District of Columbia's
Regional Haze State Implementation Plan
Five-Year Progress Report

Submitted to:

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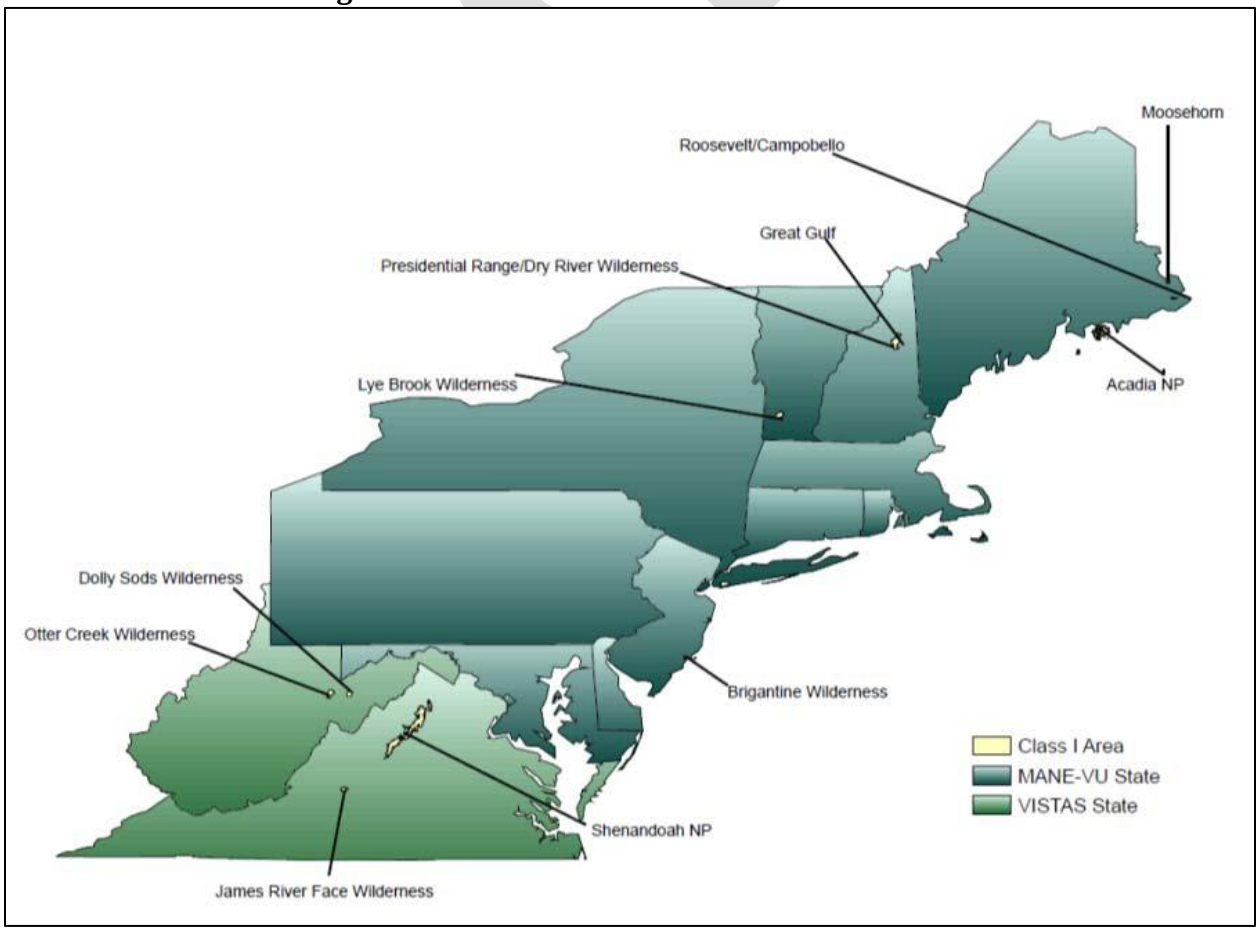
1.0 Introduction

The District of Columbia's (District's) Regional Haze State Implementation Plan (SIP) was approved by the U.S. Environmental Protection Agency (EPA) and became effective on March 5, 2012 (77 Fed. Reg. 5191; February 2, 2012). EPA's Regional Haze Rule requires states to review their Regional Haze SIPs every five years to determine whether the goals previously set are still reasonable, whether reasonable measures have been implemented to meet those goals, and what additional measures will be implemented in the next five to ten years. This document is the District's first 5-year progress report.

1.1 Federal Regional Haze Program Requirements

When Congress amended the federal Clean Air Act (CAA) in 1977, they added Section 169A (42 U.S.C. 7491) to, "[declare] 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." Class I Federal Areas include international parks; national wilderness areas that exceed 5,000 acres in size; national memorial parks that exceed 5,000 acres in size; and national parks which exceed 6,000 acres in size.

Figure 1. Class I Areas in the MANE-VU RPO



The CAA directed EPA to promulgate regulations to meet the national visibility goal. EPA deferred action on regional haze until monitoring, modeling, and scientific knowledge about the relationships between pollutants and visibility impairment were improved. When Congress amended the CAA in 1990, they added Section 169B (42 U.S.C. 7492), authorizing further visibility research and periodic assessments of the progress made toward improving visibility in Class I areas.

Based on the results of research conducted in the 1990s, and to implement the CAA visibility goal, EPA adopted the Regional Haze Rule (64 Fed. Reg. 35714) on July 1, 1999, and the rule went into effect on August 30, 1999. The Regional Haze Rule seeks to address the combined visibility effects of various pollution sources over a wide geographic region. Five regional planning organizations (RPOs) were developed to coordinate and evaluate technical information to better understand how their states and tribes impact Class I areas across the country. The District is part of the Mid-Atlantic/ Northeast Visibility Union (MANE-VU) RPO[1]. MANE-VU states conducted modeling and other technical analysis of the causes of haze at each Class I area throughout the Mid-Atlantic and Northeast corridor, and of the levels of contribution from all sources within each state to the visibility degradation. The Northeast States for Coordinated Air Use Management (NESCAUM) provided support.

EPA's Regional Haze Rule requires states – even those without Class I Areas – to develop and implement state implementation plans (SIPs) to reduce pollution that causes visibility impairment. States and tribes are encouraged to pursue the development of coordinated long-term strategies of measures to assure reasonable progress towards the national visibility goal. Regional Haze SIPs must be provided to Federal Land Manager (FLM) agencies responsible for protecting Class I areas: the National Park Service and the Fish and Wildlife Service (both of the U.S. Department of Interior), and the Forest Service (U.S. Department of Agriculture). SIPs are also provided to the public for review before submittal to EPA for approval.

The role of MANE-VU and the process that MANE-VU went through to help develop the first round of Regional Haze SIPs is thoroughly explained in the District's Regional Haze SIP. The District's Regional Haze SIP considered contributions to visibility impairment in five Class I areas within 300 kilometers of the District: Brigantine Wilderness area in New Jersey, Shenandoah National Park in Virginia, the Dolly Sods and Otter Creek Wilderness Areas in West Virginia, and the James River Face Wilderness in Virginia. Four of the five areas are in the Visibility Improvement – State and Tribal Association of the Southeast (VISTAS) RPO. Brigantine is the only site in the MANE-VU RPO.

1.2 Review of Regional Haze SIP Requirements

Each Regional Haze SIP must include the following elements to meet Regional Haze Rule requirements:

- Reasonable Progress Goals (RPGs) – States with Class I areas must develop RPGs to ensure continued progress towards achieving natural visibility conditions by 2064. Two

[1] Member states and tribal governments include: Connecticut, Delaware, the District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Penobscot Indian Nation, Rhode Island, St. Regis Mohawk Tribe, and Vermont.

RPGs are established for each Class I area for each 10-year SIP implementation period – one RPG for the 20 percent "best" visibility days, and one RPG for the 20 percent "worst" visibility days.

- Long-Term Strategy (LTS) – States must develop a 10- to 15-year strategy for meeting the RPGs. The LTS is a compilation of control measures designed to reduce emissions during implementation of the SIP.

- Best Available Retrofit Technology (BART) – A third key Regional Haze Rule requirement is to establish BART for certain categories of existing major stationary sources built between 1962 and 1977. BART-eligible sources tend to be fossil fuel-fired electric generating units (EGUs) that contribute at least 0.5 deciviews of visibility impairment to a Class I area. BART emission limits and compliance schedules are determined on a source-by-source basis, and BART controls must be installed and in operation as expeditiously as practicable.

Additional Regional Haze Rule requirements include a monitoring strategy, emissions inventory, consultation process, reporting, recordkeeping, and other measures necessary to assess and report on visibility. More details on the SIP development process and requirements can be found in the District's Regional Haze SIP and in EPA guidance.

