Department of Environmental Conservation
Division of Air Resources

NEW YORK STATE IMPLEMENTATION PLAN FOR REGIONAL HAZE

PROPOSED NOVEMBER 2009

New York State Department of Environmental Conservation
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Executive Summary

As required by 40 CFR Section 51.308 of the Regional Haze Rule, the New York State Department of Environmental Conservation's Division of Air Resources has prepared this State Implementation Plan (SIP) revision demonstrating how reductions in the emissions of visibility impairing pollutants will result in a decrease in the degree of visibility impairment in Class I areas in the northeastern United States.

The overall goal of the Federal Haze Program (64 FR 35714) is to reduce haze to natural, pre-industrial conditions in these areas by 2064. This SIP, however, as required by the Regional Haze Rule deals with the first planning period that ends in 2018. The decrease in New York State emissions, in concert with the efforts of other states, is focused on attaining this goal, decreasing visibility impairment to the necessary degree by 2018 to be on a "glide path" to meet the ultimate 2064 goal.

Although New York State has no Class I areas, emissions in the State contribute to visibility degradation in downwind Class I areas in several other states. These include: the Lye Brook Wilderness Area, VT, Brigantine Wildlife Refuge, NJ, Presidential Range-Dry River Wilderness Area and Great Gulf Wilderness Area, NH, Roosevelt-Campobello International Park, Acadia National Park, Moosehorn Wildlife Refuge, ME, and the Shenandoah National Park in VA. These emissions include sulfates, nitrates, particulate matter, ammonia, and volatile organic compounds (i.e., VOC).

Since emissions must be addressed on a region-wide basis, the Mid-Atlantic Northeast Visibility Union (MANE-VU) was formed by the states, tribes, and federal agencies in the mid-Atlantic and northeast areas to coordinate regional haze planning activities for the region and with the four other Regional Planning Organizations (RPOs) covering other areas of the country. MANE-VU has provided technical analyses and other assistance to the member organizations in affiliation with the Northeast States for Coordinated Air Use Management (NESCAUM) and the Mid-Atlantic Regional Air Management Association (MARAMA).

This SIP revision satisfies the requirements of the federal haze program found in 40 CFR Section 51.308 by evaluating the current and future projected inventory of sources, assessing the progress necessary to reduce emissions to meet the 2018 goal, providing for consultation with other states, tribes and federal land managers (FLMs) in establishing progress goals, and establishing a strategy by which New York's share of regional emission reductions will be implemented. This strategy was arrived at through a consultation process with other states and tribes, FLMs and the Environmental Protection Agency (EPA). The State of New York agrees and commits to implement this strategy as described in this document.

40 CFR Section 51.308(f) requires a State to revise its regional haze implementation plan and submit it to the EPA by July 31, 2018 and every ten years thereafter. Additionally, Section 51.308(g) requires periodic reports evaluating progress toward the reasonable progress goals established for each mandatory Class I area. In accordance

with the requirements listed in Section 51.308(g) of the federal rule for regional haze, New York also commits to submitting both the SIP revision and the periodic report on reasonable progress to the EPA every five years.

1.0 Background and Overview of the Federal Regional Haze Regulation

1.1 Haze Characteristics and Effects

Haze refers to the presence of light-inhibiting pollutants in the atmosphere. These particles and gases scatter or absorb light to cause a net effect referred to as "light extinction." This scattering and absorbing occur across the sight path of an observer, thus leading to a hazy condition. Emissions of pollutants such as particulate matter, especially fine particulate matter (particles with a diameter less than 2.5 microns in size), sulfur dioxide, and nitrogen oxides are the primary contributors to visibility problems. Particulate matter can be emitted directly from stationary sources, or comprised in part of nitrate and sulfate particles formed through reactions involving nitrogen oxides and sulfur dioxide in the atmosphere. These constituents of haze are capable of being transported great distances while in the atmosphere. Due to this, sources may contribute to visibility impairment in Class I areas far downwind of their location, requiring a regional solution to the haze problem.

Reduction in visibility-impairing pollutant emissions such as nitrogen oxides (a precursor to ground-level ozone formation) also lead to a reduction in ozone. Ozone can diminish the ability for plants to produce and store food, making them more susceptible to disease, cause crop yield and forest growth to decline, and result in damage to leaves and trees in urban or other recreational areas. Nitrogen oxides and sulfur dioxide can both lead to acid rain, which damages forests and crops, acidifies waterways, and, long-term, alters the natural variety of plant and animal life in an ecosystem. In the Adirondack Mountains of New York State, mineral acidification from atmospheric deposition is responsible for ecosystem damage, including loss of fish populations. A major effect of acid rain on forest health and productivity is a reduction in the available supply of calcium and other base cations (positively charged ions) in soil that are needed for forest growth. The Catskill Mountain region of New York State has among the highest rates of sulfur and nitrogen deposition in the state and the lowest values for soil calcium availability. Significantly, the forested watersheds of the Catskill region provide the New York City water supply.

The inherent reduction of visibility-impairing pollutant emissions will also be protective of public health. While the presence of particulate matter is among the major causes of regional haze, ongoing studies reveal its contribution to a number of health issues, including respiratory irritation; decreased lung function; development or aggravation of respiratory conditions such as bronchitis; irregular heartbeat; and premature mortality. Ozone formed from nitrogen oxide emissions, along with sulfur dioxide and sulfate particles, causes similar respiratory impairment, especially among children whose respiratory systems are still developing, the elderly, and adults who are active outdoors. By regulating sulfur

dioxide, nitrogen oxides and particulate matter, severe respiratory and cardiovascular diseases can be avoided. Reducing nitrogen oxides, an ozone precursor, is of great importance for New York State, which contains multiple areas which are classified as being in nonattainment of the ozone National Ambient Air Quality Standards (NAAQS). New York State also contains a fine particulate matter nonattainment area. Particulate matter consists of microscopic solid or liquid particles and is the major cause of the regional haze issue. Finally, the Department believes that improved visibility will lead to economic and tourism benefits in, for example, the "forever wild" areas in the Adirondacks.

1.2 General Background / History of Federal Regional Haze Rule

In amendments to the Clean Air Act (CAA) in 1977, Congress added Section 169 (42 U.S.C. 7491) setting forth the following national visibility goal:

> *Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from man-made air pollution.*

Over the following years, modest steps were taken to address the visibility problems in Class I areas. In the time since the CAA was passed, progressively worsening conditions have been witnessed in the nation's Class I areas. The control measures taken mainly addressed plume blight from specific pollution sources, and did little to address regional haze issues in the Eastern United States. In fact, visibility in eastern parks has declined by as much as 83 percent [http://www.epa.gov/oar/visibility/what.html].

When the CAA was amended in 1990, Congress added Section 169B (42 U.S.C. 7492), authorizing further research and regular assessments of the progress made so far. In 1993, the National Academy of Sciences concluded that "current scientific knowledge is adequate and control technologies are available for taking regulatory action to improve and protect visibility."[1]

The EPA's Regional Haze Rule was adopted on July 1, 1999, and went into effect on August 30, 1999. The Regional Haze Rule's aim was to achieve national visibility goals by 2064. This rulemaking addressed the combined visibility effects of various pollution sources over a wide geographic region. This wide reaching pollution net means that many states – even those like New York without Class I areas – are required to participate in haze reduction efforts. The EPA designated five Regional Planning Organizations (RPOs) to assist with the coordination and cooperation needed to address the haze issue. The Mid-Atlantic / Northeast states, including the District of Columbia, were designated as part of the Mid-Atlantic /

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[1] *Protecting Visibility in National Parks and Wilderness Areas*. National Research Council. Washington, DC: 1993

Northeast Visibility Union (MANE-VU).[2]

The EPA's adoption of the Regional Haze Rule was not without controversy. On May 24, 2002, the US Court of Appeals, D.C. District Court ruled on the challenge brought by the American Corn Growers Association against the EPA's Regional Haze Rule of 1999, 64 FR 35714. The Court remanded the BART provisions of the rule to the EPA, and denied industry's challenge to the haze rule goals of natural visibility and no degradation requirements. On June 15, 2005, the EPA finalized a rule addressing the Court's remand. The final BART Rule, 70 FR 39104, was published on July 6, 2005.

1.3 Area of Influence for MANE-VU Class I Areas

New York State contains no Class I Areas. However, as required by the haze rule, states that contribute to visibility impairment in Class I areas in other states must be identified and measures taken to reduce the emissions of visibility-impairing pollutants. In order to identify states where emissions are most likely to influence visibility in MANE-VU Class I areas, MANE-VU prepared the *Contributions to Regional Haze in the Northeast and Mid-Atlantic United States* in Appendix A. Based on this analysis, MANE-VU concluded that it was appropriate to define an area of influence including all of the states participating in MANE-VU plus other states that modeling indicated contributed at least 2% of the sulfate ion at MANE-VU Class I areas in 2002. These states are shown in Table 1-1 below. The 2% was arrived at after a review of the back trajectory and modeling results showing that states contributing 2% (or more) make up about 90-95% "of total light extinction. For states contributing 5% (or more), only about 75-80% of total light extinction is accounted for. New York agrees with the 2% criteria, given the high percentage of light extinction for which it accounts. New York believes that the 2% criteria represents a level of contribution for visibility impairment from any state that needs to be assessed for mitigation. Failure to do so will result in Class I areas failing to reach their reasonable progress goals and ultimately delay needed improvements in air quality.

[2]A description of MANE-VU and a full list of its members is found in Section 3 of this document.

Table 1-1 - States That Contribute to Visibility Impairment in the MANE-VU Class I Areas of Acadia, Moosehorn, Great Gulf, Lye Brook and Brigantine

State	RPO	State	RPO
Connecticut	MANE-VU	North Carolina	VISTAS
Delaware	MANE-VU	South Carolina	VISTAS
Maine	MANE-VU	Tennessee	VISTAS
Maryland	MANE-VU	Virginia	VISTAS
Massachusetts	MANE-VU	West Virginia	VISTAS
New Hampshire	MANE-VU	Illinois	MRPO
New Jersey	MANE-VU	Indiana	MRPO
New York	MANE-VU	Michigan	MRPO
Pennsylvania	MANE-VU	Ohio	MRPO
Rhode Island	MANE-VU	New Brunswick, Canada	N/A
Vermont	MANE-VU	Ontario, Canada	N/A
Georgia	VISTAS	Quebec, Canada	N/A
Kentucky	VISTAS		

1.4 Class I Areas Affected

In accordance with 40 CFR Section 51.308(d)(4)(iii), emissions sources within the State of New York contribute to visibility impairment in the following Class I Areas:

Acadia National Park, Maine
Brigantine Wildlife Refuge, New Jersey
Great Gulf Wilderness Area, New Hampshire
Lye Brook Wilderness Area, Vermont
Moosehorn National Wildlife Refuge, Maine
Presidential Range-Dry River Wilderness Area, New Hampshire
Roosevelt-Campobello International Park, Maine/Canada
Shenandoah National Park, Virginia

The effect of New York's emissions and the measures that will be necessary to meet the goals of the Regional Haze program in the above areas are the focus of this document.

Information about procedures by which monitoring data and other information were used in determining the contribution of emissions from within these States to regional haze visibility impairment at MANE-VU Class I areas is included in Appendix A, *Contributions to Regional Haze in the Northeast and Mid-Atlantic United States*.

2.0 General Planning Provisions

Pursuant to the requirements of 40 CFR Sections 51.308(a) and (b), New York submits this State Implementation Plan (SIP) to meet the requirements of the EPA's Regional Haze rules under the requirements set forth in the Clean Air Act. Elements of this SIP address the core elements required by 40 CFR Section 51.308(d), the Best Available Retrofit Technology (BART) components of 40 CFR Section 50.308(e), the establishment of Reasonable Progress Goals (RPG) and the measures that contributing states like New York must take to take to do their part in meeting the RPG. In addition, this SIP addresses Regional Planning, State and Federal Land Manager coordination, and contains a commitment to provide plan revisions and adequacy determinations as necessary.

2.1 SIP Submission Dates

Section 51.308(b) required that this SIP be submitted by December 17, 2007. As a result of a delay in the notification of New York of the measures needed to meet Class I area reasonable progress goals, it was necessary to wait to make the required submission until the measures had been identified by the Class I states.

The State of New Hampshire notified the Department in a letter dated May 16, 2008 of the completion of the consultation process that resulted in MANE-VU states agreeing to emission management strategies that would meet the reasonable progress goal requirements of Section 40 CFR 51.308(d)(1) of the Clean Air Act. While MANE-VU member states agreed to a course of action that included pursuing the adoption and implementation of the emission management strategies on a June 20, 2007 conference call, discussions and analyses continued into early 2008 before the level of reductions these strategies would attain was determined. It wasn't until the May 16, 2008 letter that the State of New York was informed that this course of action was indeed final.

Another factor seriously disrupting the haze SIP development process was the July 11, 2008 decision from the U.S. Court of Appeals for the District of Columbia Circuit that would vacate the Clean Air Interstate Rule (CAIR) and remand the rule back to EPA. This disruption has resulted in the need for both Class I states and contributing states to reevaluate the control strategies and other elements of their regional haze SIPs, which caused states to delay submissions further. Complicating this matter was EPA's petition for rehearing and the Court's request for a briefing asking if it should stay the mandate until EPA revises the rule in response to the remand. On December 23, 2008, the U.S. Court of Appeals for the District of Columbia Circuit decided to remand the rule back to EPA without vacatur of CAIR, but did not impose a particular schedule by which EPA must alter CAIR.

Section 51.308(f) requires New York to submit a revision to this SIP by July 31, 2018 and every ten years thereafter, at which point additional adjustments to the strategies described in this SIP may take place.

Section 51.308(g) requires New York to submit a report to the EPA every five years evaluating progress toward the reasonable progress goal for each Class I Federal area located outside New York that may be affected by emissions from within New York. The first progress report is due five years from submittal of the initial SIP and must be in the form of a SIP revision. At that time, a new emission inventory and modeling results should be available. Modifications to this SIP can also be done at that time. In accordance with Section 51.308(h), New York will also submit a formal determination of the adequacy of its existing Regional Haze SIP revision at the time the progress report is submitted. The first progress report is due five years from submittal of the initial implementation plan and must be in the form of an implementation plan revision or, if no changes to New York's SIP are necessary, in the form of a negative declaration that further revision of the existing SIP is not needed.

2.2 New York Statutory Authority

New York is proposing this SIP in accordance with State laws and rules, and has the necessary authority, as described below, to adopt the SIP and other required rules and regulations.

Ambient Air Quality Monitoring, Compilation, Analysis and Reporting (110(a)(2)(B))

CAA Section 110(a)(2)(B) requires SIPs to include provisions to provide for the establishment and operation of ambient air quality monitors, collecting and analyzing ambient air quality data, and making these data available to EPA upon request. This information is included in the various SIPs that have been submitted to EPA.

The New York State Department of Environmental Conservation (Department) measures air pollutants at more than 80 sites across the state, using continuous and/or manual instrumentation. These sites are part of the federally-mandated National Air Monitoring Stations Network (NAMS) and the State and Local Air Monitoring Stations (SLAMS) Network. Real time direct reading measurements include gaseous criteria pollutants (ozone, sulfur dioxide, oxides of nitrogen, carbon monoxide), $PM_{2.5}$ (fine particulate with a diameter less than 2.5 microns), and meteorological data. Filter based $PM_{2.5}$, lead, and acid deposition samples are collected manually and shipped to the laboratory for analysis. The information obtained is compared to the NAAQS and is used to determine the attainment status of areas where these pollutants are monitored.

The near real-time data for gaseous pollutants and $PM_{2.5}$ are used for Air Quality Index (AQI) projection, and can be accessed by interested parties on the Department web site. The Department also provides real-time data to EPA for AIRNow live national ozone mapping. All ambient measurements undergo data validation and are subsequently submitted to EPA's Air Quality System (AQS) for public access.

The Department commits to continue to operate an air quality monitoring network that complies with EPA requirements and to submit this data to EPA's Air Quality System.

Enforcement and Stationary Source Permitting (110(a)(2)(C))

CAA Section 110(a)(2)(C) requires States to include a program providing for enforcement of all SIP measures and the regulation of construction of new or modified stationary sources to meet Prevention of Significant Deterioration (PSD) and nonattainment new source review (NNSR) requirements. On March 12, 2009, New York submitted 6 NYCRR Part 231, New Source Review for New and Modified Facilities, to EPA for approval and inclusion in the SIP. This regulation meets the federal requirements for the application of PSD and New Source Review requirements in New York and is presently in effect in New York. The application of these requirements ensures that major sources of PM2.5 in the state meet the requirements of the federal PSD and NNSR permitting programs as they apply to PM2.5. With PSD and NNSR requirements for PM2.5 now in effect in New York, the Department meets the requirement ensuring that major sources in this state will not cause or contribute to air pollution in excess of the NAAQS in New York or other states.

New York ensures that all applicable federal PSD requirements which are included in PSD permits are incorporated into Title V operating permits, and that all federally-enforceable requirements are applied and enforced. New York therefore affirms that the current NNSR and PSD permitting programs remain in effect and continue to apply to the state's major stationary sources, and that the requirements from these programs are federally enforceable.

Environmental Conservation Law (ECL) Section 19-0305 and Article 71 Sections 71-2103 and 71-2105 authorizes the commissioner of the Department to enforce the codes, rules and regulations of the Department established in accordance with Article 19. The SIP is a compilation of rules and regulations that have been duly promulgated by the Department in accordance with its statutory authority and consistent with the State Administrative Procedures Act. Therefore, the Department has the authority to enforce all SIP measures.

Assurance of Adequate Resources (110(a)(2)(E))

CAA Section 110(a)(2)(E) requires States to provide (i) necessary assurances that the State will have adequate personnel, funding and authority under State law to carry out its SIP, (ii) requirements that the State comply with the requirements respecting State boards under CAA Section 7428, and (iii) necessary assurances that, where the State has relied on a local or regional government, agency, or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of such plan provision.

