. SAI had previously developed forecasting tools for nine other areas in the MARAMA Region. SAI created a database of meteorological data and PM<sub>2.5</sub> concentration data from monitors in or upwind of Allegheny County. The data was analyzed using Classification and Regression Tree (CART) software.



Photo: John Mingle, June 2005

The database and CART results were used to identify relationships between meteorology and PM<sub>2.5</sub> concentration for each monitoring site. Although high PM<sub>2.5</sub> concentrations occurred under a variety of conditions, in general, summertime events were associated with the regional build up and transport of PM<sub>2.5</sub> while wintertime events were driven by local meteorological conditions and possibly local emissions.

SAI evaluated the Allegheny County, PA forecasting tool using historical data, and the Pennsylvania Department of Environmental Protection field-tested the tool using real-time data. The results of these analyses are included in the final report, available on MARAMA's website at [www.marama.org/reports](http://www.marama.org/reports).

➤ The new PM<sub>2.5</sub> forecasting tool for Allegheny County will help forecasters predict the air quality in Pittsburgh, PA.

## FX-Net, a Powerful New Tool for MARAMA Forecasters

MARAMA collaborated with EPA and the National Oceanic and Atmospheric Administration (NOAA) to bring FX-Net to MARAMA forecasters. FX-Net is a powerful meteorological tool that enables a desktop computer to emulate a National Weather Service workstation. The Pilot Project (Phase 1) gave MARAMA forecasters free access to FX-Net and provided a forum for discussing improvements to the tool. MARAMA members suggested many enhancements to the software. During Phase 2, MARAMA members will receive an updated version of FX-Net with new features and improved functionality.

NOAA's FX-Net is one of the best tools available to help forecasters predict ozone and PM<sub>2.5</sub> concentrations. The latest version of FX-Net, available in Fall 2005, includes the ability to overlay photochemical modeling results with meteorological and air quality monitoring data. The integration of meteorological, air quality, and modeling data in one analytical tool will greatly enhance the abilities of forecasters. The cooperative effort of EPA, NOAA, and MARAMA has demonstrated the benefits of collaboration between national and regional programs.

### 2001

As visibility protection efforts take shape, five MARAMA states join MANE-VU, and two help form VISTAS.



### 2002

Carnegie Mellon University researchers, aided by MARAMA and NESCAUM, complete an improved regional ammonia emissions inventory system.

### 2003

MARAMA and Rutgers University complete the design of a VOC sampling course with a memorable chocolate sauce demonstration.

# Strides in Data Analysis

## A Smart Way to Combine Trajectory Data with Ambient Air Quality Data: CATT

The Combined Aerosol and Trajectory Tool (CATT) is a beneficial tool for a wide range of air quality analyses. MARAMA helped enhance CATT in 2005. CATT allows users to pair air quality data with gridded wind trajectory data, which helps determine the regions that contribute to air pollution. This year, MARAMA managed a project to enhance CATT with additional data and analytical capabilities. Work by CAPITA (Center for Air Pollution Impact and Trend Analysis) of Washington University in St. Louis was funded by all five Regional Planning Organizations. CATT is available as part of a large system of tools and data (<http://datafed.net>) complete with user instructions and resources for discussion. To build regional capacity for the enhanced tool, MARAMA organized an on-line training session on CATT.

## Progress Made in Characterizing PM<sub>2.5</sub> Constituents

Data generated by PM<sub>2.5</sub> speciation monitors is extensive and complex. MARAMA downloaded data from the EPA Technology Transfer Network (TTN) website for eleven speciation monitors in the MARAMA region and reformatted the data to provide user-friendly spreadsheets for data analysts in the region. MARAMA is analyzing the downloaded speciation data and will provide episode analyses, site-by-site analyses, and regional comparisons in early 2006.

### New Reports on MARAMA's Website ([www.marama.org/reports](http://www.marama.org/reports))

- *The Development of PM<sub>2.5</sub> Forecasting Tools for Selected Cities in the MARAMA Region*
- *The Development of a PM<sub>2.5</sub> Forecasting Tool for Allegheny County, Pennsylvania*
- *Correlating Federal Reference Method & Continuous PM<sub>2.5</sub> Monitors in the MARAMA Region*

## 2005 Outstanding Service Awards

The MARAMA Board honored Sean Nolan and Rob Altenburg of the Pennsylvania Department of Environmental Protection for their extraordinary work developing an automated system that provides important data to air quality forecasters throughout the MARAMA Region.

The Board also recognized Susan Wierman for her exceptional leadership, outstanding contributions, generous commitment of time, and her devotion both to MARAMA and to improving air quality in the Mid-Atlantic Region.

### 2004

MARAMA completes a survey of residential wood combustion activity in the MANE-VU region.



MARAMA releases a Draft Regional Haze SIP Template to assist MANE-VU states.

MARAMA members evaluate emissions from refineries and related sources in DE, NJ and southeastern PA.

# What is MARAMA?

The Mid-Atlantic Regional Air Management Association is a voluntary, non-profit association of ten state and local air pollution control agencies. MARAMA provides cost-effective approaches to regional collaboration by pooling resources to develop and analyze data, share ideas, and train members to implement common requirements.

## MARAMA Staff



MARAMA staff members during their summer 2005 retreat. Back row from left to right: Brian DeRocco, Bill Gillespie, and Pat Davis. Second row: Alice Lutrey, Sam Alima, Susan Stephenson, Serpil Kayin, and Katie Sheen Abbott. Front row: Megan Schuster, Susan Wierman, and Joan Walstrum.

## Executive Board, 2005

**Roger C. Westman**, Allegheny County, Chair  
**Ali Mirzakhali**, Delaware, Vice Chair  
**Keith Overcash**, North Carolina, Treasurer  
**Donald E. Wambsgans III**, District of Columbia  
**Thomas Snyder**, Maryland  
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**Morris Fine**, Philadelphia  
**John M. Daniel Jr.**, Virginia  
**John Benedict**, West Virginia

## MARAMA Staff

**Susan S.G. Wierman**, Executive Director  
**Serpil Kayin, Ph.D.**, Senior Environmental Scientist  
**Bill Gillespie**, Senior Environmental Scientist  
**Susan Stephenson**, Air Quality Planner/  
Public Outreach Coordinator  
**Megan Schuster**, Air Quality Specialist  
**Katie Sheen Abbott**, Air Quality Planner/  
Public Outreach Coordinator  
**Pat Davis**, Data Analyst/Statistician  
**Alice Lutrey**, Training Coordinator/Office Manager  
**Sam Alima**, Accounting/Grants Assistant  
**Brian DeRocco**, Administrative Assistant  
**Joan Walstrum**, Administrative Assistant

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