1.3 Required Elements of the Progress Report

EPA's Regional Haze Rule requires states to review their Regional Haze SIPs every five years and submit a progress report to EPA as a SIP revision. The progress report must fulfill the requirements of Title 40 of the Code of Federal Regulations (C.F.R.) Part 51, Sections 102, 103, 308(g), 308(h), and 308(i). Procedures include:

- § 102 – Public hearings; and
- § 103 – Submission of plans and preliminary review of plans.

To comply with § 308(g), each periodic progress report must evaluate at a minimum the following elements:

(1) A description of the status of implementation of all measures included in the implementation plan for achieving reasonable progress goals for mandatory Class I federal areas both within and outside the state.

(2) A summary of the emissions reductions achieved throughout the state through implementation of the measures described in paragraph (1).

(3) For each mandatory Class I federal area within the state, an assessment of the following visibility conditions and changes, with values for most impaired and least impaired days expressed in terms of 5-year averages of these annual values:
   (i) The current visibility conditions for the most impaired and least impaired days;
   (ii) The difference between current visibility conditions for the most impaired and least impaired days and baseline visibility conditions; and

(iii) The change in visibility impairment for the most impaired and least impaired days over the past 5 years.

(4) An analysis tracking the changes over the past 5 years in pollutant emissions contributing to visibility impairment from all sources and activities within the state. Emissions changes should be identified by type of source or activity. The analysis must be based on the most recent updated emissions inventory, with estimates projected forward as necessary and appropriate, to account for emissions changes during the applicable 5-year period.

(5) An assessment of any significant changes in anthropogenic emissions within or outside the state that have occurred over the past 5 years that have limited or impeded progress in reducing pollutant emissions and improving visibility.

(6) An assessment of whether the current implementation plan elements and strategies are sufficient to enable the state, or other states with mandatory Class I federal areas affected by emissions from the state, to meet all established reasonable progress goals.

(7) For any state with a Class I area, a review of the state's visibility monitoring strategy and any modifications to the strategy as necessary.

To comply with § 308(h), the progress report must conclude with a determination of adequacy of the existing Regional Haze SIP.

To comply with § 308(i), the FLMs responsible for Class I areas affected by emissions originating in the District must be provided with an opportunity to review the progress report prior to any public hearing. Coordination is also supposed to occur with Class I states and EPA.

The following chapters address the requirements of § 308(g), (h), and (i).

Brigantine Wilderness is a tidal wetland and shallow bay habitat along New Jersey's Atlantic coastline. It is one of the most active flyways for migratory water birds in North America. Birdwatchers have zoomed in on close to 300 species, including Atlantic Brant and American Black Duck.

Shenandoah National Park is 197,000 acres of forest that stretches for 80 miles along the Blue Ridge Mountains, which form the eastern boundary of the Appalachian Range. The Park was established in 1936, and the natural regeneration to the "wilderness" conditions that followed encouraged National Park Service officials to recommend and eventually designate 42% of the Park as wilderness.

James River Face Wilderness is located in Bedford and Rockbridge Counties in west central Virginia. The first designated wilderness in Virginia (1975), James River Face Wilderness Area is bounded on the northeast by the James River and on the south by Petites Gap Road. The land reaches a high point of 3,073 feet on Highcock Knob, near the southern boundary, and a low point of about 650 feet near the river.

Dolly Sods, part of the Monongahela National Forest in West Virginia, contains wide-open views among high-elevation plateaus. In previous times, these open fields, or "sods", were used for grazing. The wind and boggy soils ultimately made the area uninhabitable. Restoration efforts have since created a diverse wilderness, heavily influenced by being located downstream of a creek through the Allegheny Mountains, considered the eastern continental divide.

Otter Creek Wilderness, very close and similar to Dolly Sods and also within the Monongahela National Forest, lies within a bowl formed by mountains, the confluence of mountain streams, and floods. It is a second generation forest with spruce that dominates the higher country and gives way to hardwoods such as black cherry and yellow birch lower down. It is also a recovering habitat, currently managed for wild turkey, black bears, and similar species.

2.0 Visibility Progress

Title 40 C.F.R. Sections 51.308(g)(3) and 51.309(d)(10)(i)(C) require that for each mandatory Class I Federal area within a State, the State must assess the following visibility conditions and changes:

(i) The current visibility conditions for the most impaired and least impaired days;
(ii) The difference between current visibility conditions for the most impaired and least impaired days and baseline visibility conditions;
(iii) The change in visibility impairment for the most impaired and least impaired days over the past five years.

The District does not have a Class I area, so is not required to assess visibility conditions and changes. The following information is provided to show that progress is being made in improving visibility at the five Class I areas within 300 kilometers of the District.

Neither MANE-VU nor VISTAS found that the District influences visibility impairment in these Class I areas[2]. The following data supports the District's assessment, particularly to meet the requirements of 40 C.F.R. Section 51.308(g)(6) and the determination of the adequacy of the District's Regional Haze SIP.

2.1 About Visibility

States with Class I areas are required to track improvements in both visibility and emissions in order to demonstrate reasonable progress towards meeting natural visibility conditions. The federal Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring network is used to track visibility. Dozens of ambient air samplers throughout the country characterize haze by photography, the measurement of optical extinction with transmissometers and nephelometers, and the measurement of the composition and concentration of the fine particles that produce the light extinction and the tracers that identify emission sources.

Data from IMPROVE monitors along with emissions estimates, meteorological measurements, and chemistry are used in air quality models to simulate haze, assess contributions from upwind areas, and evaluate visibility benefits of specific control measures.

2.2 Reasonable Progress Goals

During the first round of SIPs, MANE-VU states with Class I areas adopted "reasonable progress goals" (RPGs) for visibility improvement at Class I areas by 2018, with the goal of achieving natural visibility conditions by the year 2064. VISTAS states with Class I areas also adopted RPGs for visibility improvement for their Class I areas. RPGs are expressed as deciviews (DVs), where each deciview change is an equal incremental change in visibility perceived by the

[2] The MANE-VU states established a contribution threshold for determining whether a state could be considered to affect an area. The criteria for contribution were determined to be greater than 0.1 microgram per cubic meter (ug/m3) or 2% of sulfate pollution to a Class I area. MANE-VU concluded that the District did not contribute greater than 0.1 ug/m^3 or 2% sulfate contribution to **any nearby** Class I areas and thus the District was not identified as influencing the visibility impairment of any Class I area. VISTAS likewise found the District was not influencing visibility impairment for its Class I areas.

human eye. A deciview is derived from air quality measurements used to estimate light extinction, which varies when conditions are pristine versus extremely hazy. RPGs are established to track progress between two points in time:

- Baseline visibility, generally from 2000 to 2004; and
- Natural visibility conditions in 2064.

"Natural visibility" is where anthropogenic sources of air pollution no longer impair visibility. Natural visibility conditions in the Eastern United States range from 80 to 150 miles. The national goal is to achieve natural visibility in Class I areas by 2064.

Constant annual incremental improvement in the Haze Index (in deciviews) – between baseline and natural visibility conditions – is termed the "uniform rate of progress" (also called a "glidepath").

Visibility progress is evaluated in 5-year increments. To mitigate the impacts of year-to-year variability in natural processes and natural visibility, the Regional Haze Rule mandates the use of two 5-year averaged RPG values per Class I area: one based on the 5-year average of the 20% "most impaired" (haziest, or worst) days per calendar year, and one based on the 5-year annual average of the 20% "least impaired" (clearest, or best) days. The RPGs are designed to at least ensure no degradation for the best-day visibility and achievement of uniform rate of progress for worst-day visibility.

Since there are no Class I areas within the District, the District was not required to establish any RPGs. As a member of MANE-VU, the District supported the RPGs set by MANE-VU Class I states and by other states outside of the MANE-VU region.

The RPGs in Tables 1 through 5 were established for 2018 for each Class I area near the District. For Brigantine, the one nearby Class I area in MANE-VU, the baseline "no degradation" and RPG deciview amounts for the 20% clearest days for 2018 are equivalent.

2.2.1 Current Visibility Conditions

In June 2011, a national report of IMPROVE data documented progress in visibility improvement for the 2005-2009 5-year period[3]. In May 2013, NESCAUM analyzed IMPROVE monitoring data and developed a *Tracking Visibility Progress* report for MANE-VU for the 2007-2011 5-year period[4]. Both analyses indicate that visibility at all MANE-VU Class I areas has improved. All areas are expected to meet 2018 RPGs. According to NESCAUM's report, none of the RPGs for 2018 provided for a lower rate of improvement than the uniform rate.

Reported "current" visibility levels indicate gradual progress at each Class I area, as follows.