The Division of Air Resources (DAR), with a staff of 264, receives both operating and capital funding. Operating funds are allocated to the Division annually and are used for daily administrative expenses. These expenses include salaries, fringe benefits, indirect and non-personnel services such as travel, supply and equipment costs. Indirect costs are, in turn, allocated to other Departments or divisions that support DAR activities. DAR is allocated operating funds from five sources: General Fund, Utility Environmental Regulatory Account, Co-operative Agreements (i.e., EPA Section 103 and 105 grants) and the Clean Air Fund, which is comprised of the Title V and Mobile Source accounts.

Capital funds are allocated to the Division at the discretion of the State legislature and are used for the financing or acquisition of capital facilities such as the construction of an air monitoring site. The Division is allocated Capital funds from three sources: General Fund, Mobile Source Account and Rehabilitation and Improvement.

Section 110(a)(2)(E)(ii) requires that the state comply with the requirements respecting state boards under CAA Section 7428. New York's Public Officer's Law (POL) satisfies these requirements. Specifically, POL Section 74(2) states "No officer or employee of a state agency, member of the legislature or legislative employee should have any interest, financial or otherwise, direct or indirect, or engage in any business or transaction or professional activity or incur any obligation of any nature, which is in substantial conflict with the proper discharge of his duties in the public interest." POL 74(3)(e) states "No officer or employee of a state agency, member of the legislature or legislative employee should engage in any transaction as representative or agent of the state with any business entity in which he has a direct or indirect financial interest that might reasonably tend to conflict with the proper discharge of his official duties."

Finally, the Department confirms that where the State has relied on a local or regional government, agency, or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of such plan provision.

Emergency Powers and Contingency Plans (110(a)(2)(G))

CAA Section 110(a)(2)(G) requires States to provide for authority to address activities causing imminent and substantial endangerment to public health, including contingency plans to implement the emergency episodes in their SIPs. Articles 3 and 19 of the ECL provide this authority to the Department and are included in the SIP.

Among other provisions, ECL Section 3-0301 entitled “General functions, powers and duties of the department and the commissioner” authorizes the Department to prevent and control air pollution emergencies, as defined in subdivision 1 of ECL Section 3. In exercising such prevention and control the Department and the commissioner may limit the consumption of fuels and use of vehicles, curtail or require the cessation of industrial processes and limit or require the cessation of incineration and open burning, and take any other action he may deem necessary to prevent and/or control air pollution emergencies. The Department adopted 6 NYCRR Part 207, Control Measures for an Air Pollution Episode, and EPA approved this regulation as part of the New York SIP (46 FR 55690).

Authority for SIP Revisions for Revised NAAQS (110(a)(2)(H))

CAA Section 110(a)(2)(H) requires States to have the authority to revise their SIPs in response to changes in the NAAQS, availability of improved methods for attaining the NAAQS, or in response to an EPA finding that the SIP is substantially inadequate.

Revisions to the SIP are authorized by Article 19 and Sections 3-0301, 19-0103, 19-0301, 19-0303 and 19-0305 of the ECL. Article 19 of the ECL was adopted to protect New York’s air resources from pollution and to effectuate the policy of the State to maintain a reasonable degree of purity of the air resources, consistent with the public health and welfare and the industrial development of the State. To this end, the Legislature gave the Department specific powers and duties, including the power to promulgate regulations for preventing, controlling, or prohibiting air pollution. The Department also has the specific authority to regulate motor vehicle exhaust and approve air contaminant control systems as well as regulate fuels. Section 71-2103 provides general enforcement authority for the air regulations. Section 71-2105 provides criminal enforcement authority.

This general statement of authority is included in the SIP.

Authority for SIP Revisions for New Nonattainment Areas (110(a)(2)(I))

CAA Section 110(a)(2)(I) requires States to have the authority to revise their SIPs in response to changes in nonattainment areas.

Revisions to the SIP are authorized by the same citations as described in the above paragraph regarding SIP revisions for revised NAAQS.

This general statement of authority is included in the SIP.

Consultation, Public Notification and PSD/Visibility (110(a)(2)(J))

CAA Section 110(a)(2)(J) requires States to meet the applicable requirements of CAA Section 121 relating to consultation, CAA Section 127 relating to public information and Part C relating to PSD and visibility protection.

CAA Section 121 requires States to provide a satisfactory process of consultation with general purpose local governments, designated organizations of elected officials of local governments and any Federal land manager having authority over Federal land to which the State plan applies. On December 22, 2005, the Department reestablished a SIP Coordinating Council consisting of senior policy representatives from 19 state agencies and authorities, and a SIP Task Force consisting of officials from thirty-seven local governments and designated organizations of elected officials. Though there are no Federal lands within New York State to which the State plan applies, the Department has participated in the consultation process of the Regional Haze SIP (40 CFR 51.308) with the Federal Land Managers, States and Tribes of the Mid-Atlantic Northeast Visibility Union (MANE-VU), and other regional planning organizations where emissions from New York are reasonably anticipated to contribute to visibility impairment to Class I areas.

CAA Section 127 requires State plans to contain measures which will be effective to notify the public during any calendar year, on a regular basis, of instances or areas in which any national primary ambient air quality standard is exceeded or was exceeded during any portion of the preceding calendar year to advise the public of the health hazards associated with such pollution, and to enhance public awareness of the measures which can be taken to prevent such standards from being exceeded and the ways in which the public can participate on regulatory and other efforts to improve air quality.

The Department's website, at http://www.dec.ny.gov/chemical/34985.html, contains an Air Quality Index (AQI) for reporting daily air quality to the public. It describes how clean or polluted the air is, and what associated health effects might be a concern. It was created as a way to correlate levels of different pollutants to one scale; the higher the AQI value, the greater the health concern. When levels of ozone and/or fine particles are expected to exceed an AQI value of 100, an Air Quality Health Advisory is issued alerting sensitive groups to take the necessary precautions. The Department, in cooperation with the New York State Department of Health, posts warnings on the above-referenced website if dangerous conditions are expected to occur. These warnings are also aired through the media, and are available on the toll-free Ozone Hotline at 1-800-535-1345. The Air Quality Forecast displays the predicted AQI value for eight regions in New York State. It also displays the observed values for the previous day. Air

quality measurements from New York's statewide continuous monitoring network are updated hourly where available. Parameters monitored include ozone, fine particulate, carbon monoxide, sulfur dioxide, nitrogen oxides, methane/nonmethane hydrocarbons, and meteorological data. Additional ozone information to enhance public awareness is located at http://www.dec.ny.gov/chemical/8400.html.

Air Quality Modeling / Data (110(a)(2)(K))

CAA Section 110(a)(2)(K) requires States to provide for the performance of such air quality modeling as the Administrator may prescribe for the purpose of predicting the effect on ambient air quality of any emissions of any air pollutant for which the Administrator has established a NAAQS. It also requires States to submit, upon request, data related to such air quality modeling to the Administrator.

The Department certifies that the air quality modeling and analysis used in SIPs complies with EPA's guidance* on the use of models in attainment demonstrations, and commits to continue to use air quality models in accordance with EPA's approved modeling guidance and to submit data to the Administrator if requested.

* US EPA 200. "Guidance on the use of models and other analyses for demonstrating attainment of air quality goals for ozone, $PM_{2.5}$ and regional haze." EPA-454/B-07-002.

Consultation / Participation by Affected Local Entities (110(a)(2)(M))

CAA Section 110(a)(2)(M) requires States to provide for consultation and participation by local political subdivisions affected by the plan.

The Department established an Inter-agency Consultation Group (ICG) pursuant to 6 NYCRR Part 240, "Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved under Title 23 U.S.C. or the Federal Transit Laws." Members of this group include the Federal Transit Administration, Federal Highway Administration, the New York State Department of Transportation, the United States Environmental Protection Agency, the New York State Department of Environmental Conservation, and several Metropolitan Planning Organizations statewide. The ICG is central to the entire transportation conformity process, and serves as the underpinning for conformity determinations and as the primary mechanism for ensuring early coordination and negotiation among all parties affected by transportation conformity, including the general public, the business community, and other interested parties.

Additional consultation and participation by local political subdivisions are provided through the SIP Task Force established on December 22, 2005, which consists of officials from thirty-seven local governments and designated organizations of elected officials.

The Department commits to continue to provide for consultation and participation by local political subdivisions.

3.0 Regional Planning

In 1999, EPA and affected States and Tribes agreed to create five Regional Planning Organizations (RPOs) to facilitate interstate coordination on Regional Haze SIP/TIPs. The State of New York is a member of the Mid-Atlantic / Northeast Visibility Union (MANE-VU) RPO. Members of MANE-VU are listed in Table 3-1 below.

Table 3-1 - MANE-VU RPO Members

Connecticut	Pennsylvania
Delaware	Penobscot Nation
District of Columbia	Rhode Island
Maine	St. Regis Mohawk Tribe
Maryland	Vermont
Massachusetts	U.S. Environmental Protection Agency*
New Hampshire	National Park Service*
New Jersey	U.S. Fish and Wildlife Service*
New York	U.S. Forest Service*

* Non-voting members

New York's Regional Haze SIP utilizes data analysis, modeling results and other technical support documents prepared for MANE-VU members. By coordinating with MANE-VU and other RPOs, New York State has worked to ensure that its long term strategy, control measures and BART determinations provide sufficient reductions to mitigate impacts of sources from New York State in affected Class I areas.

Since its inception on July 24, 2001, MANE-VU has established an active committee structure to address both technical and non-technical issues related to regional haze. The primary committees are the Technical Support Committee (TSC), charged with assessing the nature and magnitude of the regional haze problem within MANE-VU, interpreting the results of technical work, and reporting on such work to the MANE-VU Board; and the Communications Committee which is charged with developing approaches to inform the public about the regional haze problem in the region and making any recommendations to the MANE-VU Board to facilitate that goal. The Communications Committee has become an effective means to develop outreach tools both for stakeholders and the public regarding regional issues within MANE-VU's member states.

Ultimately, policy decisions are made by the MANE-VU Board. In addition to the formal working committees, there are also three standing working groups of the TSC. They are broken down by topic area: Emissions Inventory, Modeling, and Monitoring/Data Analysis Workgroups.

MANE-VU has also established a Policy Advisory Group to facilitate communication with Federal Land Managers, between the Technical and Communications Committees, and with MANE-VU staff. The Policy Advisory Group provides advice to decision-makers on policy questions.

MANE-VU's work is managed by the Ozone Transport Commission (OTC) and carried out by the OTC, the Mid-Atlantic Regional Air Management Association (MARAMA) and the Northeast States for Coordinated Air Use Management (NESCAUM). The states, along with federal agencies and professional staff from OTC, MARAMA and NESCAUM, are members of the various committees and workgroups.

The following are highlights of many of the ways MANE-VU member states and tribes have cooperatively addressed regional haze, most of which New York State has participated in.

- Budget Prioritization: MANE-VU developed a process to coordinate MARAMA, OTC and NESCAUM staff in developing budget priorities, project rankings, and the eventual federal grant requests.

- Issue Coordination: MANE-VU established a set conference call and meeting schedule for each of its committees and workgroups. In addition, its Air Directors regularly discuss pertinent issues.

- SIP Policy and Planning: MANE-VU has initiated a process to track the key milestones needed for SIP development and developed a SIP template with the assistance of MANE-VU states/tribes.

- Capacity Building: To educate its staff and members, MANE-VU included technical presentations on conference calls and organized workshops with nationally recognized experts. Presentations on data analysis, BART work, inventory topics, modeling, control measures etc. were an effective education and coordination tool.

- Routine Operations: MANE-VU staff at OTC, MARAMA and NESCAUM established routine operations to address the following topics: budget, grant deliverables/ due dates, workgroup meetings, inter-RPO feedback, haze rule development, etc.

4.0 Federal Land Manager Coordination

40 CFR Section 51.308(i) requires coordination between States, Tribes and the Federal Land Managers (FLMs). As a part of the development of this SIP, opportunities have been provided by MANE-VU for FLMs to review and comment on each of the technical documents developed by MANE-VU as well as this document. New York State provided agency contacts to the Federal Land Managers as required (pp. 35747-48 of the 1999 Regional Haze Rule).

As required by Section 51.308(i)(2), New York State provided the FLMs an opportunity for consultation, in person and at least 60 days prior to holding any public hearing on an implementation plan or plan revision, and also provided the FLMs the opportunity to provide their:

- Assessment of the impairment of visibility in any Class I areas,
- Recommendations for states containing Class I areas on the development of reasonable progress goals, and
- Recommendations on the development and implementation of strategies to address visibility impairment.

A copy of the draft SIP was provided to the FLMs for their review. New York State received comments regarding this SIP from the FLMs after their review. The FLM's comments and New York State's responses are included in Appendix B, *Summary of Federal Land Manager Comments and Responses*, of this plan, in accordance with 40 CFR 51.308(i)(3).

Section 51.308(i)(4) requires procedures for continuing consultation between the State and FLMs on the implementation of the visibility protection program. The FLMs must be consulted in the following instances:

- Development and review of implementation plan revisions,
- Review of 5-year progress reports, and
- Development and implementation of other programs that may contribute to impairment of visibility in Class I areas.

The Department commits to continue to coordinate and consult with the FLMs during the development of future progress reports and plan revisions, as well as during the implementation of programs having the potential to contribute to visibility impairment in the mandatory Class I areas. New York State will consult with the FLMs on the status of the following implementation items:

- Implementation of emissions strategies identified in the SIP as contributing to achieving improvement in the worst-day visibility,
- Summary of major new source permits issued,
- Status of State actions to meet commitments for completing any future

assessments or rulemakings on sources identified as likely contributors to visibility impairment, but not directly addressed in the most recent SIP revision,

- Any changes to the monitoring strategy or monitoring stations status that may affect tracking of reasonable progress,
- Work underway for preparing the 5-year review and/or 10-year revision.
- Items for FLMs to consider or provide support for in preparation for any visibility protection SIP revisions (based on a 5-year review or the 10-year revision schedule under EPA's Regional Haze Rule), and
- Summaries of topics (discussion meetings, emails, other records) covered in ongoing communications between the State and FLMs regarding implementation of the visibility program.

These consultations will be coordinated with the designated visibility protection program coordinators for the National Park Service, U.S. Fish and Wildlife Service and the U.S. Forest Service. The frequency and the form of the consultation will be determined during the initial contacts after the approval of this document.

5.0 Assessment of Baseline and Natural Conditions

Under Section 169A(b)(2)(B) of the Clean Air Act, the initial Regional Haze SIPs must contain measures to make reasonable progress toward the goal of achieving natural visibility. Comparing natural visibility levels to current baseline conditions helps determine how much progress should be made in the next five to 10 years. Determining natural visibility conditions is a SIP element and each state containing a Class I area (in consultation with Federal Land Managers and other states) was required to estimate natural visibility levels. New York State contains no Class I areas and, as such, this assessment is not required. However, it is presented here for informational purposes.

Additionally, Section 51.308(d)(4)(iii) of the EPA's Regional Haze Rule, 40 CFR 51.308 requires the inclusion in the SIP of a description of procedures by which monitoring data and other information are used in determining the contribution of emissions from within the state to regional haze visibility impairment at mandatory Class I Federal areas both within and outside the state. The Interagency Monitoring of Protected Visual Environments (IMPROVE) program was developed in 1985 to establish current visibility conditions, track changes in visibility, and help determine the causes and sources of visibility impairment in Class I areas.

IMPROVE data was used to calculate baseline and natural conditions for MANE-VU Class I areas. Data from the following IMPROVE monitors (see Table 5-1 below) is representative of Class I areas in and near MANE-VU.

Table 5-1- IMPROVE Information for MANE-VU Class I Areas

Class I Area	IMPROVE Site	Location (latitude and longitude)	State
Acadia National Park	ACAD1	44.38, -68.26	Maine
Moosehorn National Wildlife Refuge	MOOS1	45.13, -67.27	Maine
Roosevelt/Campobello International Park	MOOS1	45.13, -67.27	Maine
Great Gulf Wilderness Area	GRGU1	44.31, -71.22	New Hampshire
Presidential Range/Dry River Wilderness	GRGU1	44.31, -71.22	New Hampshire
Lye Brook Wilderness Area	LYBR1	43.15, -73.13	Vermont
Brigantine Wilderness Area	BRIG1	39.47, -74.45	New Jersey

Source: VIEWS (http://vista.circa.colostate.edu/views/), prepared on 7/06/06

5.1 Natural Conditions

In September 2003, the EPA issued guidance for a calculation of natural background and baseline visibility conditions. EPA guidance gives states a "default" method to estimate natural visibility. Natural visibility represents the visibility for each Class I area that is representative of existing conditions before human activities affected air quality in the area. MANE-VU estimated natural visibility using the default method for the 20% best and worst days, and also evaluated ways to refine the estimates. Potential refinements included increasing the multiplier used to calculate impairment attributed to carbon, adjusting the formula used to calculate the 20% best and worst visibility days, and accounting for visibility impairment due to sea salt at coastal sites. However, MANE-VU found that these refinements did not significantly improve the accuracy of the estimates and MANE-VU states desired a consistent approach. Therefore, default estimates were used.

Once the technical analysis was complete, MANE-VU provided an opportunity to comment to federal agencies and stakeholders. After serious consideration of the comments that were received, in December 2006, MANE-VU recommended adoption of the alternative reconstructed extinction equation for use in the Regional Haze SIPs. Therefore, default estimates were used with the understanding that this would be reconsidered as better scientific understanding warranted.

Notwithstanding the above, New York State does not contain any Class I areas and so is not required to estimate reasonable progress goals. However, as described in Section 3, the Department has coordinated with states containing Class I areas which are affected by emissions from sources located in New York as those states assessed baseline, natural and current visibility conditions in their respective Class I areas. The results of this work were used to determine the control measures whose implementation would be necessary by New York and other contributory states to meet reasonable progress goals for each Class I area.

5.2 Baseline Visibility

A five-year average (2000 to 2004) baseline visibility in deciviews was calculated by MANE-VU for each Class I Area for the 20 percent best and 20 percent worst days in accordance with 40 CFR 51.308(d)(2) and as detailed in Appendix L of the document entitled *Baseline and Natural Background Visibility Conditions* (NESCAUM, December 2006). The deciview visibility for these worst and best days are based on calculations and data included in Appendix C, *Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Rule* of this SIP submission.