[3] Jenny L. Hand, et al., *Spatial and Seasonal Patterns and Temporal Variability of Haze and its Constituents in the United States: Report V*, June 2011, posted on the IMPROVE website at: http://vista.cira.colostate.edu/improve/publications/Reports/2011/2011.htm.

[4] NESCAUM, *Tracking Visibility Progress 2004-2011* (revised May 24, 2013), found at: http://www.nescaum.org/topics/regional-haze/regional-haze-documents.

Table 1. RPGs for Brigantine Wilderness Area (expressed in deciviews)

Brigantine	Baseline Visibility (2000-04)	*Current Visibility*			**RPG Visibility (2018)**	Natural Visibility (2064)
		2005-09 [a]	*2007-11* [b]	***2010-14*** [c]		
20% Haziest Days	29.01	27.3	25.54	**23.31**	**25.1**	12.24
20% Clearest Days	14.33	13.9	12.50	**12.03**	**14.3**	5.51

[a] *Source:* Jenny L. Hand, et al. (June 2011); see footnote 3

[b] *Source:* NESCAUM (May 2013), Appendix B; see footnote 4

[c] *Source:* Calculated from data at Interagency Monitoring of Protected Visual Environments website. "Means for Best, Middle, and Worst 20% Visibility Days," Regional Haze Rule Summary data through 1988-2014 (posted November 2015), found at: http://vista.cira.colostate.edu/improve/data/improve/summary_data.htm.

Table 2. RPGs for Shenandoah National Park (expressed in deciviews)

Shenandoah	Baseline Visibility (2000-04)	*Current Visibility*			**RPG Visibility (2018)**	Natural Visibility (2064)
		2005-09 [a]	*2007-11* [b]	***2010-14*** [c]		
20% Haziest Days	29.3	27.3	24.6	**21.37**	**21.9**	11.35
20% Clearest Days	10.9	9.7	9.0	**8.56**	**8.7**	3.14

[a] *Source:* Jenny L. Hand, et al. (June 2011); see footnote 3

[b] *Source:* Commonwealth of Virginia Five-Year Progress Report, Tables 11 & 28 (November 2013)

[c] *Source:* Calculated based on IMPROVE data; see footnote c in Table 1

Table 3. RPGs for James River Face Wilderness Area (expressed in deciviews)

James River	Baseline Visibility (2000-04)	*Current Visibility*			**RPG Visibility (2018)**	Natural Visibility (2064)
		2005-09 [a]	*2007-11* [b]	***2010-14*** [c]		
20% Haziest Days	29.1	27.3	24.4	**22.05**	**22.4**	11.13
20% Clearest Days	14.2	13.6	12.7	**11.64**	**12.4**	4.39

Sources: Same as Table 2

Table 4. RPGs for Dolly Sods Wilderness Area (expressed in deciviews)

Dolly Sods	Baseline Visibility (2000-04)[a]	*Current Visibility*			**RPG Visibility (2018)**[a]	Natural Visibility (2064)
		2005-09 [b]	*2007-11* [c]	***2010-14*** [c]		
20% Haziest Days	29.0	27.6	25.12	**22.02**	**21.7**	10.39
20% Clearest Days	12.3	10.2	9.38	**8.99**	**11.1**	3.63

[a] *Source:* West Virginia Five-Year Progress Report, Table 18 & Figures 14 and 15 (April 2013)

[b] *Source:* Jenny L. Hand, et al. (June 2011); see footnote 3

[c] *Source:* Calculated based on IMPROVE data; see footnote c in Table 1

Table 5. RPGs for Otter Creek Wilderness Area (expressed in deciviews)

Otter Creek	Baseline Visibility (2000-04)[a]	*Current Visibility*			**RPG Visibility (2018)**[a]	Natural Visibility (2064)
		2005-09 [b]	*2007-11* [c]	***2010-14*** [c]		
20% Haziest Days	29.0	27.6	25.12	**22.02**	**21.7**	10.39
20% Clearest Days	12.3	10.2	9.38	**8.99**	**11.1**	3.63

Sources: Same as Table 4

2.2.2 Difference between Baseline Conditions and Current Visibility

The deciview measurements at Brigantine dropped between the 2000-2004 baseline period and the 2005-2009 5-year period, and then dropped even further during the 2007-2011 and 2010-2014 5-year periods. The difference between baseline and most current visibility conditions for the 20% worst days is 3.47 DVs, and for the 20% best days is 1.83 DVs. There are comparable differences in visibility for the VISTAS Class I areas.

2.2.3 Change over the Past Five Years

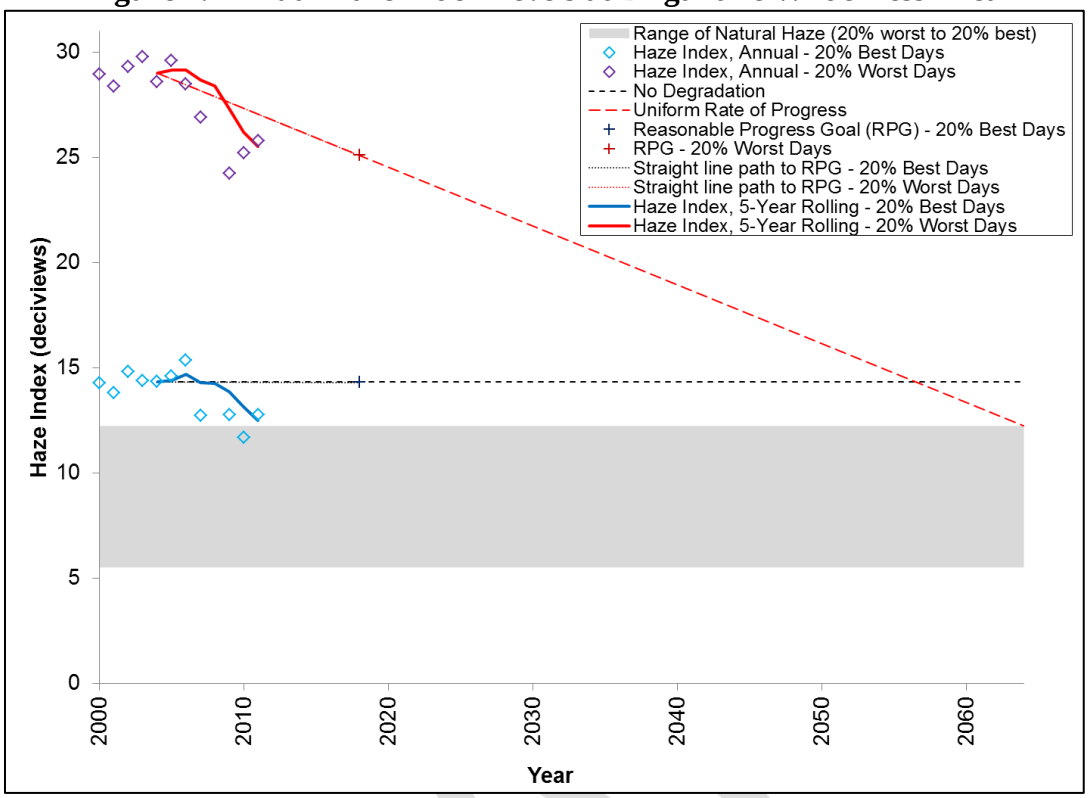
MANE-VU analysis for the previous round of Regional Haze SIPs determined that the predominant cause of haze pollution in parks and wilderness areas in MANE-VU states is sulfate particles due to sulfur dioxide (SO_2) emissions from burning coal and oil to provide heat and power to homes, businesses, and industries. VISTAS's analysis likewise concluded the predominant cause of haze pollution in Class I areas is due to SO_2 emissions. Sulfates are particularly troublesome during summer months when humidity is high. Additional pollutants contributing to regional haze are emitted by power plants, boilers, furnaces, motor vehicles, and other fuel-burning equipment as well as forest fires and wood combustion. Based on this scientific understanding, both MANE-VU and VISTAS concluded that it is likely that sulfate and SO_2 reductions need to play a central role in achieving near-term visibility improvements.

For example, the results of NESCAUM's *Tracking Visibility Progress* analysis for MANE-VU revealed the following:

- There are definite downward trends in overall haze levels at the Class I areas in and adjacent to the MANE-VU region.
- Based on rolling 5-year averages demonstrating progress since the 2000-2004 baseline period, the MANE-VU Class I areas appear to be on track to meet their 2018 RPGs for both best and worst visibility days.
- The trends are mainly driven by large reductions in sulfate light extinction, and to a lesser extent, nitrate light extinction.
- Levels of organic carbon mass (OCM) and light absorbing carbon (LAC) appear to be approaching natural background levels at most of the MANE-VU Class I areas.
- In some cases, the levels set by 2018 RPGs have already been met, and progress beyond those goals appears achievable.
- Though the Brigantine Wilderness Area is on track to meet its 2018 RPGs, challenges remain. Sulfate light extinction levels are higher at this site than at others across the region. Additional sulfate reductions would be a significant driver in reducing overall haze levels at Brigantine.