Table 5-2 presents the IMPROVE program calculations for the 20 percent worst and best baseline (2000-2004) visibility conditions for each IMPROVE monitoring site at MANE-VU Class I Areas. These values are posted on the Visibility Information Exchange Web System (VIEWS) operated by the Regional Planning Organizations (available online at http://vista.cira.colostate.edu/views/).

Table 5-2 - Baseline Visibility for the 20 Percent Worst Days and 20 Percent Best Days for Five Years (from 2000-2004) in MANE-VU Class I Areas

Class I Area (IMPROVE Monitor)	Year	20 Percent Worst Days Deciviews (dv)	20 Percent Best Days Deciviews (dv)
Acadia National Park (ACAD1)	2000	21.64	8.89
	2001	23.28	8.87
	2002	23.91	8.77
	2003	23.65	8.77
	2004	21.98	8.56
Five Year Average		22.89	8.77
Moosehorn National Wildlife Refuge and Roosevelt/Campobello International Park (MOOS1)	2000	20.63	8.93
	2001	22.13	9.3
	2002	23.06	9.12
	2003	22.5	9.48
	2004	20.28	8.93
Five Year Average		21.72	9.15
Great Gulf Wilderness Area and Presidential Range/Dry River Wilderness (GRGU1)	2000	*	*
	2001	23.29	8.26
	2002	24.84	7.77
	2003	21.59	6.94
	2004	21.56	7.68
Five Year Average		22.82	7.66
Lye Brook Wilderness Area (LYBR1)	2000	23.45	6.49
	2001	26.32	6.47
	2002	25.52	6.43
	2003	24.02	5.83
	2004	22.91	6.61
Five Year Average		24.45	6.36
Brigantine Wilderness Area (BRIG1)	2000	28.95	14.26
	2001	28.38	13.82
	2002	29.31	14.83
	2003	29.79	14.39
	2004	28.59	14.36
Five Year Average		29.01	14.33

*Data does not exist for the Great Gulf Wilderness Area IMPROVE site for the year 2000, however, according to the EPA document entitled, *Guidance for Tracking Progress Under the Regional Haze Rule*, states that, "…a minimum of three years of data meeting these completeness requirements is sufficient to calculate the 5-year averages within each 5-year period…the three year completeness criterion allows for the calculation of baseline conditions at sites with less than five years of data."

Source: VIEWS (http://vista.circa.colostate.edu/views/), prepared on 10/16/07

5.3 Comparison of Natural and Baseline Conditions

Table 5-3 compares the baseline visibility for the 20 percent worst and the 20 percent best visibility days based on the five-year average for 2000-2004, natural visibility for the 20 percent worst and the 20 percent best visibility days, and the difference between baseline and natural visibility conditions for each MANE-VU Class I area. These differences provide the beginning and endpoints of the "glide path" that indicates the progress that must be made over the term of the Regional Haze Program out to 2064. This information is also useful in determining the reasonable progress goals (RPGs) that will be established for the term of this SIP extending out to 2018, as well as the control measures that contributing states like New York will need to implement to meet these goals.

Reasonable progress goals are discussed in detail in Section 9 of this SIP.

Table 5-3 - Summary of Baseline Visibility and Natural Conditions for the 20 Percent Worst and 20 Percent Best Visibility Days

Class I Area	2000-2004 Baseline (dv)		Natural Conditions (dv)		Difference (dv)	
	Worst 20%	Best 20%	Worst 20%	Best 20%	Worst 20%	Best 20%
Acadia National Park	22.89	8.77	12.43	4.66	10.46	4.11
Moosehorn National Wildlife Refuge	21.72	9.15	12.01	5.01	9.71	4.14
Roosevelt/Campobello International Park	21.72	9.15	12.01	5.01	9.71	4.14
Great Gulf Wilderness Area	22.82	7.66	11.99	3.73	10.83	3.93
Presidential Range/Dry River Wilderness	22.82	7.66	11.99	3.73	10.83	3.93
Lye Brook Wilderness Area	24.45	6.36	11.73	2.79	12.72	3.57
Brigantine Wilderness Area	29.01	14.33	12.24	5.51	16.77	8.82

Source: VIEWS (http://vista.cira.colostate.edu/views/) prepared on 6/22/2007

6.0 Monitoring Strategy

Visibility conditions representative of those within the Class I areas is monitored by the IMPROVE program. In the mid-1980's, the IMPROVE program was established to measure visibility impairment in mandatory Class I areas throughout the United States. The monitoring sites are operated and maintained through a formal cooperative relationship between the EPA, National Park Service, U.S. Fish and Wildlife Service, Bureau of Land Management, and U.S. Forest Service. In 1991, several additional organizations joined the effort: State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control (which now is called the National Association of Clean Air Agencies) Officials, Western States Air Resources Council, Mid-Atlantic Regional Air Management Association, and Northeast States for Coordinated Air Use Management.

A Quality Assurance Project Plan (QAPP) for the IMPROVE program, dated March 2002, can be found at:

http://vista.cira.colostate.edu/improve/Publications/QA_QC/IMPROVE_QAPP_R0.pdf

6.1 IMPROVE Program Objectives

Data collected at these sites are used by land managers, industry planners, scientists, public interest groups, and air quality regulators to understand and protect the visual air quality resource in Class I areas. Most importantly, the IMPROVE program scientifically documents the visual air quality of wilderness areas and national parks. Program objectives include:

- Establish current visibility and aerosol conditions in mandatory Class I areas,
- Identify chemical species and emission sources responsible for existing anthropogenic visibility impairment,
- Document long-term trends for assessing progress toward the national visibility goals,
- Provide regional haze monitoring representing all visibility-protected federal Class I areas where practical, as required by the EPA's Regional Haze Rule.

6.2 New York's Monitoring Responsibilities

Section 51.308(d)(4)(iii) of the EPA's Regional Haze Rule requires the inclusion of procedures by which monitoring data and other information are used in determining the contribution of emissions from within the State to regional haze visibility impairment at mandatory Class I Federal areas both within and outside the State. MANE-VU and New York State accept the contribution assessment

analysis completed by NESCAUM entitled, *Contributions to Regional Haze in the Northeast and Mid-Atlantic United States* (Appendix A). New York State agrees that NESCAUM is providing appropriate technical information by using the IMPROVE program data and the VIEWS site. Information about the use of the default and alternative approaches to the calculation of baseline and natural background conditions can be found in Section 5 of this SIP.

New York, however, does not contain any Class I areas. Therefore, no monitoring plan is required to be submitted with this SIP under the EPA's Regional Haze Rule.

6.3 Monitoring Information for MANE-VU Class I Areas[1]

Although New York does not contain any Class I areas, this section provides a description and location for the IMPROVE monitors in the Class I areas to which New York contributes to regional haze.

6.3.1. Acadia National Park, Maine (Figures 6-1 and 6-2)

The IMPROVE monitor for the Acadia National Park (indicated as ACAD1) is located at Acadia National Park Headquarters in Maine at an elevation of 157 meters, a latitude of 44.38˚ and a longitude of -68.26˚.

Monitoring Strategy

The ACAD1 site is considered to be adequate for assessing reasonable progress goals of the Acadia National Park by the State of Maine and no additional monitoring sites or equipment are necessary at this time. Maine routinely participates in the IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings.

[1]All maps in this section are derived from maps found at:
http://www.nationalatlas.gov/printable/fedlands.html#list

Figure 6-1 - Locational Map of the Acadia National Park, the Moosehorn National Wildlife Refuge, and the Roosevelt Campobello International Park

Figure 6-2 - Detailed Map of Acadia National Park

6.3.2 Moosehorn National Wildlife Refuge, Maine (Figures 6-1 and 6-3)

The haze data for Moosehorn National Wildlife Refuge is collected by an IMPROVE monitor (MOOS1) that is operated and maintained by the U.S. Fish & Wildlife Service. The IMPROVE monitor for the Moosehorn National Wildlife Refuge is located near McConvey Road, about one mile northeast of the National Wildlife Refuge Baring Unit Headquarters in Maine at an elevation of 78 meters, a latitude of 45.13˚ and a longitude of -67.27˚.

Monitoring Strategy

The State of Maine considers the MOOS1 site as the only current IMPROVE monitoring site in Maine adequate for assessing reasonable progress goals of the Moosehorn National Wildlife Refuge and no additional monitoring sites or equipment are necessary at this time. Maine routinely participates in the IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings.

This monitor also represents the Roosevelt/Campobello International Park in New Brunswick, Canada.

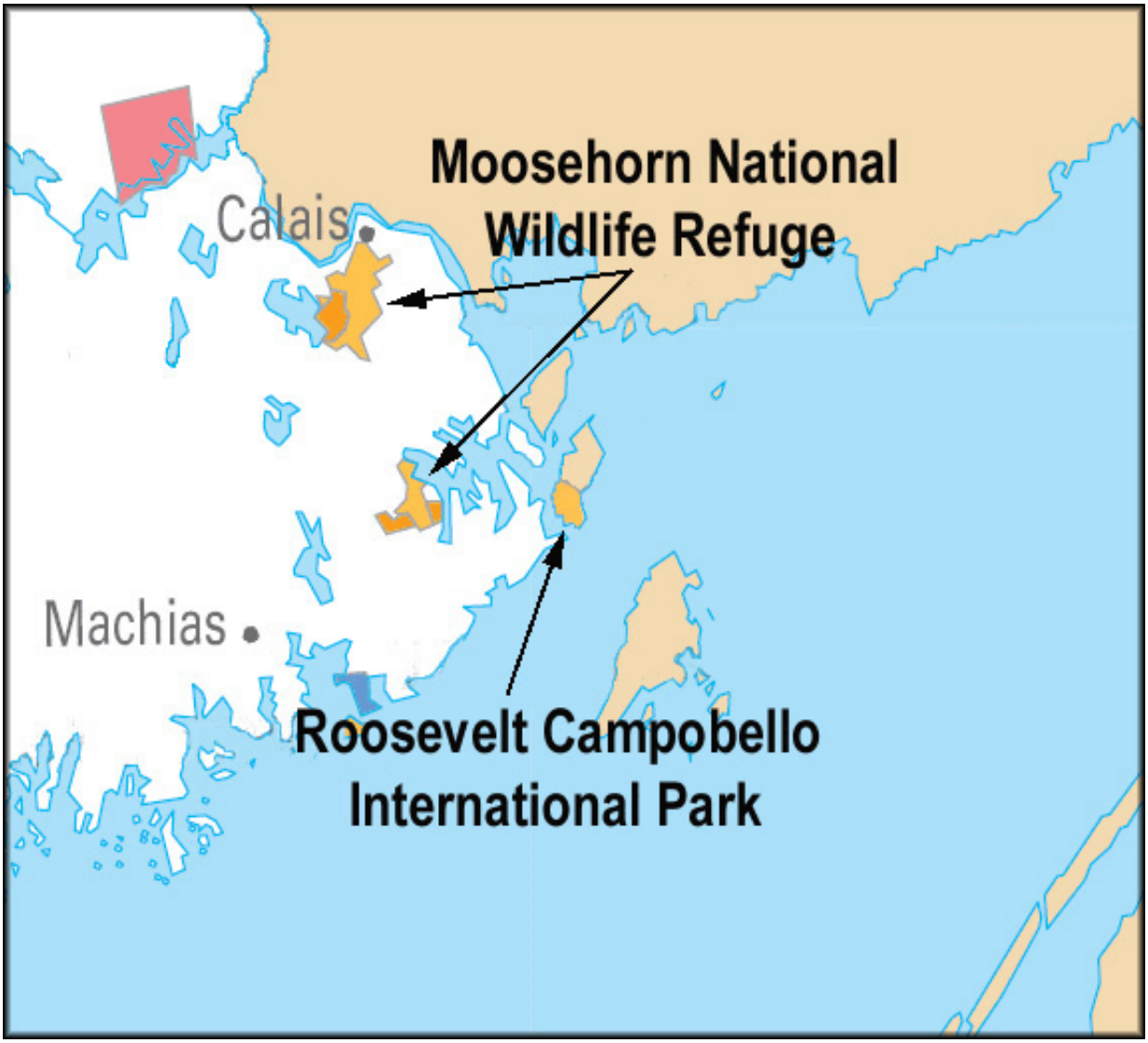
6.3.3. Roosevelt/Campobello International Park, New Brunswick, Canada (Figure 6-3)

The haze data for Roosevelt/Campobello International Park is collected by the IMPROVE monitor (MOOS1) that is operated and maintained by the U.S. Fish & Wildlife Service. The IMPROVE monitor for the Moosehorn National Wildlife Refuge is also the monitor for Roosevelt/Campobello International Park. The monitor is located near McConvey Road, about one mile northeast of the Moosehorn National Wildlife Refuge Baring Unit Headquarters in Maine at an elevation of 78 meters, a latitude of 45.13˚ and a longitude of -67.27˚.

Monitoring Strategy

The State of Maine considers the MOOS1 site as the only current IMPROVE monitoring site in Maine or Canada adequate for assessing reasonable progress goals of the Roosevelt/Campobello International Park. No additional monitoring sites or equipment are necessary. Maine routinely participates in the IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings.

Figure 6-3 - Detailed Map of the Moosehorn National Wildlife Refuge Areas and the Roosevelt Campobello International Park



6.3.4. Brigantine Wilderness Area, New Jersey (Figures 6-4 and 6-5)

The haze data for Brigantine Wilderness Area is collected by an IMPROVE monitor (BRIG1) that is operated and maintained by the U.S. Fish & Wildlife Service. The IMPROVE monitor for the Brigantine Wilderness Area is located at the Edwin B. Forsythe National Wildlife Refuge Headquarters in Oceanville, New Jersey at an elevation of 5 meters, a latitude of 39.47˚ and a longitude of -74.45˚.

Monitoring Strategy

The State of New Jersey considers the BRIG1 site as adequate for assessing reasonable progress goals of the Brigantine Wilderness Area and no additional monitoring sites or equipment are necessary at this time. New Jersey routinely participates in the IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings.

Figure 6-4 - Locational Map of the Brigantine Wilderness Area

Figure 6-5 - Detailed Map of the Brigantine Wilderness Area

6.3.5 Great Gulf Wilderness Area, New Hampshire (Figures 6-6 and 6-7)

The haze data for Great Gulf Wilderness Area is collected by an IMPROVE monitor (GRGU1) that is operated and maintained by the U.S. Forest Service. The IMPROVE monitor for the Great Gulf Wilderness Area is located at Camp Dodge, which is located in the mid northern area of Greens Grant, just east and south of where Route 16 crosses the Greens Grant/Martins Location boundary in the White Mountain National Forest, South of Gorham, New Hampshire, at an elevation of 454 meters, a latitude of 44.31˚ and a longitude of -71.22˚.

Monitoring Strategy

The State of New Hampshire considers the GRGU1 site as adequate for assessing reasonable progress goals of the Great Gulf Wilderness Area and no

additional monitoring sites or equipment are necessary at this time. New Hampshire routinely participates in the IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings.

This monitor also represents the Presidential Range/Dry River Wilderness Area in New Hampshire.

6.3.6 Presidential Range/Dry River Wilderness Area, New Hampshire (Figures 6-6 and 6-7)

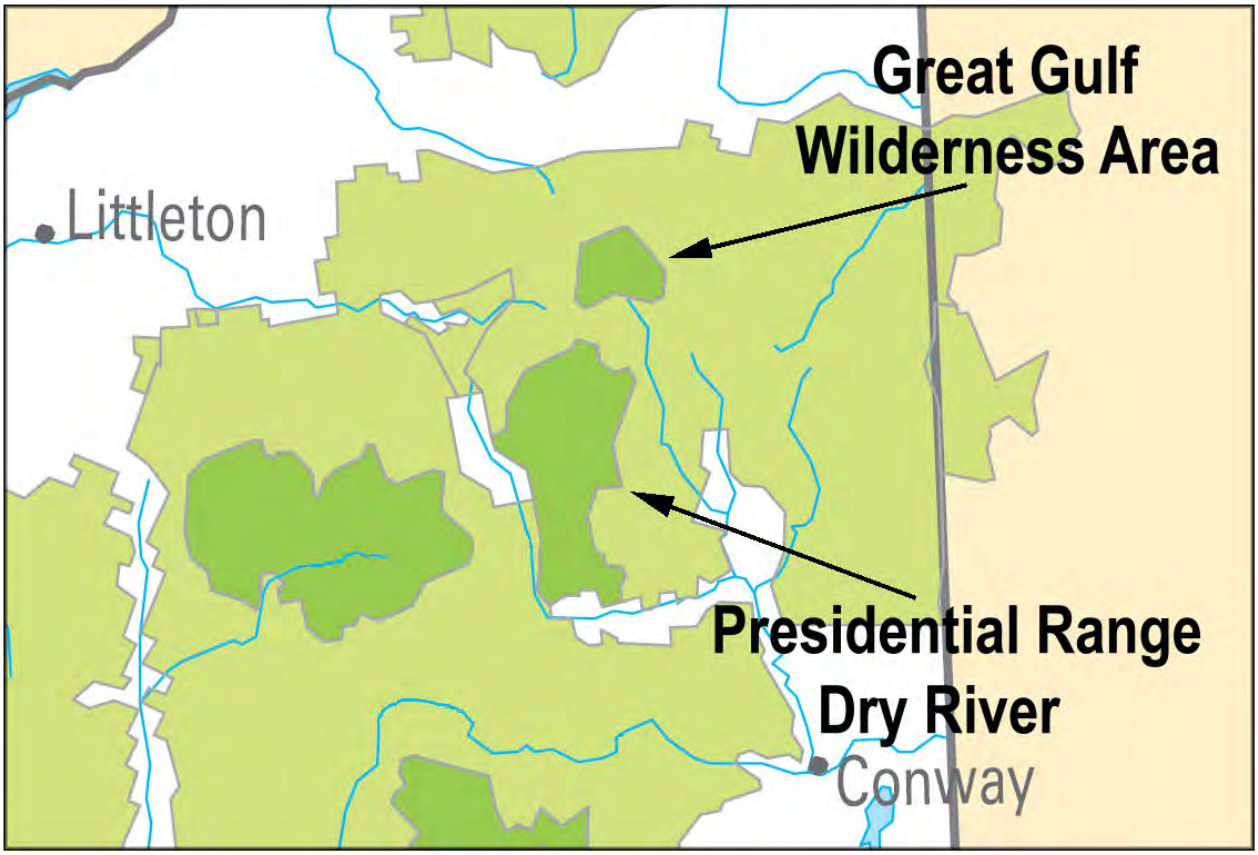
The haze data for Presidential Range/Dry River Wilderness Area is collected by an IMPROVE monitor (GRGU1) that is operated and maintained by the U.S. Forest Service. The IMPROVE monitor for the Great Gulf Wilderness Area also represents the Presidential Range/Dry River Wilderness Area. The Presidential Range/Dry River Wilderness Area monitor is located at Camp Dodge, White Mountain National Forest, South of Gorham, New Hampshire, at an elevation of 454 meters, a latitude of 44.31˚ and a longitude of -71.22˚.

Monitoring Strategy

The State of New Hampshire considers the GRGU1 site as adequate for assessing reasonable progress goals of the Presidential Range/Dry River Wilderness Area and no additional monitoring sites or equipment are necessary. New Hampshire routinely participates in the IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings.

Figure 6-6 - Locational Map of the Great Gulf Wilderness and Presidential Range Dry River Areas

Figure 6-7 - Detailed Map of the Great Gulf Wilderness and Presidential Range Dry River Areas



6.3.7 Lye Brook Wilderness, Vermont (Figures 6-8 and 6-9)

The haze data for Lye Brook Wilderness Area is collected by an IMPROVE monitor (LYBR1) that is operated and maintained by the U.S. Forest Service. The IMPROVE monitor for the Lye Brook Wilderness Area is located on Mount Equinox at the windmills in Manchester, Vermont. The monitor is not in the Wilderness Area but is located on a mountain peak across the valley to the west of the wilderness area. The Lye Brook Wilderness Area is at high elevation in the mountains and the IMPROVE site across the valley is at about the same height as the Wilderness Area at an elevation of 1015 meters, a latitude of 43.15˚ and a longitude of -73.13˚.

Monitoring Strategy

The State of Vermont considers the LYBR1 site as adequate for assessing reasonable progress goals of the Lye Brook Wilderness Area and no additional

monitoring sites or equipment are necessary at this time. Vermont routinely participates in the IMPROVE monitoring program by sending regional representatives to the IMPROVE meetings.

Figure 6-8 - Locational Map of the Lye Brook Wilderness Area

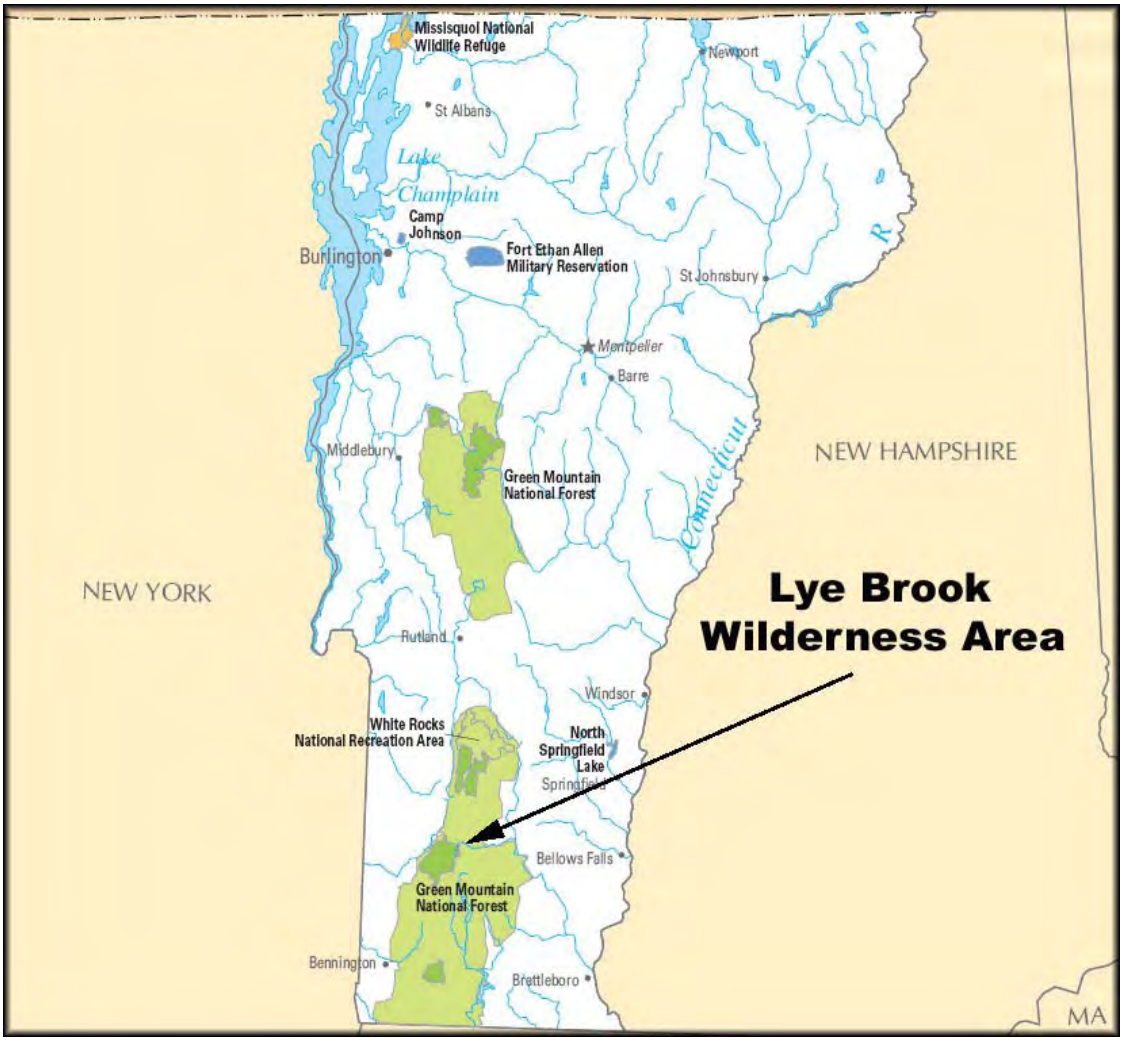
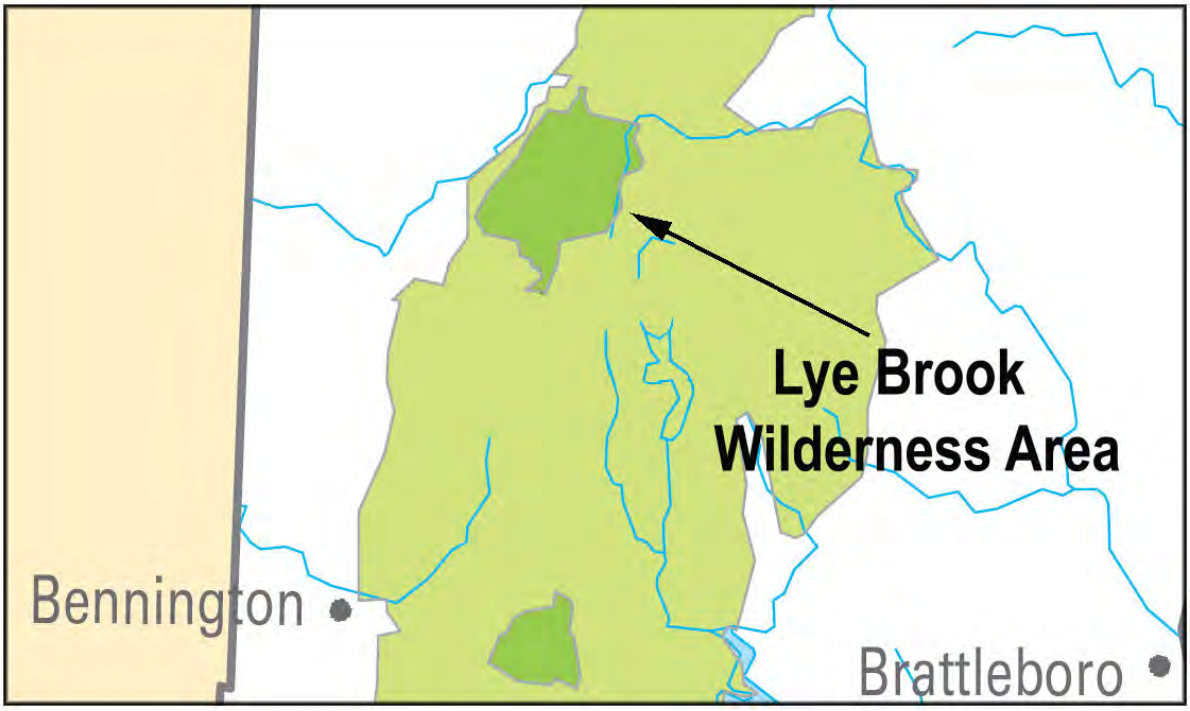


Figure 6-9 - Detailed Map of the Lye Brook Wilderness Area



7.0 Emission Inventory

Section 51.308(d)(4)(v) of the EPA's Regional Haze Rule, 40 CFR 51.308 requires the establishment of a statewide emission inventory of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory Class I area. The pollutants inventoried by New York include volatile organic compounds, nitrogen oxides, fine particles ($PM_{2.5}$), coarse particles (PM_{10}), ammonia, carbon monoxide and sulfur dioxides. The information for New York was provided to MANE-VU, which conducted the modeling of visibility impacts for the MANE-VU region. This section provides information on the development of baseline and future emission inventories that were used in modeling visibility for the purposes of this SIP.

7.1 Baseline and Future Year Emission Inventories for Modeling

Section 51.308(d)(3)(iii) of the EPA's Regional Haze Rule requires the State of New York as well as other states to identify a baseline emission inventory upon which future emission projections will be based and from which the necessary emission reductions for meeting reasonable progress goals can be determined.

Based on EPA guidance entitled, *2002 Base Year Emission Inventory SIP Planning: 8-hour Ozone, PM $_{2.5}$, and Regional Haze Programs*, found at the following link:

http://www.epa.gov/ttnchie1/eidocs/2002baseinven_102502new.pdf

which identifies the anticipated baseline emission inventory year for regional haze, MANE-VU and the State of New York are using 2002 as the baseline year. From this, future year inventories were developed for 2009, 2012 and 2018 based on this base year. These future year emission inventories include emissions growth due to projected increases in population and economic activity as well as the emissions reductions due to the implementation of control measures.

7.1.1 Baseline Inventory

The 2002 emissions inventory data were first generated by individual states in the MANE-VU area. MARAMA then coordinated and quality-assured the 2002 inventory data, and projected it for the relevant control years. The 2002 emissions from non-MANE-VU areas within the modeling domain were obtained from other Regional Planning Organizations for their corresponding areas. These Regional Planning Organizations included the Visibility Improvement State and Tribal Association of the Southeast (VISTAS), the Midwest Regional Planning Organization (MRPO) and the Central Regional Air Planning Association (CENRAP).

Version 3 of the 2002 base year emission inventory was used in the regional modeling exercise. A technical support document for the MANE-VU 2002 base inventory is presented in Appendix H, *Technical Support Document (TSD) for 2002 MANE-VU SIP Modeling Inventories, Version 3*. This document explains the data sources, methods, and results for preparing this version of the 2002 base year criteria air pollutant and ammonia emissions inventory. Documentation for the future year estimations is presented in Appendix E, *Development of Emission Projections for 2009, 2012 and 2018 for NonEGU Point, Area, and Nonroad Sources in the MANE-VU Region* of this document. The inventory and supporting data prepared includes the following:

1. Comprehensive, county-level, mass emissions and modeling inventories for 2002 emissions for criteria air pollutants and ammonia for the State and Local agencies included in the MANE-VU region.
2. The temporal, speciation, and spatial allocation profiles for the MANE-VU region inventories.
3. Inventories for wildfires, prescribed burning and agricultural field burning for the southeastern provinces of Canada.
4. Inventories for other Regional Planning Organizations, Canada, and Mexico.

The mass emissions inventory files were converted to the National Emissions Inventory Input Format Version 3.0. The modeling inventory files were processed in Sparse Matrix Operator Kernel Emissions/Inventory Data Analyzer (SMOKE). The inventories include annual emissions for oxides of nitrogen (NO_X), volatile organic compounds (VOC), carbon monoxide, ammonia, particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM10) and PM2.5. Temporal profiles prepared for MANE-VU were used to calculate daily emissions for all MANE-VU states.

Work on Version 1 of the 2002 MANE-VU inventory began in April 2004. The consolidated inventory for point, area, onroad, and nonroad sources was prepared starting with the inventories that MANE-VU state and local agencies submitted to the EPA from May through July of 2004 as a requirement of the Consolidated Emissions Reporting rule. The EPA's format and content quality assurance (QA) programs (and other QA checks not included in the EPA's QA software) were run on each inventory to identify format and/or data content issues. A contractor, E.H. Pechan & Associates, Inc. (Pechan), worked with the MANE-VU state/local agencies and the MARAMA staff to resolve QA issues and augment the inventories to fill data gaps in accordance with the Quality Assurance Project Plan prepared for MANE-VU. The final inventory and SMOKE and input files were finalized during January 2005.

Work on Version 2 (covering the period from April through September 2005) involved incorporating revisions requested by some MANE-VU state/local

agencies on the point, area, and onroad inventories. Work on Version 3 (completed on November 20, 2006) included additional revisions to the point, area, and onroad inventories as requested by some states. Thus, the Version 3 inventory for point, area, and onroad sources was built upon Versions 1 and 2. This work also included development of the biogenics inventory. In Version 3, the nonroad inventory was completely redone because of changes that the EPA made to the NONROAD2005 model. Emissions inventory data files are available on the MARAMA website at:

http://www.marama.org/visibility/EI_Projects/index.html

7.1.2 Future Year Emission Control Inventories

An inventory technical support document for these future inventories is included in Appendix E, *Development of Emission Projections for 2009, 2012 and 2018 for NonEGU Point, Area, and Nonroad Sources in the MANE-VU Region* of this document and explains the data sources, methods, and results for future year emission forecasts for three years; four emission sectors; two emission control scenarios; seven pollutants; and eleven states plus the District of Columbia. The following is a summary of the future year inventories that were developed:

The three projection years are 2009, 2012, and 2018;

1. The five source sectors are Electric Generating Units (EGUs), non-electrical generating units (non EGUs), point sources, area sources, and nonroad mobile sources. MANE-VU prepared EGU projections using the Integrated Planning Model (IPM) and onroad mobile source projections using the SMOKE emission modeling system.

2. The two emission control scenarios are:

   a. A combined “on-the-books/on-the-way” (OTB/OTW) control strategy accounting for emission control regulation already in place, as well as some emission control regulations that will be instituted as a result of this SIP.

   b. A beyond on the way (BOTW) scenario to account for controls from potential new regulations that may be necessary to meet visibility and other regional air quality goals.

      (Note that these measures are described in detail in Section 10, and that emission reductions based on currently expected measures to which New York is committing are presented at the end of this section).

3. The inventories were developed for seven pollutants, which are SO_2, NO_X,

VOCs, carbon monoxide, PM_{10} – Primary (sum of the filterable and condensable components), $PM_{2.5}$ – Primary (sum of the filterable and condensable components), and ammonia.

4. The states are those that comprise the MANE-VU region. In addition to the District of Columbia, the other 11 MANE-VU states are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

7.2 Inventories for Specific Source Types

There are five emission source classifications in the emissions inventory as follows; Stationary point, Stationary area, Off-road mobile, On-road mobile, and Biogenic.

Stationary point sources are large sources that emit greater than a specified tonnage per year. Stationary area sources are those sources whose emissions are relatively small but due to the large number of these sources, the collective emissions could be significant (i.e., dry cleaners, service stations, agricultural sources, fire emissions, etc.). Off-road mobile sources are equipment that can move but do not generally use roadways, (i.e., lawn mowers, construction equipment, railroad locomotives, aircraft, etc.). On-road mobile sources are automobiles, trucks, and motorcycles that use the roadway system. The emissions from these sources are estimated by vehicle type and road type. Biogenic sources are natural sources like trees, crops, grasses and natural decay of plants. Stationary point sources emission data is tracked at the facility, point and process level. For all other source types, emissions are summed on the county level.

7.2.1 Stationary Point Sources

Point source emissions are emissions from large individual sources. Generally, point sources have permits to operate and their emissions are individually calculated based on source specific factors on a regular schedule. The largest point sources are inventoried annually. These are considered to be major sources having emissions of 100 tons per year (TPY) of a criteria pollutant, 25 tpy of NOx and VOC in the New York City Metropolitan Area, 10 tpy of a single hazardous air pollutant (HAP), or 25 tpy total HAPs. Emissions from smaller sources are also calculated individually but less frequently. Point sources are grouped into EGU sources and other industrial point sources, termed as non-EGU point sources.

7.2.1.1 Electric Generating Units

The base year inventory for EGU sources used 2002 continuous emissions monitoring (CEM) data reported to the EPA in compliance with the Acid Rain program or 2002 hourly emission data provided by stakeholders. These data

provide hourly emissions profiles that can be used in the modeling of emissions of SO_2 and NO_x from these large sources. Emission profiles are used to estimate emissions of other pollutants (volatile organic compounds, carbon monoxide, ammonia, fine particles) based on measured emissions of SO_2 and NO_x.

Future year inventories of EGU emissions for 2009 and 2018 were developed using the IPM model to forecast growth in electric demand and replacement of older, less efficient and more polluting power plants with newer, more efficient and cleaner units. While the output of the IPM model predicts that a certain number of older plants will be replaced by newer units to meet future electric growth and state-by-state NO_x and SO_2 caps, the State of New York did not directly rely upon the closure of any particular plant in establishing the 2018 inventory upon which the reasonable progress goals were set. This results in a conservative (higher) future year emission estimate.