Figure 2 from NESCAUM's analysis is an assessment of visibility conditions at Brigantine. Values on the "Haze Index" (deciview scale) are represented on both an annual basis (blue and purple triangles) and as 5-year rolling averages (blue and red solid lines).

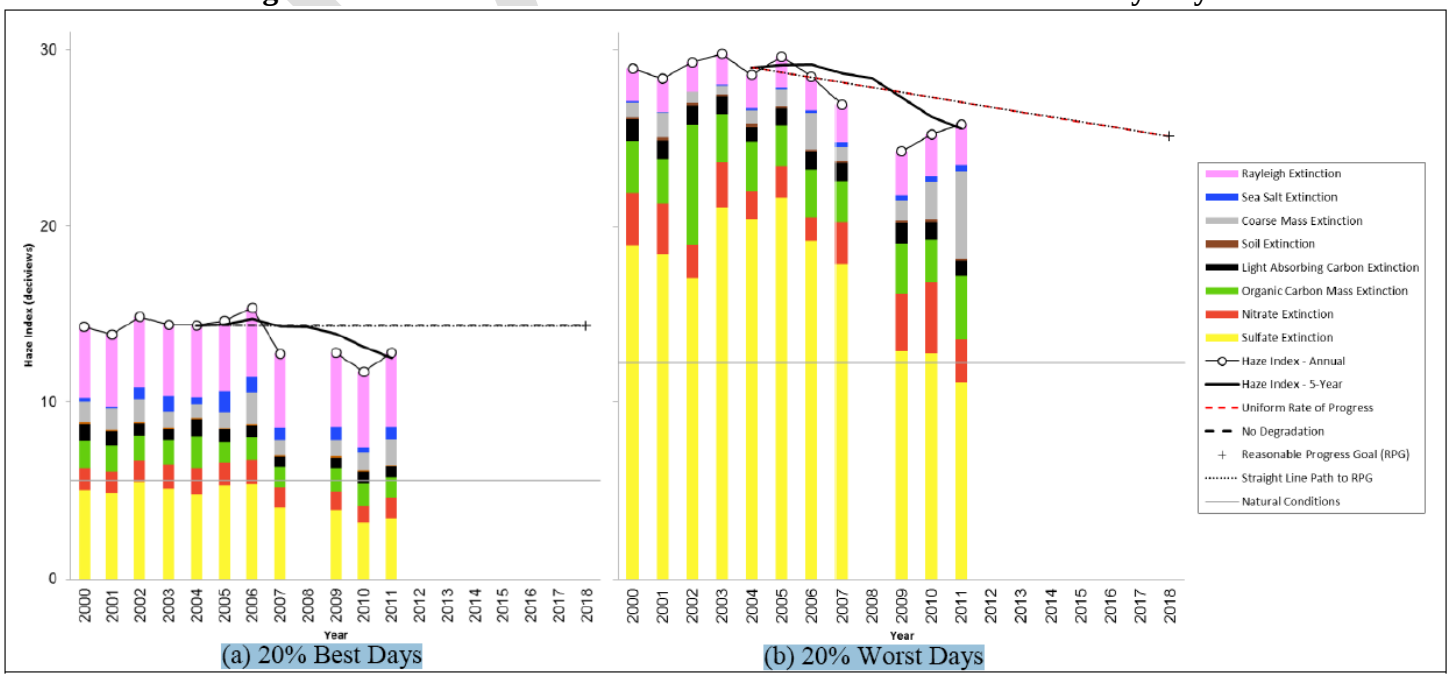
Figure 2. Annual Haze Index Levels at Brigantine Wilderness Area



In 2011, best-day visibility levels (blue) were already below the 2018 RPG (blue "+"). Worst-day visibility levels (red) may require additional progress to meet the short-term RPG goal (red "+").

Figure 3 from NESCAUM's analysis displays individual constituent contributions to haze. Large reductions in overall Haze Index values at Brigantine are primarily due to steady decreases in sulfates, mainly since 2005 on the worst days. There was a notable decline in nitrates on the worst days in 2011.

Figure 3. Individual Constituent Contribution to Annual Haze Index Levels at Brigantine Wilderness Area on 20 Percent Best and Worst Visibility Days



(a) 20% Best Days (b) 20% Worst Days

Since 2009 on the worst days, increases in contributions from sea salt and organic carbon mass have outweighed overall declines. The contribution from coarse mass in 2011 was unusually high, indicating a possible anomaly due to construction activity near the Brigantine Wilderness Area close to the IMPROVE site.[5]

From the national report of IMPROVE data[6], Table 6 enumerates individual constituent contributions to haze at Brigantine for the 2005-2009 5-year period. On both the haziest days and the clearest days, the constituents causing the most light extinction were sulfate, particulate organic matter (POM), and nitrate. The data for 2005-2009 shows improvement over the baseline period. Of the seven species, this report also finds increases in coarse mass and sea salt on both the haziest days and the clearest days.

Table 6. Individual Constituent Contribution to Visibility at Brigantine on 20 Percent Haziest and Clearest Days

Species	20% Haziest Days		20% Clearest Days	
	Baseline Visibility (2000-2004)	**Current Visibility (2005-2009)**	Baseline Visibility (2000-2004)	**Current Visibility (2005-2009)**
Sulfate Bext	127.1	**107.4**	14.8	**13.5**
Nitrate Bext	15.7	**12.2**	3.9	**3.6**
POM Bext	24.2	**14.9**	4.5	**3.6**
EC Bext	7.0	**6.1**	2.4	**1.9**
Soil Bext	1.0	**0.7**	0.2	**0.2**
Coarse Bext	5.4	**7.3**	3.2	**3.3**
Sea Salt Bext	0.4	**1.2**	1.4	**2.5**
Total PM Bext	180.8	**149.8**	30.4	**28.6**
Deciview (dv)	*29.0*	***27.3***	*14.3*	***13.9***

"Bext" means light extinction, and values are given in inverse megameters (Mm^{-1}).
Source: Jenny L. Hand, et al. (June 2011); see footnote 3

For further information on VISTAS analyses, see the final West Virginia and Virginia five-year regional haze progress reports that EPA approved for the respective SIPs on June 5, 2015 (80 Fed. Reg. 32019) (West Virginia) and May 2, 2014 (79 Fed. Reg. 25019) (Virginia).

[5] Ibid.
[6] Jenny L. Hand, et al., *Spatial and Seasonal Patterns and Temporal Variability of Haze and its Constituents in the United States: Report V*, June 2011, posted on the improve website at: http://vista.cira.colostate.edu/improve/publications/Reports/2011/2011.htm.

3.0 Status of Control Strategies in the Regional Haze SIP

Title 40 C.F.R. Sections 51.308(g)(1) and 51.309(d)(10)(i)(A) require a description of the status of implementation of all measures included in the SIP for achieving RPGs for mandatory Class I Federal areas both within and outside the State.

3.1 The MANE-VU Ask

A regional course of action was set forth by MANE-VU on June 20, 2007, as a, "Statement of the Mid-Atlantic/Northeast Visibility Union (MANE-VU) Concerning a Course of Action within MANE-VU toward Assuring Reasonable Progress." The LTS allows each state up to ten years to pursue the adoption and implementation of the following control measures:

- Timely implementation of BART requirements.
- A 90% or greater reduction in sulfur dioxide (SO_2) emissions from each of the electric generating unit (EGU) stacks identified by MANE-VU as reasonably anticipated to cause or contribute to impairment of visibility in each mandatory Class I federal area in the MANE-VU region – comprising 167 stacks in total. If it were determined to be infeasible for a state to achieve that level of reduction from a targeted unit, equivalent alternative measures would be pursued in such state.
- A low-sulfur fuel oil strategy in the inner zone states (New Jersey, New York, Delaware, and Pennsylvania, or portions thereof) to reduce the sulfur content of: distillate oil to 0.05% sulfur by weight (500 ppm) by no later than 2012, of #4 residual oil to 0.25% sulfur by weight by no later than 2012, of #6 residual oil to 0.3 – 0.5% sulfur by weight by no later than 2012, and to further reduce the sulfur content of distillate oil to 15 ppm by 2016.
- A low-sulfur fuel oil strategy in the outer zone states (the remainder of the MANE-VU region) to reduce the sulfur content of distillate oil to 0.05% sulfur by weight (500 ppm) by no later than 2014, of #4 residual oil to 0.25 – 0.5% sulfur by weight by no later than 2018, and of #6 residual oil to no greater than 0.5% sulfur by weight by no later than 2018, and to further reduce the sulfur content of distillate oil to 15 ppm by 2018, depending on supply availability.
- Continued evaluation of other control measures, including energy efficiency, alternative (clean) fuels, additional measures to reduce SO_2 and nitrogen oxide (NO_x) emissions from all coal-burning facilities by 2018, and new source performance standards for wood combustion. These and other measures would be evaluated during the consultation process to determine whether they were reasonable.