7.2.1.2 Non-EGU Point Sources

The non-EGU category used annual emissions as reported for the base year 2002 in MANE-VU Version 3. These emissions were temporally allocated to month, day, and source category code (SCC) based allocation factors. The general approach for estimating future year emissions was to use growth and control data consistent with EPA's CAIR analyses. This data was supplemented with site-specific growth factors as appropriate.

7.2.2 Stationary Area Sources

Stationary area sources include sources whose individual emissions are relatively small but due to the large number of these sources, the collective emissions are significant. Some examples include the combustion of fuels for heating, dry cleaners, and service stations. Emissions are estimated by multiplying an emission factor by some known indicator of collective activity, such as fuel usage, or number of households or population. The general approach for estimating future year emissions was to use growth and control data consistent with EPA's CAIR analyses. This data was supplemented with state-specific growth factors as appropriate.

7.2.3 Off-Road Mobile Sources

Off-road mobile sources are equipment that can move but do not use the roadways, such as construction equipment, aircraft, railroad locomotives, and lawn and garden equipment. For the majority of the off-road mobile sources, the emissions for base year 2002 were estimated using the EPA's nonroad model. The nonroad model assumes that a certain number of off-road sources will be replaced every year by newer, less polluting vehicles that meet the new EPA standards for off-road sources. These lower emissions have been built into the 2018 inventory as well as the benefits received from lower sulfur gasoline in off-road vehicles. Aircraft engines, railroad locomotives and commercial marine

vessels are not included in the nonroad model.

7.2.4 Highway Mobile Sources

For on-road vehicles, EPA's MOBILE6.2 was used to estimate emissions. For future year emissions the MOBILE6.2 model considers that a certain number of the vehicle fleet in each State will be replaced every year by newer, less polluting vehicles that meet the California Low Emission Vehicle standards promulgated by New York State as 6NYCRR Part 218. These lower emissions have been built into the 2018 inventory as well as the benefits received from lower sulfur gasoline in on-road diesel and gasoline vehicles and the 2007 heavy-duty diesel standards. All new mobile source measures and standards, as well as any benefits from implementation of individual State Inspection and Maintenance programs, were used in developing the 2018 inventory.

7.2.5 Biogenic Emission Sources

Biogenic emissions were estimated using SMOKE-BEIS3 (Biogenic Emission Inventory System 3 version 0.9) preprocessor. Further information on Biogenic emissions estimation is contained in the modeling section of this document.

7.3 Emission Processor Selection and Configuration (SMOKE)

The mass emissions inventory files were converted to the National Emissions Inventory Input Format Version 3.0. The modeling inventory files were processed in Sparse Matrix Operator Kernel Emissions/Inventory Data Analyzer (SMOKE). The SMOKE Processing System was selected for the modeling analysis. SMOKE is principally an emissions processing system, as opposed to a true emissions inventory preparation system, in which emissions estimates are simulated from "first principles." This means that, with the exception of mobile and biogenic sources, its purpose is to provide an efficient, modern tool for converting emissions inventory data into the formatted emissions files required for a photochemical air quality model. Inside the MANE-VU region, the modeling inventories were processed by the Department using the SMOKE (Version 2.1) processor to provide inputs for the CMAQ model. A detailed description of all SMOKE input files such as area, mobile, fire, point and biogenic emissions files and the SMOKE model configuration are provided in the *Technical Support Document on Agricultural and Forestry Smoke Management in the MANE-VU Region*, Appendix I. The MANE-VU member states selected several control strategies for inclusion in the modeling. Emission reduction requirements mandated by the Clean Air Act were also included in projecting future year emissions. In addition, Section 51.308(d)(3)(v)(D) requires the State of New York to consider source retirement and replacement schedules in developing the future inventories and long-term strategy.

7.4 Sources of Visibility Impairing Pollutants in MANE-VU

This section explores the origin and quantity of haze-forming pollutants emitted in the eastern and the mid-Atlantic United States. Section 51.308(d)(4)(v) of EPA's Regional Haze Rule requires a statewide emission inventory of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any mandatory Class I area. The pollutants that affect fine particle formation, and thus contribute to regional haze, are sulfur oxides (SO_X), nitrogen oxides (NO_X), volatile organic compounds (VOC), and ammonia (NH_3). Particles with an aerodynamic diameter less than or equal to 10 and 2.5 µm (i.e., primary PM_{10} and $PM_{2.5}$) can be directly emitted from various sources.

The emissions dataset illustrated below is the 2002 MANE-VU Version 2 regional haze emissions inventory. The emission inventories include carbon monoxide (CO), but it is not considered here as it does not contribute to regional haze. The MANE-VU regional haze emissions inventory version 3.0, released in April 2006, has superseded version 2.0 for modeling purposes. This inventory update was developed through the Mid-Atlantic Regional Air Management Association (MARAMA) for the MANE-VU RPO. The trends among recent emission inventories presented here use the 1996 EPA NET and 1999 NEI and Version 2 of the MANE-VU inventory. This section describes emission characteristics by pollutant and source type (e.g., point, area, and mobile).

7.5 Emission Inventory Characteristics

This section reviews trends in emissions of SO_2, VOC, NO_x, PM and ammonia. The trends among recent emission inventories presented here use the 1996 EPA NET and 1999 NEI and Version 3.0 of the 2002 MANE-VU inventory.[1] This section describes emission characteristics by pollutant and source type (e.g., point, area, and mobile). As described later, this data was superseded by more up-to-date data for modeling purposes, but this data shows trends in emissions.

[1] EPA's Emission Factor and Inventory Group (EFIG) (EPA/OAR (Office of Air and Radiation)/OAQPS (Office of Air Quality Planning and Standards)/EMAD (Emissions, Monitoring and Analysis Division) prepares a national database of air emissions information with input from numerous state and local air agencies, from tribes, and from industry. This database contains information on stationary and mobile sources that emit criteria air pollutants and their precursors, as well as hazardous air pollutants (HAPs). The database includes estimates of annual emissions, by source, of air pollutants in each area of the country on an annual basis. The NEI includes emission estimates for all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands. Emission estimates for individual point or major sources (facilities), as well as county level estimates for area, mobile and other sources, are available currently for years 1985 through 1999 for criteria pollutants, and for years 1996 and 1999 for HAPs. Data from the NEI help support air dispersion modeling, regional strategy development, setting regulation, air toxics risk assessment, and tracking trends in emissions over time. For emission inventories prior to 1999, the National Emission Trends (NET) database maintained criteria pollutant emission estimates and the National Toxics Inventory (NTI) database maintained HAP emission estimates. Beginning with 1999, the NEI began preparing criteria and HAP emissions data in a more integrated fashion to take the place of the NET and the NTI.

7.5.1 Sulfur Dioxide (SO_2)

SO_2 is the primary precursor pollutant for sulfate particles. Sulfate particles commonly account for more than 50 percent of particle-related light extinction at northeastern Class I areas on the clearest days and for as much as or more than 80 percent on the haziest days. Hence, SO_2 emissions are an obvious target of opportunity for reducing regional haze in the eastern United States. Combustion of coal and, to a lesser extent, of certain petroleum products accounts for most anthropogenic SO_2 emissions. In fact, in 1998 a single source category, coal-burning power plants, was responsible for two-thirds of total SO_2 emissions nationwide (NESCAUM, 2001a). Figure 7-1 shows SO_2 emissions trends in the MANE-VU states extracted from the NEI for the years 1996, 1999, and the 2002 MANE-VU inventory (EPA 2005 and MARAMA, 2004).

Most of the states (with the exception of Maryland) show declines in year 2002 annual SO_2 emissions as compared to 1996 emissions. Some of the states show an increase in 1999 followed by a decline in 2002 and others show consistent declines throughout the entire period. The upward trend in emissions after 1996 probably reflects electricity demand growth during the late 1990s combined with the availability of banked emissions allowances from initial over-compliance with control requirements in Phase 1 of the EPA Acid Rain Program. This led to relatively low market prices for allowances later in the decade, which encouraged utilities to purchase allowances rather than implement new controls as electricity output expanded.

The observed decline in the 2002 SO_2 emissions inventory reflects implementation of the second phase of the EPA Acid Rain Program, which in 2000 further reduced allowable emissions and extended emissions limits to more power plants. Figure 7-2 shows the percent contribution from different source categories to overall, annual 2002 SO_2 emissions in the MANE-VU states. The chart shows that point sources dominate SO_2 emissions, which primarily consist of stationary combustion sources for generating electricity, industrial energy, and heat. Smaller stationary combustion sources called “area sources” (primarily commercial and residential heating, and smaller industrial facilities) are another important source category in the MANE-VU states. By contrast, on-road and non-road mobile sources make only a relatively small contribution to overall SO_2 emissions in the region (NESCAUM, 2001).

Figure 7-1 - State Level Sulfur Dioxide Emissions

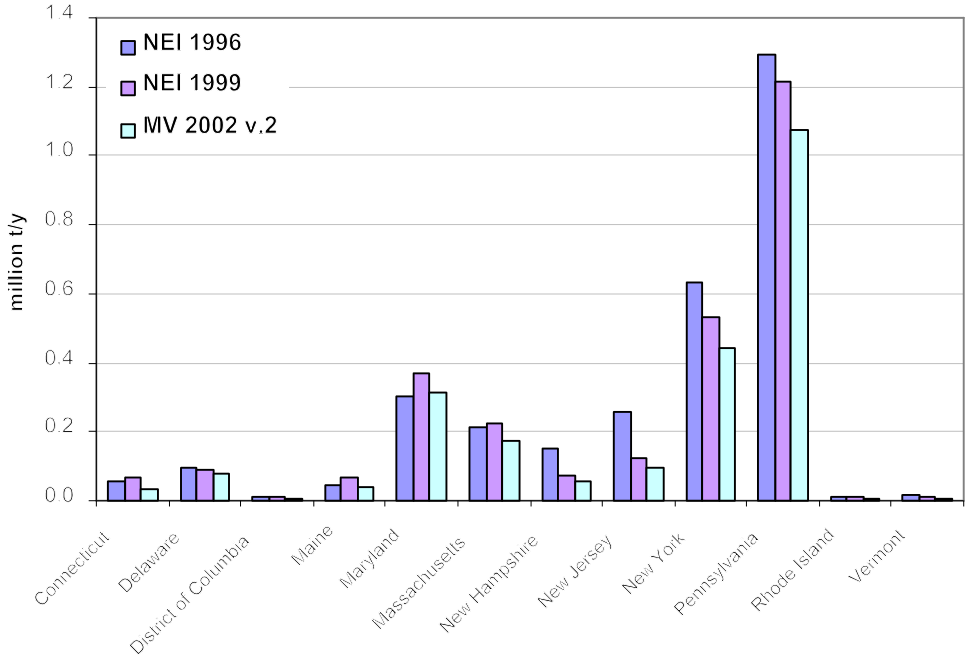
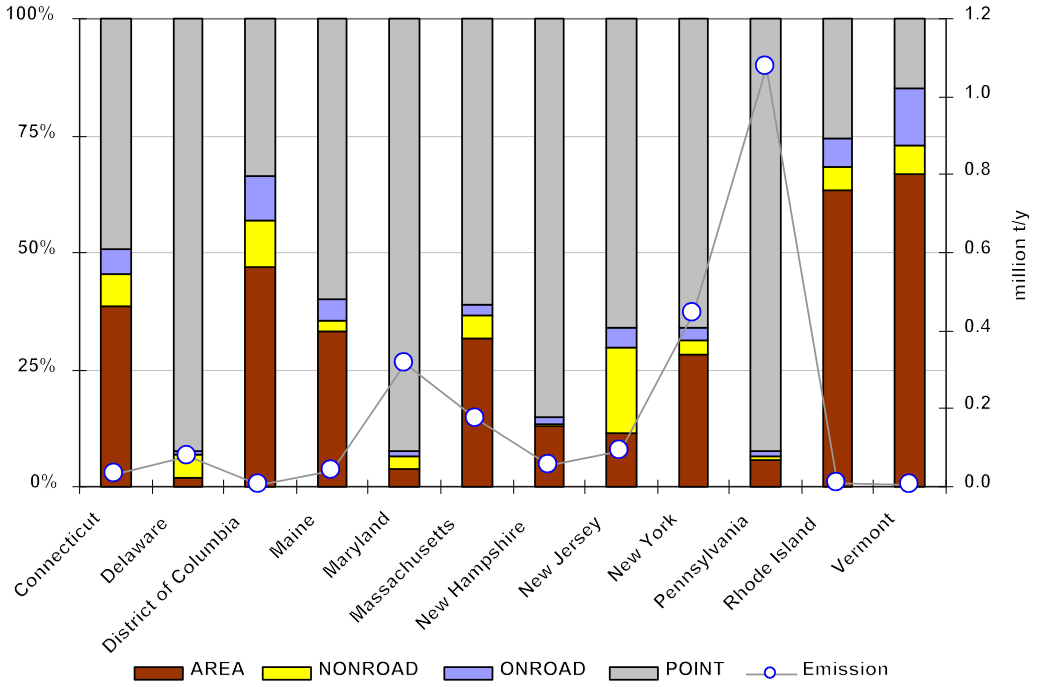


Figure 7-2 - 2002 SO_2 Emissions (Bar graph: Percentage fraction of four source categories, Circle: Annual emissions amount in million (10^6) tons per year)



7.5.2 Volatile Organic Compounds (VOCs)

Existing emission inventories generally refer to “volatile organic compounds” (VOCs) as hydrocarbons whose volatility in the atmosphere makes them particularly important from the standpoint of ozone formation. From a regional haze perspective, there is less concern with the volatile organic gases emitted directly to the atmosphere and more with the secondary organic aerosol (SOA) that the VOCs form after condensation and oxidation processes. Thus, the VOC inventory category is of interest primarily from the organic carbon perspective of $PM_{2.5}$. After sulfate, organic carbon generally accounts for the next largest share of fine particle mass and particle-related light extinction at northeastern Class I sites. The term organic carbon encompasses a large number and variety of chemical compounds that may come directly from emission sources as a part of primary PM or may form in the atmosphere as secondary pollutants. The organic carbon present at Class I sites includes a mix of species, including pollutants originating from anthropogenic (i.e., manmade) sources as well as biogenic hydrocarbons emitted by vegetation. Recent efforts to reduce manmade organic carbon emissions have been undertaken primarily to address summertime ozone formation in urban centers. Future efforts to further reduce organic carbon emissions may be driven by programs that address fine particles and visibility. These efforts are discussed in Section 10 of this document.

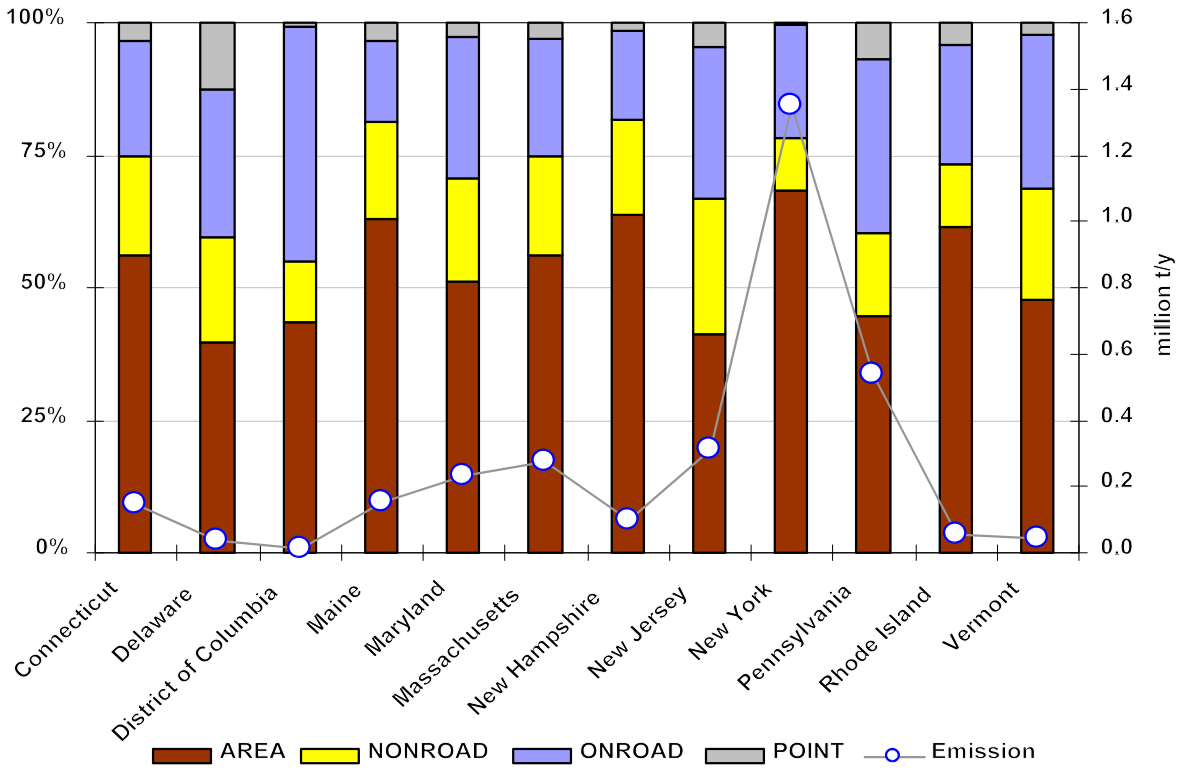
Understanding the transport dynamics and source regions for organic carbon in northeastern Class I areas is likely to be more complex than for sulfate. This is partly because of the large number and variety of organic carbon (OC) species, the fact that their transport characteristics vary widely, and the fact that a given species may undergo numerous complex chemical reactions in the atmosphere. Thus, the organic carbon contribution to visibility impairment at most Class I sites in the East is likely to include manmade pollution transported from a distance, manmade pollution from nearby sources, and biogenic emissions, especially terpenes from coniferous forests.