In a second resolution, "Statement of The Mid-Atlantic/Northeast Visibility Union (MANE-VU) Concerning a Request for a Course of Action by States Outside of MANE-VU toward Assuring Reasonable Progress," MANE-VU requested that states outside of the MANE-VU region identified as contributing to visibility impairment in the MANE-VU mandatory Class I federal areas pursue a similar course of action. Reasonable controls on non-EGU sources by 2018 were requested instead of the consideration of MANE-VU's low-sulfur fuel oil strategy to achieve equivalent reductions.

No states outside of the MANE-VU region requested action of MANE-VU states.

3.1.1 Status of BART Outside of the District

According to § 51.308(e)(4) of the Regional Haze Rule, states were given the option to opt into EPA's Clean Air Interstate Rule (CAIR) cap and trade program instead of requiring affected BART-eligible EGUs to install, operate, and maintain BART. As indicated in Table 7, most MANE-VU states did not rely on CAIR for BART due in part to ongoing uncertainty about the future of the rule and instead made determinations for BART-eligible CAIR EGUs.

Table 7. Status of BART per MANE-VU State[+]

State	BART
Connecticut	BART-eligible sources were capped by consent order at below BART-eligible levels Existing rules achieved greater reductions from its remaining BART-eligible sources than from application of BART alone
Delaware	One BART-eligible source was capped below BART-eligible levels DE Regulation 1146 achieves greater reductions than BART
Maine	ME Legislature adopted BART requirements and deadlines
Maryland	Existing controls and measures satisfied BART
Massachusetts	Developed an "Alternative to BART" program that achieves greater reductions; also rely on ozone SIP controls or *de minimis* impact determinations
New Hampshire	New Hampshire rule Env-A 2300: Mitigation of Regional Haze
New Jersey	Relying on rules in ozone and $PM_{2.5}$ SIPs and consent decrees
New York	EPA approved source-specific SIP revisions for most BART sources and issued FIPs for additional sources
Pennsylvania	Accepted CAIR and permit limits
Rhode Island	No BART-eligible sources
Vermont	No BART-eligible sources

[+] *For more details and for information on decisions by states outside of MANE-VU, see Attachment A*

In 2008, CAIR was remanded to EPA by the D.C. Circuit Court and replaced by the Cross State Air Pollution Rule (CSAPR)[7]. Implementation of CSAPR was scheduled to begin on January 1, 2012, when CSAPR would have superseded the CAIR program. On August 21, 2012, the U.S. Court of Appeals for the District of Columbia Circuit vacated CSAPR[8]. On April 29, 2014, the U.S. Supreme Court reversed and remanded this decision. EPA filed a motion to lift the stay of CSAPR and asked the D.C. Circuit to toll CSAPR's compliance deadlines by three years, so that the Phase 1 emissions budgets apply in 2015 and 2016 (instead of 2012 and 2013), and the Phase 2 emissions budgets apply in 2017 and beyond (instead of 2014 and beyond). On October 23, 2014, the U.S. Court of Appeals for the D.C. Circuit ordered that EPA's motion be granted. EPA issued an interim final rule to clarify how EPA will implement CSAPR consistent with the

[7] CSAPR requires substantial reductions of SO_2 and NOx emissions from EGUs in 28 states in the Eastern United States that significantly contribute to downwind nonattainment of the 1997 $PM_{2.5}$ and ozone NAAQS and 2006 $PM_{2.5}$ NAAQS.

[8] The D.C. Circuit issued an order staying CSAPR pending resolution of the petitions and directing EPA to continue to administer CAIR[8]. EPA issued Federal Implementation Plans (FIPs) to address the deficiencies identified in the limited disapproval of states' regional haze plans which relied upon CAIR[8]. In the FIPs, EPA relied on CSAPR to meet certain regional haze requirements notwithstanding that it was stayed at the time. EPA made a determination that CSAPR will provide for greater reasonable progress than BART and based this determination on a forward-looking projection of emissions.

D.C. Circuit's order granting EPA's motion requesting lifting the stay and tolling the rule's deadlines[9]. Subsequent to the interim final rulemaking, EPA began implementation of CSAPR on January 1, 2015.

Currently, states that previously relied on CAIR may instead rely on CSAPR for BART.

3.1.2 Status of 167 EGU Stack Outside of the District

MANE-VU identified 167 EGU sources whose 2002 emissions contributed to visibility impairment in MANE-VU Class I areas. The strategy has resulted in large reductions in SO_2 emissions due to installation of stack control technologies such as SO_2 scrubbers. In 2002, SO_2 emissions from the 167 key stacks were nearly 4.6 million tons per year. By 2011, according to data from EPA's Clean Air Markets Division (CAMD), emissions dropped by over three million tons per year. Emissions increased at only nine units by less than 146,000 tons. Overall, there was a 19% decline in heat input and a 67% drop in emissions. Of the 58 key stacks located within the MANE-VU region, 45 achieved 90% emissions reductions by 2011. Table 8 includes a status update for several states in the MANE-VU RPO.

Table 8. Status of 167 Stacks Strategy per MANE-VU State

State	90% SO2 from 167 EGU stacks
Connecticut	No listed stacks
Delaware	7 DE Admin Code 1146 achieves equivalent reductions
Maine	Low sulfur rule achieves greater reductions
Maryland	Maryland Healthy Air Act achieves greater reductions
Massachusetts	Relying on Alternative to BART, EPA's MATS rule, and EGU closures
New Hampshire	New Hampshire rule Env-A 2300: Mitigation of Regional Haze
New Jersey	Existing orders achieve greater reductions
New York	Relying on source shut-downs or controls
Rhode Island	No listed stacks
Vermont	No listed stacks

In Pennsylvania, 2011 emissions levels from its key stacks equaled the MANE-VU Ask amounts.

3.1.3 Status of Adoption of the Low Sulfur Fuel Strategy Outside of the District

Several MANE-VU states have adopted sulfur in fuel oil limits with various implementation dates through 2018, as shown in Table 9.

[9] U.S. Environmental Protection Agency. Rulemaking to Amend Dates in Federal Implementation Plans Addressing Interstate Transport of Ozone and Fine Particulate Matter: Interim final rule with request for comment. 79 Fed. Reg. 71663 (December 3, 2014).

Table 9. Summary of Adopted Sulfur in Fuel Oil Limits

State	Zone	#2 Distillate Oil	#4/#6 Residual Oil
Connecticut	Outer	500 ppm by 7/1/2014 15 ppm by 7/1/2018	0.3% for EGUs 0.5% for industrial boilers 0.3% by 7/1/2018 for other stationary sources
Delaware	Inner	15 ppm by 2016	0.5% by 2016
Maine	Outer	0.005% by weight by July 2016 0.0015% by weight by January 2018	0.5% by 2018
Maryland	Outer	500 ppm by 7/1/2014	1.0 or 2.0%, depending on location
Massachusetts	Outer	50 ppm by 7/1/2014 15 ppm by 7/1/2018	1% by 7/1/2014 (0.5% for power plants) 0.5% by 7/1/2018
New Jersey	Inner	500 ppm by 2014 15 ppm by 2016	3000-5000 ppm by 2014 depending on county
New York	Inner	15 ppm by 2012 – heating oil 15 ppm by 2014 – other sources	0.3% in NYC 0.37% in Nassau, Rockland, Westchester 0.5% in rest of state (purchase date 7/1/2014, use date 7/1/2016)
Pennsylvania	Inner	500 ppm by 2016	0.25% by weight (#4) by 2016 0.5% by weight (#5, #6) by 2016
Rhode Island	Outer	0.05% (500 ppm) by 7/1/2014 0.0015% (15 ppm) by 7/1/2018	1% (current) 0.5% by 7/1/2018
Vermont	Outer	0.05% by weight by 7/1/2014 0.0015% by weight by 7/1/2018	0.25% by weight (#4) by 7/1/2018 0.5% by weight (#5, #6) by 7/1/2018

New Hampshire does not have low sulfur rules in place.