As shown in Figure 7-3, the VOC inventory is dominated by mobile and area sources. On-road mobile sources of VOCs include exhaust emissions from gasoline passenger vehicles and diesel-powered heavy-duty vehicles as well as evaporative emissions from transportation fuels. VOC emissions may also originate from a variety of area sources (including solvents, architectural coatings, and dry cleaners) as well as from some point sources (e.g., industrial facilities and petroleum refineries).

Biogenic VOCs may play an important role within the rural settings typical of Class I sites. The oxidation of hydrocarbon molecules containing seven or more carbon atoms is generally the most significant pathway for the formation of light-scattering organic aerosol particles (Odum et al., 1997). Smaller reactive hydrocarbons that may contribute significantly to urban smog (ozone) are less likely to play a role in organic aerosol formation, though it was noted that high ozone levels can have an indirect effect on visibility by promoting the oxidation of

other available hydrocarbons, including biogenic emissions (NESCAUM, January 2001). In short, further work is needed to characterize the organic carbon contribution to regional haze in the Northeast and Mid-Atlantic states and to develop emissions inventories that will be of greater value for visibility planning purposes.

Figure 7-3 - 2002 VOC Emissions (Bar graph: Percentage fraction of four source categories, Circle: Annual emissions in 10^6 tons per year)



7.5.3 Oxides of Nitrogen (NO_X)

NO_X emissions contribute to visibility impairment in the eastern U.S. by forming light-scattering nitrate particles. Nitrates generally account for a substantially smaller fraction of fine particle mass and related light extinction than sulfates and organic carbon at northeastern Class I sites. Notably, nitrates may play a more important role at urban sites and in the wintertime. In addition, NO_X may have an indirect effect on summertime visibility by virtue of its role in the formation of ozone, which in turn promotes the formation of secondary organic aerosols (NESCAUM 2001a). Figure 7-4 shows NO_X emissions in the MANE-VU region at the state level. Since 1980, nationwide emissions of NO_X from all sources have shown little change. In fact, emissions increased by 2 percent between 1989 and 1998 (EPA, 2000a). This increase is most likely due to industrial sources and the transportation sector, as power plant combustion sources have implemented

modest emissions reductions during the same time period. Most states in the MANE-VU region experienced declining NO_X emissions from 1996 through 2002, except Massachusetts, Maryland, New York, and Rhode Island, which show an increase in NO_X emissions in 1999 before declining to levels below 1996 emissions in 2002. Power plants and mobile sources generally dominate state and national NO_X emissions inventories. Nationally, power plants account for more than one-quarter of all NO_X emissions, amounting to more than six million tons. The electric sector plays an even larger role, however, in parts of the industrial Midwest where high NO_X emissions have a particularly significant power plant contribution. By contrast, mobile sources dominate the NO_X inventories for more urbanized Mid-Atlantic and New England states to a far greater extent, as shown in Figure 7-5. In these states, on-road mobile sources - a category that mainly includes highway vehicles - represent the most significant NO_X source category. Emissions from non-road (i.e., off-highway) mobile sources, primarily diesel-fired engines, also represent a substantial fraction of the inventory. While there are fewer uncertainties associated with available NO_X estimates than in the case of other key haze-related pollutants - including primary fine particle and ammonia emissions - further efforts could improve current inventories in a number of areas (NESCAUM, 2001a).

In particular, better information on the contribution of area and non-highway mobile sources may be of most interest in the context of regional haze planning. First, available emission estimation methodologies are weaker for these types of sources than for the large stationary combustion sources. Moreover, because SO_2 and NO_X emissions must mix with ammonia to participate in secondary particle formation, emissions that occur over large areas at the surface may be more efficient in secondary fine particulate formation than concentrated emissions from isolated tall stacks (Duyzer, 1994).

Figure 7-4 - State Level Nitrogen Oxides Emissions

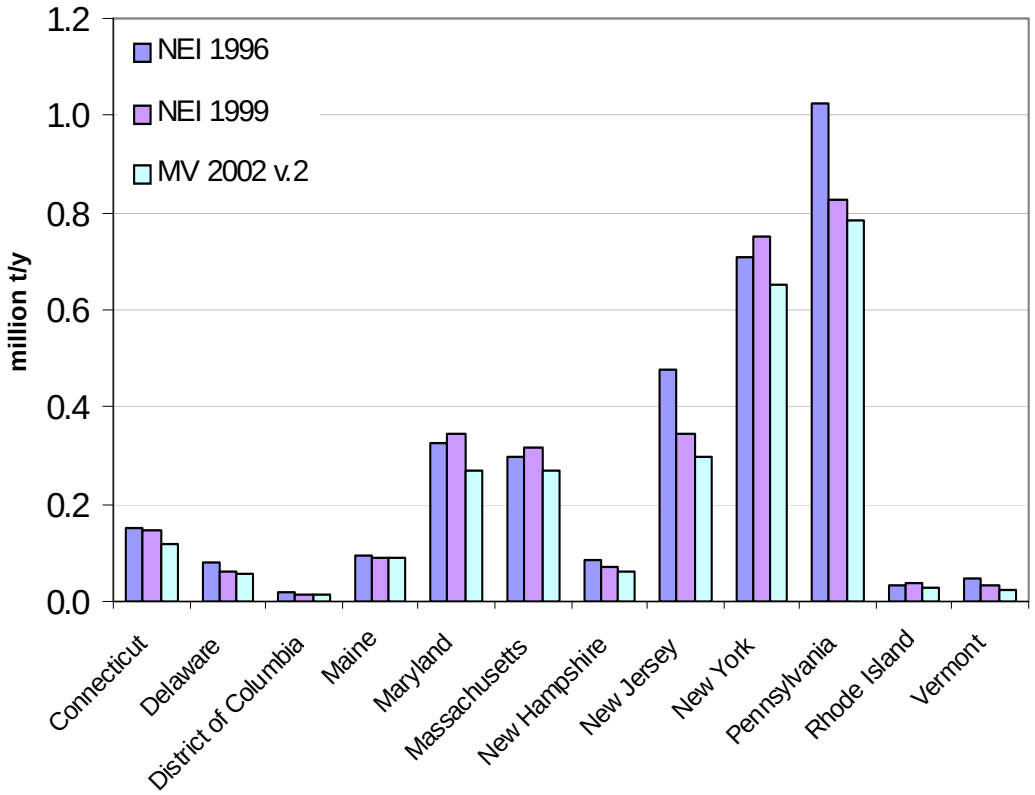
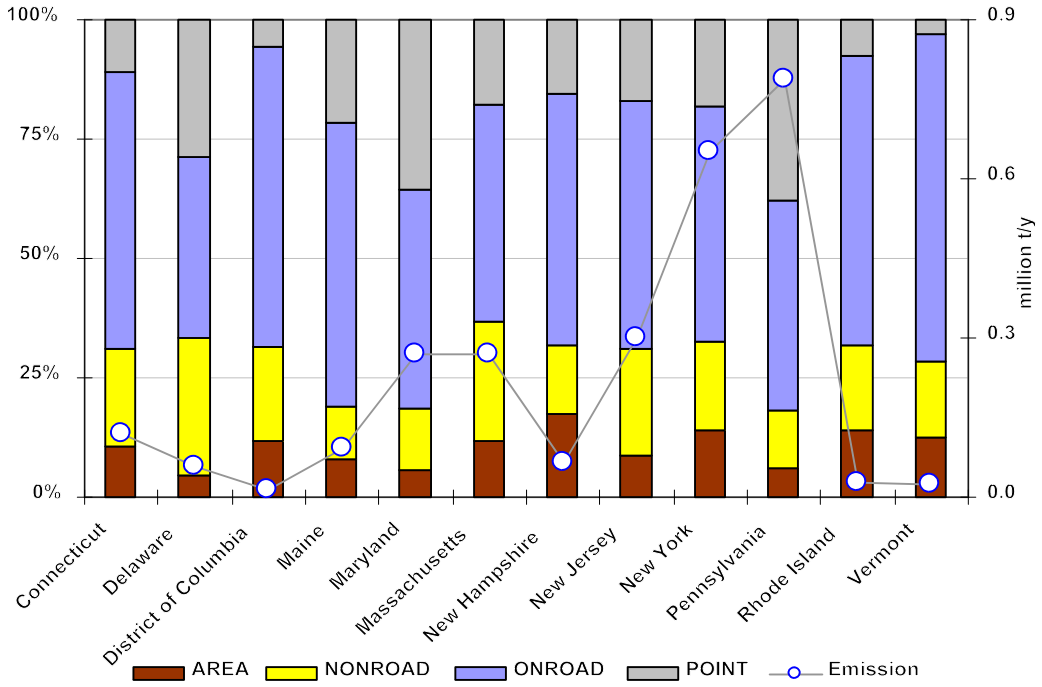


Figure 7-5 - 2002 NO_x Emissions (Bar graph: Percentage fraction of four source categories, Circle: Annual emissions amount in 10^6 tons per year)



7.5.4 Primary Particulate Matter (PM_{10} and $PM_{2.5}$)

Directly-emitted or "primary" particles (as distinct from secondary particles that form in the atmosphere through chemical reactions involving precursor pollutants like SO_2 and NO_X) can also contribute to regional haze. For regulatory purposes, a distinction is made between particles with an aerodynamic diameter less than or equal to 10 micrometers and smaller particles with an aerodynamic diameter less than or equal to 2.5 micrometers (i.e., primary PM_{10} and $PM_{2.5}$, respectively). Figure 7-6 and Figure 7-7 show PM_{10} and $PM_{2.5}$ emissions for the MANE-VU states for the years 1996, 1999, and 2002. Note that for PM_{10} the inventory values are drawn from the 2002 NEI. Most states show a steady decline in annual PM_{10} emissions over this time period.

By contrast, emission trends for primary $PM_{2.5}$ are more variable. Crustal sources are significant contributors of primary PM emissions. This category includes fugitive dust emissions from construction activities, paved and unpaved roads, and agricultural tilling. Typically, monitors estimate PM_{10} emissions from these types of sources by measuring the horizontal flux of particulate mass at a fixed downwind sampling location within perhaps 10 meters of a road or field. Comparisons between estimated emission rates for fine particles using these types of measurement techniques and observed concentrations of crustal matter in the ambient air at downwind receptor sites suggest that physical or chemical processes remove a significant fraction of crustal material relatively quickly. As a result, it rarely entrains into layers of the atmosphere where it can transport to downwind receptor locations. Because of this discrepancy between estimated emissions and observed ambient concentrations, modelers typically reduce estimates of total $PM_{2.5}$ emissions from all crustal sources by applying a factor of 0.15 to 0.25 to the total $PM_{2.5}$ emissions before including it in modeling analyses. From a regional haze perspective, crustal material generally does not play a major role. On the 20 percent best-visibility days during the baseline period (2000-2004), it accounted for six to eleven percent of particle-related light extinction at MANE-VU Class 1 sites. On the 20 percent worst-visibility days, however, crustal material generally plays a much smaller role relative to other haze-forming pollutants, ranging from two to three percent. Moreover, the crustal fraction includes material of natural origin (such as soil or sea salt) that is not targeted under the Regional Haze Rule.

Of course, the crustal fraction can be influenced by certain human activities, such as construction, agricultural practices, and road maintenance (including wintertime salting) — thus, to the extent that these types of activities are found to affect visibility at northeastern Class I sites, control measures targeted at crustal material may prove beneficial. Experience from the western United States, where the crustal component has generally played a more significant role in driving overall particulate levels, may be helpful to the extent that it is relevant in the eastern context. In addition, a few areas in the Northeast, such as New Haven, Connecticut and Presque Isle, Maine, have some experience with the control of

dust and road-salt as a result of regulatory obligations stemming from their past non-attainment status with respect to the NAAQS for PM_{10}.

Current emissions inventories for the entire MANE-VU area indicate residential wood combustion represents 25 percent of primary fine particulate emissions in the region. This implies that rural sources can play an important role in addition to the contribution from the region's many highly populated urban areas. An important consideration in this regard is that residential wood combustion occurs primarily in the winter months, while managed or prescribed burning activities occur largely in other seasons. The latter category includes agricultural field-burning activities, prescribed burning of forested areas and other burning activities such as construction waste burning. Limiting burning to times when favorable meteorological conditions can efficiently disperse resulting emissions can manage many of these types of sources.

Figure 7-8 and Figure 7-9 show that area and mobile sources dominate primary PM emissions. (The NEI inventory categorizes residential wood combustion and some other combustion sources as area sources.) The relative contribution of point sources is larger in the primary $PM_{2.5}$ inventory than in the primary PM_{10} inventory since the crustal component (which consists mainly of larger or "coarse-mode" particles) contributes mostly to overall PM_{10} levels. At the same time, pollution control equipment commonly installed at large point sources is usually more efficient at capturing coarse-mode particles.

Figure 7-6 - State Level Primary PM_{10} Emissions

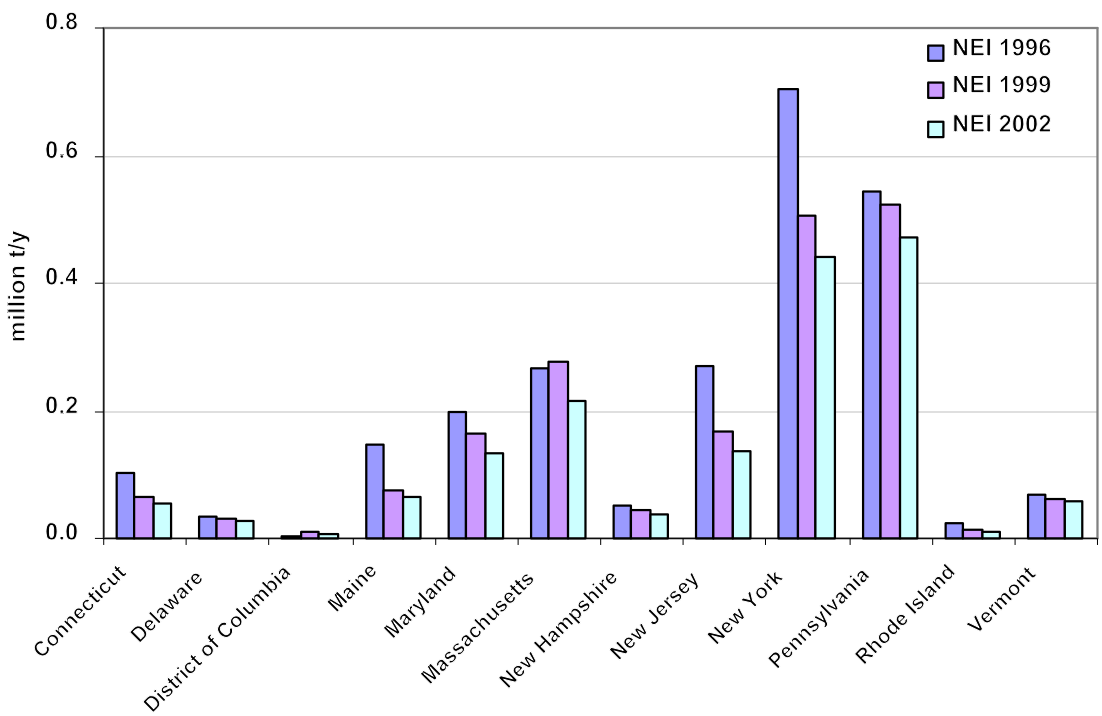


Figure 7-7 - State Level Primary $PM_{2.5}$ Emissions

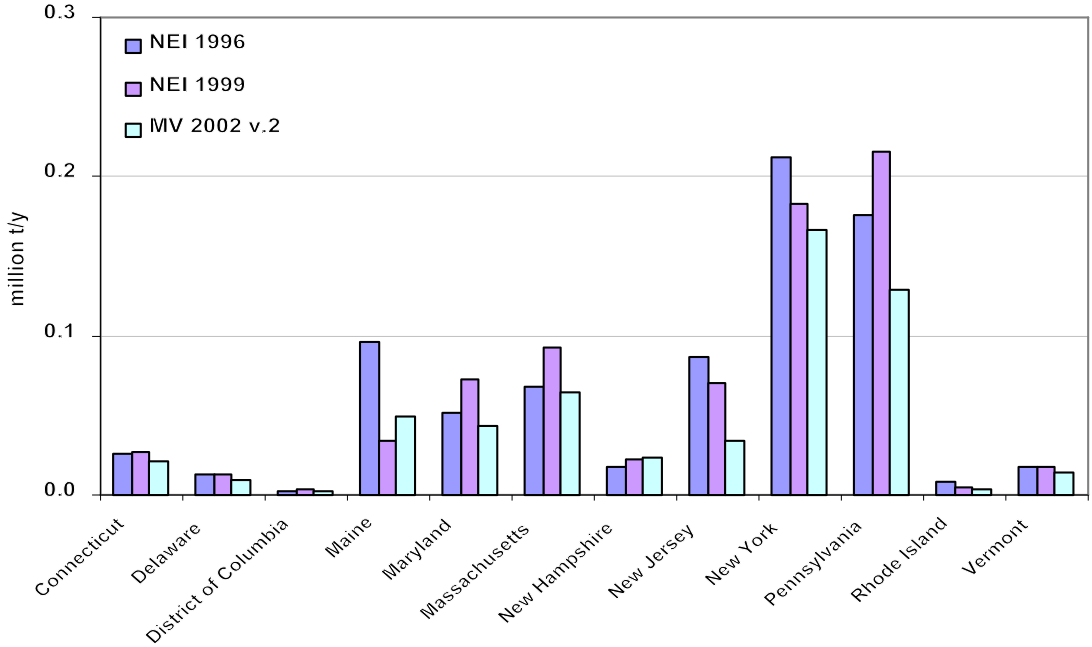


Figure 7-8 - 2002 Primary PM_{10} Emissions (Bar graph: Percentage fraction of four source categories, Circle: Annual emissions amount in 10^6 tons per year)