3.1.4 Status of Other Measures Outside of the District

Most states continue to evaluate other regional haze strategies and otherwise rely on existing energy, climate, and ozone SIP measures. According to the NESCAUM update in Attachment A, Maine adopted rules on outdoor wood and pellet boilers, an outdoor wood boiler replacement and buy-back program, and a wood stove replacement buy-back program. Massachusetts is implementing controls on outdoor wood-fired boilers and evaluating other measures, and Rhode Island is considering a state law to address outdoor wood boiler emissions.

3.2 The District's Long-Term Strategy

As a member of MANE-VU, the District agreed to pursue the adoption of a coordinated LTS of measures (the MANE-VU Ask) to achieve RPGs for Class I areas within MANE-VU. The District's SIP did not include a goal related to 167 stacks, since none of the targeted EGUs are in the District. All of the other measures in MANE-VU's Ask have been pursued:

- **Timely implementation of BART** – The District had two electric generating units (EGUs) at the Pepco Benning Road Generation Station that were included in its Regional Haze SIP. As indicated in the SIP, the facility accepted a permit condition to shut down the EGUs by December 17, 2012. The permit condition was submitted with the SIP and became federally enforceable (77 Fed. Reg. 5191; February 2, 2012). The arrangement exempted the units from triggering BART requirements.

- **Low sulfur home heating oil** – On November 13, 2015, the District finalized a regulation to reduce the sulfur content of commercially available home heating oil (62 DCR 014839). The final rule calls for a 500 ppm (0.05% by weight) limit on #2 oil and a 2,500 ppm (0.25% by weight) limit on #4 oil in 2016, and a 15 ppm (0.0015% by weight) limit on #2 oil in 2018.

- **Additional control measures** – In 2013, the District's adoption of Phase II Ozone Transport Commission (OTC) model rules became federally enforceable (78 Fed. Reg. 24992; April 29, 2013). The rules control volatile organic compounds (VOCs) from consumer and commercial products, adhesives and sealants, portable fuel containers, solvent cleaning, and architectural and industrial maintenance (AIM) coatings. These reductions go above and beyond the Phase I rules that were included in the SIP.

  The District is also moving forward on a proposed Air Toxics and Hazardous Air Pollutants regulation (proposed on June 6, 2014, at 61 DCR 005773). A nonroad anti-idling rule was finalized on November 6, 2015 (62 DCR 014273) that will provide additional air quality benefit.

The following SIP-approved control measures are a part of the District's LTS and are federally enforceable:

Table 10. Control Measures in the District's Regional Haze SIP

SIP-Approved Control Measures	District Regulation and Latest Effective Date		Latest EPA Approval into SIP
POINT SOURCE CONTROL MEASURES			
Title V permit condition to shut down two electric generating units (EGUs) in 2012	Regional Haze Plan at 40 C.F.R. § 52.470(e)	10/27/2011	2/2/2012, 77 FR 5191
NO_x SIP Call	20 DCMR §§ 1000-1013, 1099 20 DCMR § 1014	12/8/2000 5/1/2001	12/22/2000, 65 FR 80783 11/1/2001, 66 FR 55099
AREA SOURCE CONTROL MEASURES			
Seasonal Open Burning Restrictions	20 DCMR § 604	3/15/1985	8/28/1995, 60 FR 44431
Control of Fugitive Dust	20 DCMR § 605	3/15/1985	8/28/1995, 60 FR 44431
Stage II Vapor Recovery	20 DCMR §§ 705.1-705.3 20 DCMR §§ 705.4-705.14	9/30/1993 3/15/1985	10/27/1999, 64 FR 57777
Ban on Cutback Asphalt Operations (April to September)	20 DCMR § 709	3/15/1985	10/27/1999, 64 FR 57777
Mobile Equipment Repair and Refinishing (MERR)	20 DCMR § 718	11/26/2004	12/23/2005, 69 FR 76855
Consumer and Commercial Products; Adhesives and Sealants; Portable Fuel Containers; Solvent Cleaning; AIM Coatings	20 DCMR §§ 719-737 20 DCMR §§ 743-749 20 DCMR §§ 751-758 20 DCMR §§ 763-769 20 DCMR §§ 773-778	12/30/2011	4/29/2013, 78 FR 24992
Sulfur Content of Fuel Oil	20 DCMR § 801	3/15/1985	8/28/1995, 60 FR 44431

In addition, the District received SIP credit for the following sector-specific federal measures, implemented or expected to be implemented by 2018:

- EGUs: Clean Air Interstate Rule (CAIR) – The District operated under a CAIR Federal Implementation Plan (FIP) to meet NO_x SIP Call obligations for EGUs until the remaining two EGU units in the District shut down in 2012. The District is not subject to CSAPR, which has replaced CAIR, because EPA's analysis found that the District had no cost-effective measures to implement to address contribution.

- Non-EGUs: NO_x SIP Call Phase I (NO_x Budget Trading Program) – Title 20 of the District of Columbia Municipal Regulations (DCMR) Sections 1000 to 1013 incorporated requirements of the OTC's NO_x Budget Program model rule through 2003. In 2003, EPA began to administer the NO_x Budget Trading Program under the NO_x SIP Call, which was incorporated by reference in 20 DCMR § 1014. The rule was in effect through 2008. After 2008, EPA stopped administering the NO_x SIP Call trading program and required NO_x SIP Call states to sunset their NO_x SIP Call trading program provisions.

  On March 8, 2015, the District finalized a rulemaking that placed an emissions cap of 25 tons per ozone season on three NO_x SIP Call units at the District's one non-EGU facility, the U.S. General Services Administration (62 DCR 5685). The cap ensures that the District continues to meet NO_x SIP Call emissions reductions obligations adopted in the District's SIP for non-EGUs.

- Area Sources: Federal On-Board Vapor Recovery – On May 9, 2012, EPA determined the use of onboard refueling vapor recovery (ORVR) for capturing gasoline vapor when gasoline-powered vehicles are refueled is in widespread use throughout the highway motor vehicle fleet. EPA also waived the requirement that current and former ozone nonattainment areas classified "serious" and above must implement Stage II vapor recovery systems on gasoline pumps (77 Fed. Reg. 28772).

  The District has not taken action to remove Stage II requirements from its SIP to date.

- Area Sources: New Residential Woodstove New Source Performance Standard (NSPS) – On February 3, 2015, EPA strengthened the NSPS for residential wood heaters to make new heaters significantly cleaner (80 Fed. Reg. 13671).

- Nonroad Sources: Nonroad Diesel Emissions Program – Standards and fuel sulfur limits were set for several groups of nonroad diesel engines, including industrial spark-ignition engines, recreational nonroad vehicles, locomotives, and marine vessels (40 C.F.R. Part 89). The rules were initially effective in 2004 and were fully phased in by 2012.

- Mobile Sources – Two EPA mobile source rules are now in place:
  - Heavy-Duty Highway Rule, effective for diesel engines in the 2007 model year (40 C.F.R. Part 86, Subpart P)
  - Tier 2 Vehicle and Gasoline Sulfur Program, became effective in 2005 model year (40 CFR Part 80, Subpart H; 40 CFR Part 85, 40 CFR Part 86); and

Additional on-the-book or on-the-way (OTB/W) federal measures in the SIP included 2-, 4-, 7-, and 10-year MACT standards in place after 2002; combustion turbine and RICE MACT; ICI boiler and process heater MACT; EPA's Refinery Enforcement Initiative, and source retirements

and replacements. Large control strategies in other states were included as well.

Federal rulemakings that were not included in the SIP such as the Tier 3 Vehicle Emission and Fuel Standards and the greenhouse gas rules for light-duty and heavy-duty vehicles will provide additional benefit.

4.0 An Assessment of Emissions Reductions from Regional Haze SIP Strategies

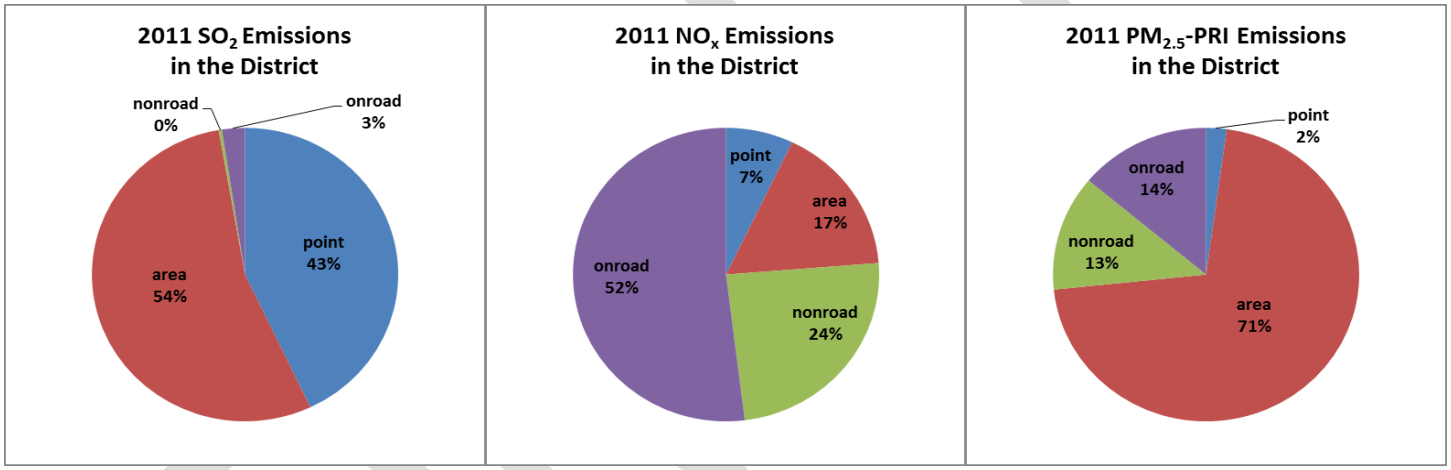
Title 40 C.F.R. Sections 51.308(g)(2) and 51.309(d)(10)(i)(B) requires a summary of the emissions reductions achieved throughout the State through implementation of the measures described in paragraph § 51.308 (g)(1).

4.1 Emissions in the District

It is difficult to attribute emissions reductions in the District to regional haze SIP strategies directly, but this chapter describes pollutant sources and trends for the most prominent haze-causing pollutants.

As indicated in Figure 4, most emissions of pollutants that most contribute to haze, SO_2 and $PM_{2.5}$-primary, come from area sources. Most NO_x emissions come from onroad and nonroad mobile sources.

Figure 4. Percent by Sector of 2011 Emissions of SO_2, NO_x, and $PM_{2.5}$-Primary



Source: 2011 National Emissions Inventory

4.2 Area Source SO_2 and $PM_{2.5}$ Emissions

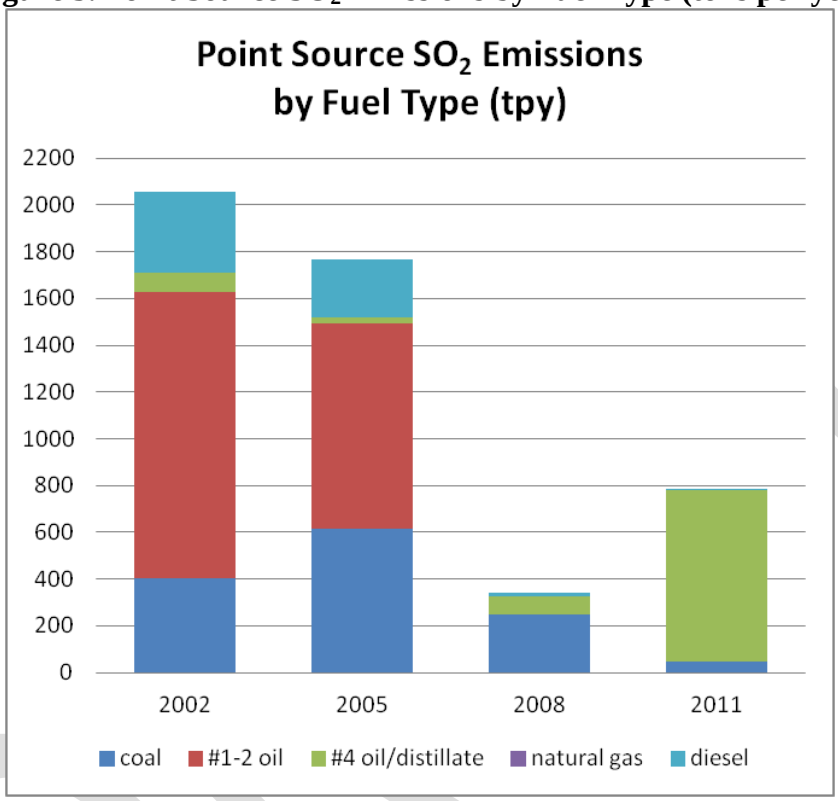
Area source SO_2 emissions are predominantly due to the combustion of oil in the industrial, commercial, and institutional (ICI) and residential sectors. ICI oil use has dropped since 2002, while residential use of #2 oil has increased in the District. The District expects reductions in SO_2 emissions from full implementation of EPA's ICI Boiler MACT in January 2016 and beyond as well as from implementation of the District's low sulfur fuel regulations.

Top sources of area source $PM_{2.5}$-primary emissions are residential wood combustion, construction, paved roads, and commercial cooking. There have been slight increases in $PM_{2.5}$ emissions since 2002, not because of actual emissions increases but because of changes in the calculation methodologies for residential wood combustion and paved roads that began with EPA's 2008 National Emissions Inventory. The District expects reductions in $PM_{2.5}$ from implementation of the federal residential wood NSPS.

4.3 Point Source SO_2 Emissions

Point sources accounted for about 43% of SO_2 emissions in the District in 2011. Historically, SO_2 has been linked to the use of coal at the District's one coal-burning facility and the combustion of oil at the District's two electric generating units (EGUs). Overall, SO_2 emissions from point sources have decreased significantly since 2002, as shown in Figure 5.

Figure 5. Point Source SO_2 Emissions by Fuel Type (tons per year)

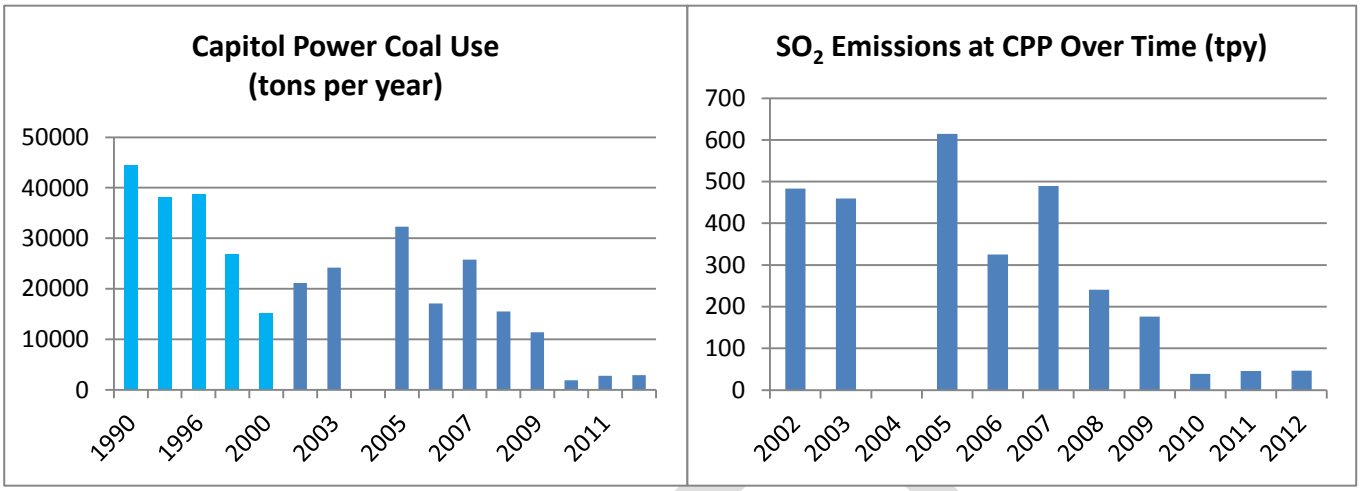


Source: 2011 National Emissions Inventory

According to Department of Energy & Environment (DOEE) records, coal use at the one coal-burning facility in the District, the U.S. Capitol Power Plant, has dropped dramatically since the 1990s, as demonstrated in Figure 6. Emissions of SO_2 due to coal are expected to remain low[10].

[10] On June 6, 2013, DOEE issued final permits that established facility-wide emission limits at Capitol Power Plant. The facility intends to construct a cogeneration unit and has accepted limits on hazardous air pollutants (HAPs) to avoid ICI Boiler MACT applicability, which goes into effect in January 2016. HAP limits are expected to limit SO_2 emissions as a co-benefit.