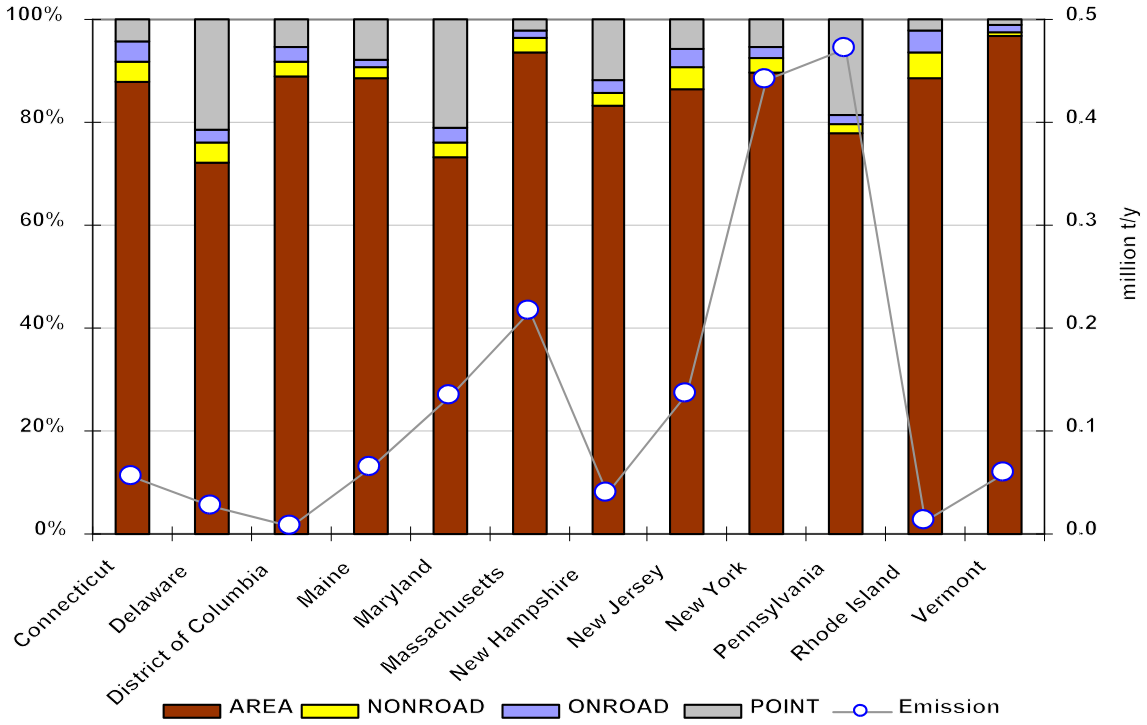
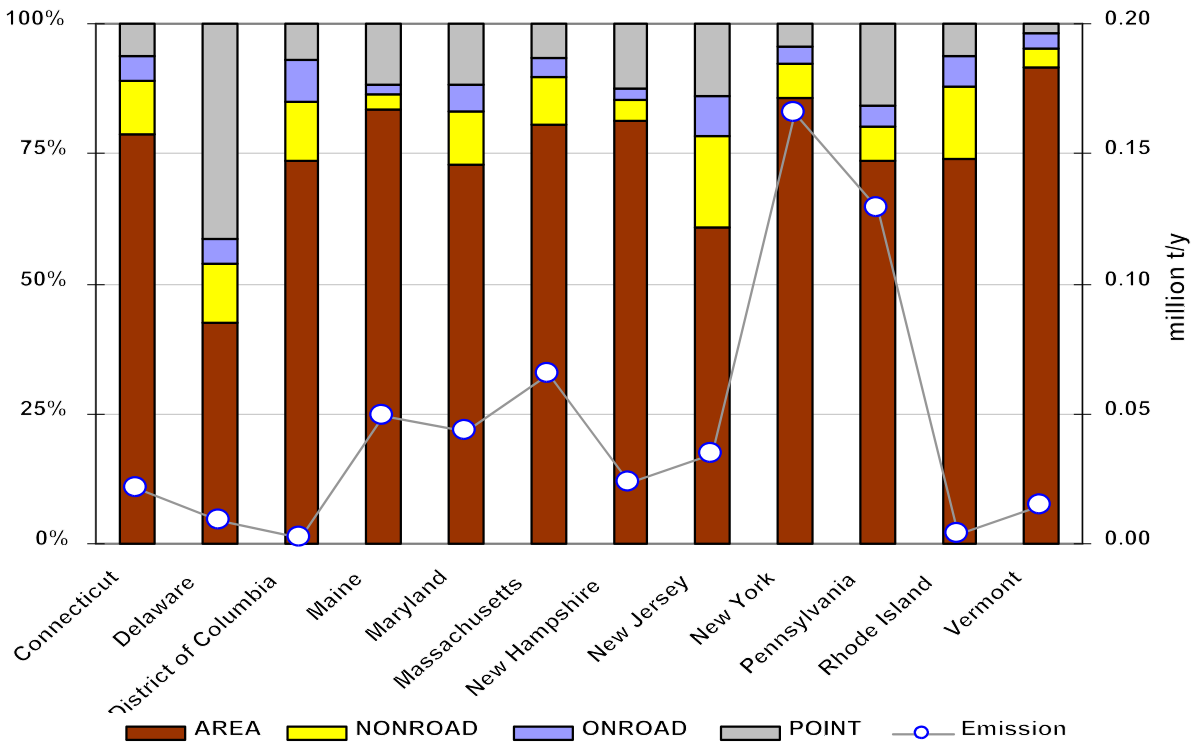


Figure 7-9 - 2002 Primary $PM_{2.5}$ Emissions (Bar graph: Percentage fraction of four source categories, Circle: Annual emissions amount in 10^6 tons per year)



7.5.5 Ammonia Emissions (NH_3)

Knowledge of ammonia emission sources will be necessary in developing effective regional haze reduction strategies because of the importance of ammonium sulfate and ammonium nitrate in determining overall fine particle mass and light scattering. Identifying emissions from ammonia sources is necessary to help develop regional haze reduction strategies. According to 1998 estimates, livestock agriculture and fertilizer use accounted for approximately 86 percent of all ammonia emissions to the atmosphere (EPA, 2000b). However, better ammonia inventory data is needed for the photochemical models used to simulate fine particle formation and transport in the eastern United States. States were not required to include ammonia in their air emissions data collection efforts until fairly recently (see consolidated emissions reporting rule, 67 FR 39602; June 10, 2002), and so it will take time for the quality of ammonia inventory data to match the quality of the data for the other criteria pollutants.

Ammonium ions (formed from ammonia emissions to the atmosphere) are an important constituent of airborne particulate matter, typically accounting for 10–20

percent of total fine particle mass. Reductions in ammonium ion concentrations can be extremely beneficial because a more-than-proportional reduction in fine particle mass can result. Ansari and Pandis (1998) showed that a one mg/m^3 reduction in ammonium ion could result in up to a four mg/m^3 reduction in fine particulate matter. Decision makers, however, must weigh the benefits of ammonia reduction against the significant role it plays in neutralizing acidic aerosols.[2]

To address the need for improved ammonia inventories, MARAMA, NESCAUM and EPA funded researchers at Carnegie Mellon University (CMU) in Pittsburgh to develop a regional ammonia inventory (Davidson et al., 1999). This study focused on three issues with respect to current emissions estimates: (1) a wide range of ammonia emission factor values, (2) inadequate temporal and spatial resolution of ammonia emissions estimates, and (3) a lack of standardized ammonia source categories.

The CMU project established an inventory framework with source categories, emissions factors, and activity data that are readily accessible to the user. With this framework, users can obtain data in a variety of formats[3] and can make updates easily, allowing additional ammonia sources to be added or emissions factors to be replaced as better information becomes available (Strader et al., 2000; NESCAUM, 2001b). Figure 7-10 shows that estimated ammonia emissions were fairly stable in the 1996, 1999, and 2002 NEI for MANE-VU states, with some increases observed for Massachusetts, New Jersey and New York. Area and on-road mobile sources dominate according to Figure 7-11. Specifically, emissions from agricultural sources and livestock production account for the largest share of estimated ammonia emissions in the MANE-VU region, except in the District of Columbia. The two remaining sources with a significant emissions contribution are wastewater treatment systems and gasoline exhaust from highway vehicles.

[2] SO_2 reacts in the atmosphere to form sulfuric acid (H_2SO_4). Ammonia can partially or fully neutralize this strong acid to form ammonium bisulfate or ammonium sulfate. If planners focus future control strategies on ammonia and do not achieve corresponding SO_2 reductions, fine particles formed in the atmosphere will be substantially more acidic than those presently observed.

[3] For example, the user will have the flexibility to choose the temporal resolution of the output emissions data or to spatially attribute emissions based on land-use data.

Figure 7-10 - State Level Ammonia Emissions

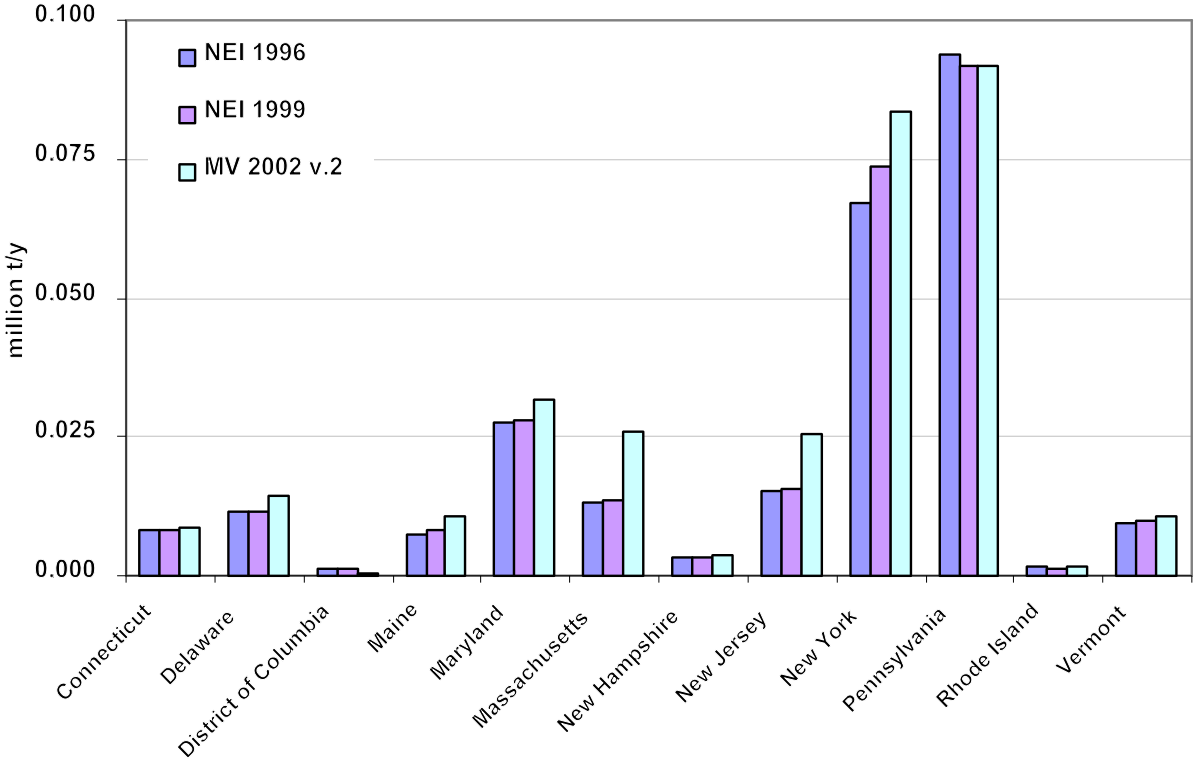
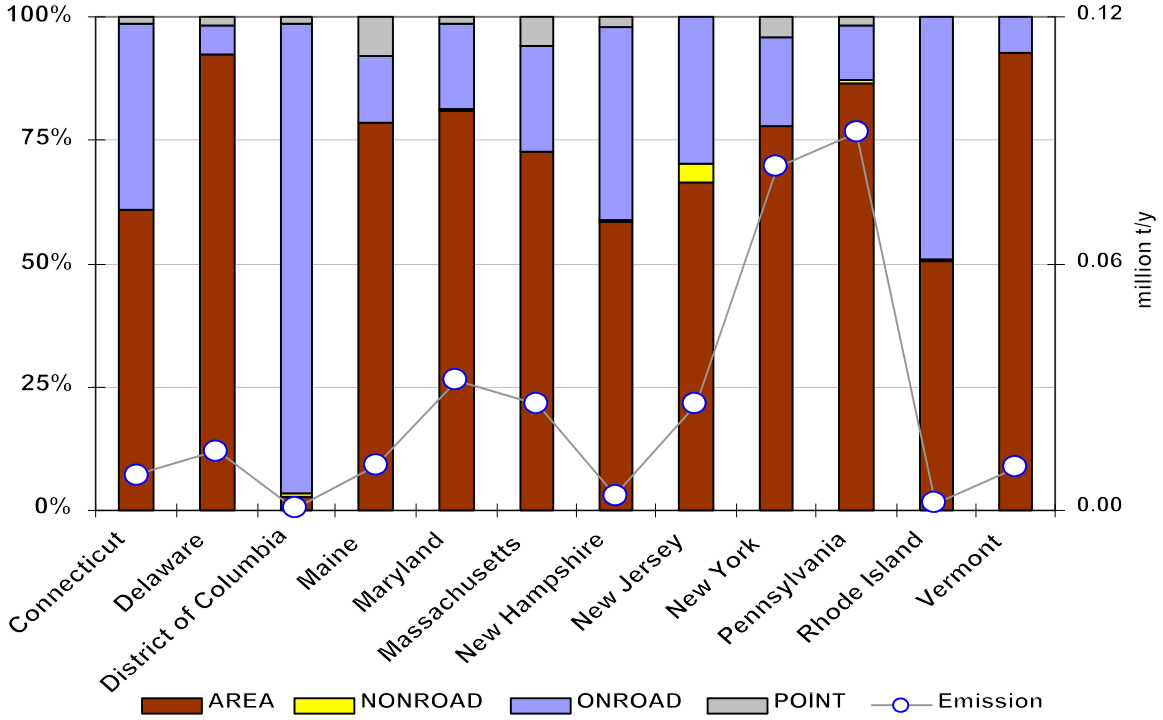


Figure 7-11 - 2002 NH_3 Emissions (Bar graph: Percentage fraction of four source categories, Circle: Annual emissions amount in 10^6 tons per year)



7.5.6 Further Discussion

Figures 7-1, 7-4, 7-6, 7-7, and 7-10 show SO2, NOx, PM10, PM2.5 and ammonia emissions trends in the MANE-VU states extracted from the NEI for the years 1996, 1999, and the 2002 MANE-VU inventory. Comparing emissions from each year, these figures provide an indication of whether there is an identifiable trend in emissions prior to the base year, as well as the ability to show the relative emissions on a state-specific basis for these three years. It is thus possible to compare the relative emissions from each state as well as to assess whether a trend in emissions is evident over this period. This information is useful in determining what air program-related changes might have been effective in influencing the levels of these pollutants in recent years, and is suggestive of what trends might be seen in the first planning period. For example, the figures related to SO2 suggests that most states show declines in year 2002 as compared tn 1996 emissions. Where it occurred. the upward trend in emissions after 1996 likely reflects electricity demand growth during the late 1990s combined with the availability of banked emissions allowances from initial overcompliance with control requirements in Phase 1 of the EPA Acid Rain Program. Understanding the material presented in these graphs if useful in determining how to project emissions and judging whether projections are reasonable. The specific interpretation of each graph is discussed in detail in the adjacent portions of section 7.

7.6 Summary of Emission Inventories

The tables below summarize the 2002 and 2018 emissions as developed by the methods described above, and used in the modeling for haze impacts through the period of this SIP. Tables 7-1 and 7-2 present the MANE-VU-wide figures, with the percent changes over the period for the entire MANE-VU region shown in Table 7-3. Likewise, Tables 7-4 and 7-5 summarize the emissions for New York State, with Table 7-6 showing the percent changes over time.

For MANE-VU, while both PM2.5 and PM10 emissions are shown to increase slightly, the emission of the precursors for particulate matter VOC, NOx and SO2 decrease significantly. With sulfate being the predominate contributor to regional haze, the reductions are dramatic, contribuing to the expected meeting of the reasonable progress goals for the Class I areas within MANE-VU.

In the case of New York's emissions, PM2.5 emissions are predicted to decrease slightly but, as is the case with MANE-VU emissions as a whole, VOC, NOx and SO2 emissions are expected to decrease significantly as well.

7.6.1 Summary of MANE-VU Emissions Inventories

Table 7-1 - MANE-VU 2002 Emissions Inventory Summary (TPY)

Sector	VOC	NOx	PM2.5	PM10	NH3	SO2
Point	97,300	673,660	55,447	89,150	6,194	1,907,634
Area	1,528,141	262,477	332,729	1,455,311	249,795	316,357
On-Road Mobile	789,560	1,308,233	22,107	31,561	52,984	40,091
Non-Road Mobile	572,751	431,631	36,084	40,114	287	57,257
Biogenics	2,575,232	28,396	-	-	-	-
TOTAL	5,562,984	2,704,397	446,367	1,616,136	309,260	2,321,339

Source: Pechan, 2006. "Technical Support Document for 2002 MANE-VU SIP Modeling Inventories, Version 3." November 2006.
Available online: http://www.marama.org/visibility/Inventory%20Summary/2002EmissionsInventory.htm

Table 7-2 - MANE-VU 2018 Emissions Inventory Summary (TPY)

Sector	VOC	NOx	PM2.5	PM10	NH3	SO2
Point	115,052	413,021	93,580	129,315	11,134	657,018
Area	1,387,882	284,535	345,419	1,614,476	341,746	305,437
On-Road Mobile	269,981	303,955	9,189	9,852	66,476	8,757
Non-Road Mobile	380,080	271,185	23,938	27,059	369	8,643
Biogenics	2,575,232	28,396	-	-	-	-
TOTAL	4,728,227	1,301,092	472,126	1,780,702	419,725	979,855

Source: MACTEC, 2007. "Development of Emission Projections for 2009, 2012, and 2018 for non-EGU Point, Area, and Nonroad Sources in the MANE-VU Region." February 28, 2007.
Available online: http://www.marama.org/visibility/Inventory%20Summary/FutureEmissionsInventory.htm
EGU Point Emissions: VISTAS_PC_If IPM Run (Alpine Geophysics, 2008)

Table 7-3 - Change in MANE-VU Emissions 2002 to 2018 (*Percent)

Sector	VOC	NOx	PM2.5	PM10	NH3	SO2
Point	18.2	-38.7	68.8	45.1	79.8	-65.6
Area	-9.2	8.4	3.8	10.9	36.8	-3.4
On-Road Mobile	-65.8	-76.8	-58.4	-68.8	25.5	-78.2
Non-Road Mobile	-33.6	-37.2	-33.7	-32.5	28.6	-84.9
Biogenics	0.0	0.0	--	--	--	--
TOTAL	-15.0	-51.9	5.8	10.2	35.7	-57.8

*Negative percent indicates a decrease in emissions

7.6.2 Summary of New York 2002 Emissions Inventories

Table 7-4 - New York 2002 Emissions Inventory Summary (TPY)

Sector	CO	NOx	VOC	NH3	SO2	PM10	PM25
Area	356,287	98,804	514,425	67,422	113,978	369,595	85,841
Point	53,563	584,450	134,363	1,861	686,426	10,326	25,075
Nonroad	1,205,509	119,808	158,121	79	13,288	9,605	9,000
Onroad	2,942,730	313,888	179,731	14,439	10,229	7,599	5,402
Biogenic	63,436	8,313	492,483	-	-	-	-
Totals	4,621,525	1,125,263	1,479,123	83,801	823,921	397,125	125,318

Source: NOx, SO2 and PM2.5: NYSDEC's Proposed PM2.5 Attainment Demonstration (May 2008)
CO and VOC :NYSDEC's Proposed 8-Hour Ozone Attainment Demonstration (Feb 2008)
Others: MACTEC, 2007. "Development of Emission Projections for 2009, 2012, and 2018 for non-EGU Point, Area, and Nonroad Sources in the MANE-VU Region." February 28, 2007.
Available online: http://www.marama.org/visibility/Inventory%20Summary/FutureEmissionsInventory.htm

7.6.3 Summary of New York 2018 Emissions Inventories

Table 7-5 - New York 2018 Emissions Inventory Summary (TPY)

Sector	CO	NOx	VOC	NH3	SO2	PM10	PM25
Area	307,659	108,444	457,421	96,078	141,408	392,027	86,422
Point	101,118	55,681	13,091	2,767	118,936	17,062	13,460
Nonroad	1,474,727	72,400	104,562	103	1,686	5,830	5,349
Onroad	1,694,820	78,365	68,104	19,167	1,794	2,775	2,542
Biogenic	63,436	8,313	492,483	--	--	--	--
Totals	3,641,760	323,203	1,135,571	118,115	263,824	417,694	107,773

Source: MACTEC, 2007. "Development of Emission Projections for 2009, 2012, and 2018 for non-EGU Point, Area, and Nonroad Sources in the MANE-VU Region." February 28, 2007.
Available online: http://www.marama.org/visibility/Inventory%20Summary/FutureEmissionsInventory.htm

Table 7-6 - Change in New York Emissions 2002 to 2018 (*Percent)

Sector	CO	NOx	VOC	NH3	SO2	PM10	PM25
Area	-13.6	9.8	-11.1	42.5	24.1	6.1	0.7
Point	88.8	-90.5	-90.3	48.7	-82.7	65.2	-46.3
Nonroad	22.3	-39.6	-33.9	30.4	-87.3	-39.3	-40.6
Onroad	-42.4	-75.0	-62.2	32.7	-82.5	-63.5	-52.9
Biogenic	0.0	0.0	0.0	--	--	--	--
Totals	-21.2	-71.3	-23.2	40.9	-68.0	5.2	-14.0

*Negative percent indicates a decrease in emissions

8.0 Best Available Retrofit Technology (BART) Requirements

As mandated by 40 CFR Section 51.308(e), the State of New York, along with other states, is required to submit an implementation plan containing emission limitations representing BART and schedules for compliance with BART for each BART-eligible source that may reasonably be anticipated to cause or contribute to any impairment of visibility in any Class I Federal area. BART requirements are intended to reduce emissions specifically from large sources that, due to age, were exempted from new source performance standards (NSPS) requirements of the Clean Air Act. BART controls must be implemented unless the Department demonstrates that an emissions trading program or other alternative will achieve greater reasonable progress toward natural visibility conditions.

New York State, with the help of the MANE-VU Regional Planning Organization, has developed a strategy to implement the requirements of BART that includes the adoption of a state rule that will contain the requirements for BART controls. BART-eligible sources and the associated control requirements will be identified as a result of the promulgation of this rule, which will also define the applicability of BART controls, include provisions for a schedule by which controls must be installed, and provide for the establishment of enforceable permit conditions and limits to ensure compliance.

8.1 BART and the Clean Air Interstate Rule

The BART-eligible electricity generating units (EGUs) in MANE-VU represent the largest emissions reduction potential among the various BART-eligible source categories. The population of BART-Eligible EGUs within the MANE-VU domain can be broadly divided into four groups.

- CAIR States (year-round): Those in states eligible for participation in the EPA Clean Air Interstate Rule (CAIR) program on a year round basis (Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania for SO2 and NOx), and
- CAIR States (seasonal): Those in states that participate in the seasonal CAIR program only (Connecticut and Massachusetts for summertime NOx), and
- Opt-out States: Those in states that are not eligible to participate in the annual CAIR program and choose not to participate in the seasonal CAIR program (Rhode Island and New Hampshire), and
- Non-CAIR States: Those in states which are not eligible to participate in the CAIR program (Maine and Vermont).

EPA determined that the application of CAIR will satisfy BART for those EGUs in states that participated in the CAIR program. The reason for this is that EPA contends that CAIR will achieve reductions that are “better-than-BART.” EPA

supported this position in the final BART rule, detailed in Appendix O: *Supplemental Air Quality Modeling Technical Support Document (TSD) for the Clean Air Interstate Rule (CAIR), May 2004*. This applied for all BART-eligible EGUs in Pennsylvania, Delaware, Maryland, the District of Columbia, New Jersey, and New York. Those EGUs located in Connecticut and Massachusetts were also included in the CAIR program, but only with respect to their emissions of ozone season NOx.

Though New York implemented (CAIR) through the promulgation of 6 NYCRR Parts 243, 244 and 245, it is requiring BART-eligible EGU's to undergo a BART determination in accordance with the provisions of the federal BART Rule (see Section 8.3). Given that EPA will be required to revise its rules to respond to the CAIR remand, performing the BART determinations at this time will complete this requirement and not make it subject to another BART review after EPA responds to the CAIR remand.

The BART Guidelines (40 CFR Appendix Y) provide criteria for determining if other programs will produce reductions equivalent to BART. These criteria, sometimes referred to as the "better-than-BART-test," consist of:

- A determination if the geographic distribution of emissions reductions from the two programs is expected to be similar, the comparison can be made based on emissions alone, or

- If the distribution of emissions reductions is anticipated to be significantly different, then a two-pronged visibility improvement test is employed. The first prong is that the alternative program must not result in a degradation of visibility at any Class I area. The second prong is that the alternative program must result in greater visibility improvement overall, based on an average across all affected Class I areas.

Section (e)(2) of the Regional Haze Rule provides that a state may opt to implement an emissions trading program or other alternative measure rather than to require sources subject to BART to install, operate and maintain BART. To do so, the State must demonstrate that this emissions trading program or other alternative measure will achieve greater reasonable progress than would be achieved through the installation and operation of BART. To make this demonstration, the State must submit an implementation plan containing the elements listed in Section (e)(2).

8.2 Large Electrical Generating Units

Under 40 CFR §51.308(e)(1)(i)(B) of the Regional Haze Rule, the determination of BART for fossil fuel fired power plants having a total generating capacity of greater than 750 megawatts must be made pursuant to the guidelines of

Appendix Y of this part of the CFR (Guidelines for BART Determinations under the Regional Haze Rule). The EPA adopted those guidelines on July 6, 2005. The guidelines provide a process for making BART determinations that States can use in implementing the regional haze BART requirements on a source-by-source basis, as provided in 40 CFR 51.308(e)(1). States must follow the guidelines in making BART determinations on a source-by-source basis for power plants of greater than 750 megawatts (MW) but are not required to use the process in the guidelines when making BART determinations for other types of sources.

8.3 The Federal BART Rule

The EPA finalized the federal BART facility-by-facility requirements of the Regional Haze Rule on June 15, 2005. The BART program requires states to develop an inventory of sources within each state or tribal jurisdiction that would be eligible for controls as described above. The rule contains elements that:

- Outline methods to determine if a source is eligible for the application of controls
- Outline methods to determine if these sources are "reasonably anticipated to cause or contribute to haze"
- Define the methodology for conducting BART control analysis
- Provide presumptive limits for electricity generating units (EGUs) larger than 750 Megawatts, and
- Provide a justification for the use of the Clean Air Interstate Rule (CAIR) as BART for CAIR affected EGUs.

The first step in the BART process is identifying sources that are "BART-eligible." BART-eligible sources are those that:

- Fall into one of 26 specific source categories identified in the Clean Air Act;
- Have units that were in existence on August 7, 1977, but had not been in operation for more than fifteen years as of that date (prior to August 7, 1962); and
- Have a potential to emit (PTE) 250 tons per year (TPY) or more of any single visibility impairing pollutant. These pollutants include SO_2, NOx, VOCs, PM_{10} and ammonia. States are allowed flexibility in addressing ammonia and VOC sources. New York State has chosen not to include controls for ammonia and VOC's as a part of its BART and regional haze programs.

Many facilities in the MANE-VU region that were potentially BART-eligible were relatively small emission sources with potential emissions that exceed the statutory threshold of 250 tons per year or more, but with actual emissions of

visibility impairing pollutants of well under 250 tons in any year. Facilities such as these can accept a permit limitation, restricting their emissions to less than 250 tons per year. Any otherwise BART-eligible facility may “cap-out” of BART. New York will provide for this through the placement of emission restrictions in each facility’s Title V permit. Figure 8-1 shows tentative NYS BART sources.

According to 40 CFR §51.308(e)(1)(ii)(C) of the Regional Haze Rule, states are not required to make a determination of BART for SO2 or for NOx if a BART eligible source has the potential to emit less than 40 tons per year of such pollutants, or for PM10 if a BART eligible source emits less than 15 tons per year of such pollutant.

As allowed by 40 CFR §51.308(e)(1)(iii) of the Regional Haze Rule, if it is determined in establishing BART that technological or economic limitations exist on the applicability of measurement methodology to a particular source which would make the imposition of an emission standard infeasible, a design, equipment, work practice, or other operational standard, or combination thereof, requiring the application of BART may be proposed by the facility owner. Such standard, to the degree possible, is to set forth the emission reduction to be achieved by implementation of such design, equipment, work practice or operation, must provide for compliance by means which achieve equivalent results, and must be approved by the Department.

Once a source is found to be “eligible” under the BART program, states must determine if that facility causes or contributes to the formation of haze at any Class I area. Three methods can be used to determine if a source reasonably causes or contributes to regional haze in any Class I area, including:

- Individual source assessment (Exemption Modeling) – This assessment uses CALPUFF or other EPA approved modeling methods. Results of modeling would be compared to natural background conditions. The EPA defined “cause” as an impact of 1.0 deciview or more and “contribute” as an impact of 0.5 deciview or more. However, states have the discretion to set lower thresholds for contribution.

- Cumulative assessment of all BART "eligible sources” – Under this approach, all eligible sources can be determined to be subject to BART. This method could also be used to analyze an area’s contribution to visibility impairment and demonstrate that no sources are subject, based on cumulative modeling.

- Assessment based on model plants – This assessment allows states to exempt sources with common characteristics that are determined not to impair visibility at Class I areas.

The EPA provided the states with a great deal of flexibility in implementing the BART program. The Department's BART rule will provide for the assessment of individual source contributions (Option 1 above). New York has preliminarily identified several sources that are considered to be "BART-eligible" based on modeling conducted by MANE-VU. However, New York's BART rule is expected to provide source owners with the opportunity to conduct "exemption modeling" that demonstrates that the candidate sources do not cause or contribute to visibility impairment in Class I areas. The criteria (i.e., threshold by deciview) by which a source may be shown to cause or contribute are also a part of New York's draft rule.

Owners of sources that have been identified as BART-eligible, and have been found to cause or contribute to haze in a Class I area, must conduct an engineering review to determine if the installation of new control requirements is appropriate. This review must take into consideration five factors:

- Cost
- Energy and non-air environmental impacts
- Existing controls at the source
- Remaining useful life of source
- Visibility improvement reasonably expected from the technology

Once this assessment has been completed, BART controls for each source are identified. In some cases, the installation of controls or other emission reduction measures may need to be undertaken. Another possibility is that controls already in place may be determined to qualify as BART, due, in most cases, to a higher-than-reasonable cost associated with installing additional controls. Other outcomes may include a determination that the source may be shutting down or that the impact of controls would be insufficient to require the reduction of emissions.

8.4 New York State's BART Rule (6 NYCRR Part 249)

The Department is in the process of adopting a regulation to codify the BART requirements. As provided in 40 CFR §51.308(e)(1)(iv), BART must be in operation for each applicable source as expeditiously as practicable but in no event later than five years after approval of the Regional Haze SIP revision by the EPA. The Department's BART rule will require that each source subject to BART must submit its plan detailing how it will comply with the BART requirements by October 1, 2010. The plan must show that the required BART controls will be installed by a July 1, 2013 deadline. July 1, 2013 is also the date by which sources that wish to avoid BART controls must "cap out" or shut down. The requirement to implement BART by July 1, 2013 is within the 5-year requirement for the installation of controls.

Requirements for implementing BART controls or achieving emission reductions from a BART-eligible source, along with compliance schedules, will be placed in each source's air quality permit. Most of these sources operate under Title V permits per 6 NYCRR Part 201 and 40 CFR Part 70. Under New York's Title V permitting program, conditions placed in permits must have a basis in a regulation containing the requirements for BART controls, necessitating the promulgation of a BART rule as mentioned above. State-level BART rulemaking will provide New York with the necessary authority to require BART analyses, install controls, develop compliance schedules, recordkeeping, reporting and other elements required under the federal haze program. The rule mirrors the federal BART regulation except as it pertains to certain CAIR sources, and will require that cost, energy and non-air environmental impacts, existing controls at the source, remaining useful life of source and visibility improvement reasonably expected from the technology be considered in the BART analysis.

The area in which New York's BART rule will vary from the federal rule is that CAIR sources that meet the criteria for being "BART eligible" will not be exempted from the BART rule. Those sources meeting these criteria that cause or contribute to haze in Class I areas will be required to conduct a review to determine if the installation of new control requirements is appropriate.

As provided in 40 CFR §51.308(e)(1)(v), the Title V operating permits for BART sources must include a requirement that each source maintain the control equipment and establish procedures to ensure such equipment is properly operated and maintained. This requirement will be included in the Title V operating permit for each source subject to BART.

The projected schedule for completing this rulemaking is as follows:

Proposal in the NY State Register:	October, 2009
Package to Environmental Board:	February, 2010
File Regulation with the Secretary of State:	April, 2010
Regulation Effective Date:	May, 2010

This schedule is included in the comprehensive rulemaking timeline that appears in Table 10-5 of this document.

After the rulemaking is complete, the final list of BART-eligible facilities will be identified and the applicability of BART controls determined. During this period, FLMs will be provided a 60-day review period for the BART determinations, including any BART exemption modeling demonstrations. The permits for these facilities will be modified to include the installation of the necessary controls and a schedule for the operation of any required control equipment developed. The installation of controls, the shutdown of the affected sources, or the imposition of an emission cap accepted by the facility to avoid the need for BART controls will

be required to be in place within five years of the EPA's approval of New York's Haze SIP.

Figure 8-1 Tentative NYS BART Sources

The non-EGU sources the are potentially subject to BART requirements are located at the following facilities:

Alcoa Massena Operations (West Plant)
Massena, NY

Kodak Park Division
Rochester, NY

Lafarge Building Materials Inc

Ravena, NY

Lehigh Northeast Cement Company
Glens Falls, NY

Owens-Corning Delmar Plant
Feura Bush, NY

St Lawrence Cement Corp-Catskill Quarry
Catskill, NY

International Paper Ticonderoga Mill
Ticonderoga, NY

EGU sources that are potentially subject to BART requirements are located at the following facilities:

Arthur Kill Generating Station
Staten Island, NY

Bowline Point Generating Station
West Haverstraw, NY

Con Ed-59th St Station
New York, NY

Danskammer Generating Station
Newburgh, NY

Roseton Generating Station
Newburgh, NY

EF Barrett Power Station
Island Park, NY

Northport Power Station
Northport, NY

Oswego Harbor Power
Oswego, NY

Poletti Power Project
Astoria, NY

Port Jefferson Energy Center

Port Jefferson, NY

Ravenswood Generating Station
Queens, NY

Samuel A Carlson Generating Station
Jamestown, NY

Trigen Syracuse Energy Corporation
Syracuse, NY

8.5 Anticipated Visibility Improvement as a Result of BART

MANE-VU conducted modeling analyses of BART-eligible sources using CALPUFF in order to provide a regionally consistent foundation for assessing the degree of visibility improvement which could result from installation of BART controls. It is anticipated that, once BART analyses as required by New York's regulation have been conducted, and the applicable emission controls are installed, a significant reduction in emissions of visibility impairing pollutants will occur. Although New York has no Class I areas, the emissions from its sources are contributory to regional haze in several states that contain Class I areas. Through the collaborative effort described in Section 9, these Class I states have identified control measures that should be applied in order to meet the Reasonable Progress Goals out until 2018. These measures include the application of Best Available Retrofit Technology (BART) to eligible facilities to which New York State is committed through this SIP. The implementation of these measures will, according to the analyses conducted by the Class I areas that developed the "Ask", provide the necessary visibility improvement to meet the Reasonable Progress Goals that will allow the required visibility level for the initial period (i.e., 2018) to be achieved, as well as the natural visibility levels in 2064.