Figure 6. Capitol Power's Coal Use and SO_2 Emissions



In 2011, more SO_2 emissions came from the use of #4 oil than from the use of any other fuel type used by large facilities in the District. When it was operating, the Pepco Benning Road Generation Station used over 98% of the #4 oil consumed; the other five point source facilities, which typically use #4 oil as a back-up to natural gas, consumed less than 2%. Since 2008, the two EGUs alone (not including the other units at the Pepco Benning facility that use #4) consumed 79% (2008), 91% (2009), 97% (2010), and 100% (100%) of all #4 oil from the point source sector. The District's two EGUs shut down in 2012, so SO_2 emissions due to use of #4 oil are likely to be very low in future years. For example, SO_2, NO_x, and $PM_{2.5}$ emissions were 511 tons, 238 tons, and 24 tons (respectively) in 2011 and dropped to 21 tons, 7 tons, and less than 1 ton (respectively) in 2012 and to zero emissions in 2013 due to permanent shutdown of the EGUs.

Emissions from the third largest point source in the District, the U.S. General Services Administration (GSA), have remained relatively steady over time. The facility burns natural gas and #2 fuel oil, so it is not a significant source of SO_2 emissions. For example, SO_2 emissions have been less than 16 tons per year since 2008. Emissions are expected to remain low due to the combustion of gas and, once finalized, the District's ultra-low sulfur fuel regulations.

4.4 Onroad and Nonroad NO_x Emissions

Both MANE-VU and VISTAS found SO_2 to be the primary visibility impairing pollutant in the Eastern United States. Emissions of NO_x in the District are primarily from mobile sources, and are more of a problem during the formation of ground-level ozone. The sectors also contribute over 25% of $PM_{2.5}$ emissions.

EPA adopted the Tier 3 Vehicle Emission and Fuel Standards Program in March 2014, which will diminish contributions from mobile sources. The vehicle standards will reduce both tailpipe and evaporative emissions from passenger cars, light-duty trucks, medium-duty passenger vehicles, and some heavy-duty vehicles. The gasoline sulfur standard will enable more stringent vehicle emissions standards and will make emissions control systems more effective beginning in 2017. EPA also established Light-Duty Vehicle Greenhouse Gas Emissions and Corporate

Average Fuel Economy Standards in 2012 and proposed Phase 2 Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for medium- and heavy-duty engines and vehicles in 2015. The programs begin in model year 2017 and 2018, respectively. The programs will significantly reduce carbon emissions and further improve the fuel efficiency of vehicles, and will likely result in criteria pollutant co-benefits.

5.0 Emissions Progress

Title 40 C.F.R. Sections 51.308(g)(4) and 51.309(d)(10)(i)(D) require each state to analyze and track the change over the past five years in emissions of pollutants contributing to visibility impairment from all sources and activities within the State. Emissions changes should be identified by type of source or activity. The analysis must be based on the most recent updated emissions inventory, with estimates projected forward as necessary and appropriate, to account for emissions changes during the applicable 5-year period.

5.1 Tracking of Emissions in 2008 and 2011

MANE-VU's emissions analysis used 2002 as a baseline year. Future year emissions inventories for 2018 were developed and processed for use in regional modeling. Emissions inventories for other parts of the modeling domain were obtained from other RPOs and EPA. Three future year 2018 scenarios were explored: "on the books or on the way" (OTB/W), "beyond on the way" (BOTW), and a "best and final" scenario. Modeling showed that the "best and final" emissions scenario, which included additional measures that became the MANE-VU Ask (the LTS), would meet or exceed the RPGs at each MANU-VU Class I area in 2018.

The following tables compare the District's base year 2002 inventory and 2018 "best and final" projection inventory (MANE-VU EI Version 3) to EPA's National Emission Inventory (NEI) for 2008 and 2011 version 2. The estimates per year may not be directly comparable because of differences in the specific emissions sources included in the inventories, differences in calculation methodologies (*e.g.*, assumptions about growth and control rates), changes in emissions factors, unanticipated shutdowns or new sources, and introduction of new control measures.

Table 11. 2002 Baseline Emissions (tons per year)

Sector	SO_2	NO_x	$PM_{2.5}$	PM_{10}	VOC	NH_3
EGU Point	*345*	*300*	*4*	*4*	*0*	*0*
Non-EGU Point	*618*	*480*	*128*	*157*	*69*	*4*
Point	963	780	132	161	69	4
Area	1,337	1,644	1,029	6,293	6,432	14
Onroad Mobile	271	8,902	153	222	4,895	398
Nonroad Mobile	375	3,571	299	310	2,073	2
TOTAL	**2,946**	**14,897**	**1,613**	**6,986**	**13,469**	**418**

Table 12. 2008 Emissions (tons per year)

Sector	SO_2	NO_x	$PM_{2.5}$	PM_{10}	VOC	NH_3
Point	343	597	45	49	69	0
Area	820	1,751	1,050	4,394	7,143	180
Onroad Mobile	52	8,173	378	538	3,143	172
Nonroad Mobile	58	2,686	221	230	1,460	3
TOTAL	**1,273**	**13,205**	**1,694**	**5,211**	**11,815**	**354**

Table 13. 2011 Emissions (tons per year)

Sector	SO_2	NO_x	$PM_{2.5}$	PM_{10}	VOC	NH_3
Point	788	692	35	35	68	0
Area	991	1,621	915	2,643	5,731	172
Onroad Mobile	45	4,739	207	520	2,146	155
Nonroad Mobile	6	2,364	204	212	1,250	3
TOTAL	**1,829**	**9,418**	**1,361**	**3,410**	**9,195**	**330**

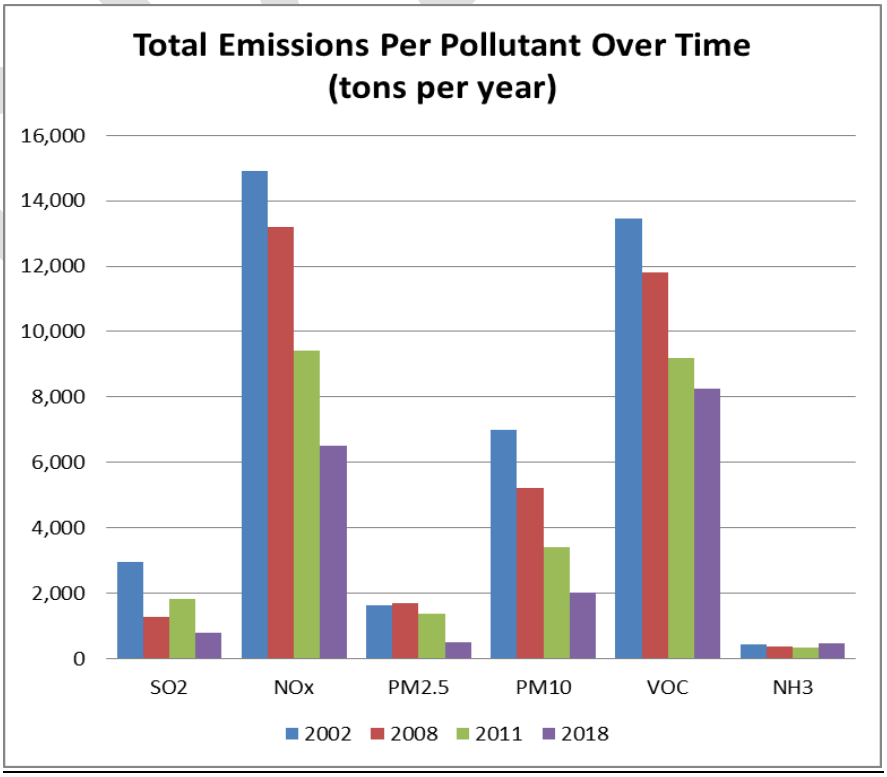
Table 14. 2018 "Best and Final" Emissions Projections (tons per year)

Sector	SO_2	NO_x	$PM_{2.5}$	PM_{10}	VOC	NH_3
EGU Point	*83*	*103*	*99*	*104*	*5*	*12*
Non-EGU Point	*481*	*627*	*161*	*194*	*85*	*5*
Point	564	730	260	298	90	17
Area	159	2,229	667	1,501	4,991	17
Onroad Mobile	41	1,717	58	65	1,797	438
Nonroad Mobile	5	1,815	124	135	1,369	3
TOTAL	**769**	**6,491**	**508**	**1,999**	**8,247**	**475**

Source: 2011 National Emissions Inventory

These numeric results are represented in Figure 7, which shows the trends per pollutant during the analysis period. Total emissions dropped between 2002 and 2008 for every pollutant except $PM_{2.5}$, and for every pollutant between 2008 and 2011 except SO_2.

Figure 7. Total Emissions per Pollutant over Time



Emissions are projected to proceed downward in 2018 for every pollutant except NH_3. Since exhaust from highway vehicles are a major source of ammonia emissions in the District, overall NH_3 emissions will likely drop in 2018.

5.2 Emissions per Pollutant by Sector

Figure 8 breaks down the contributions by sector and pollutant.

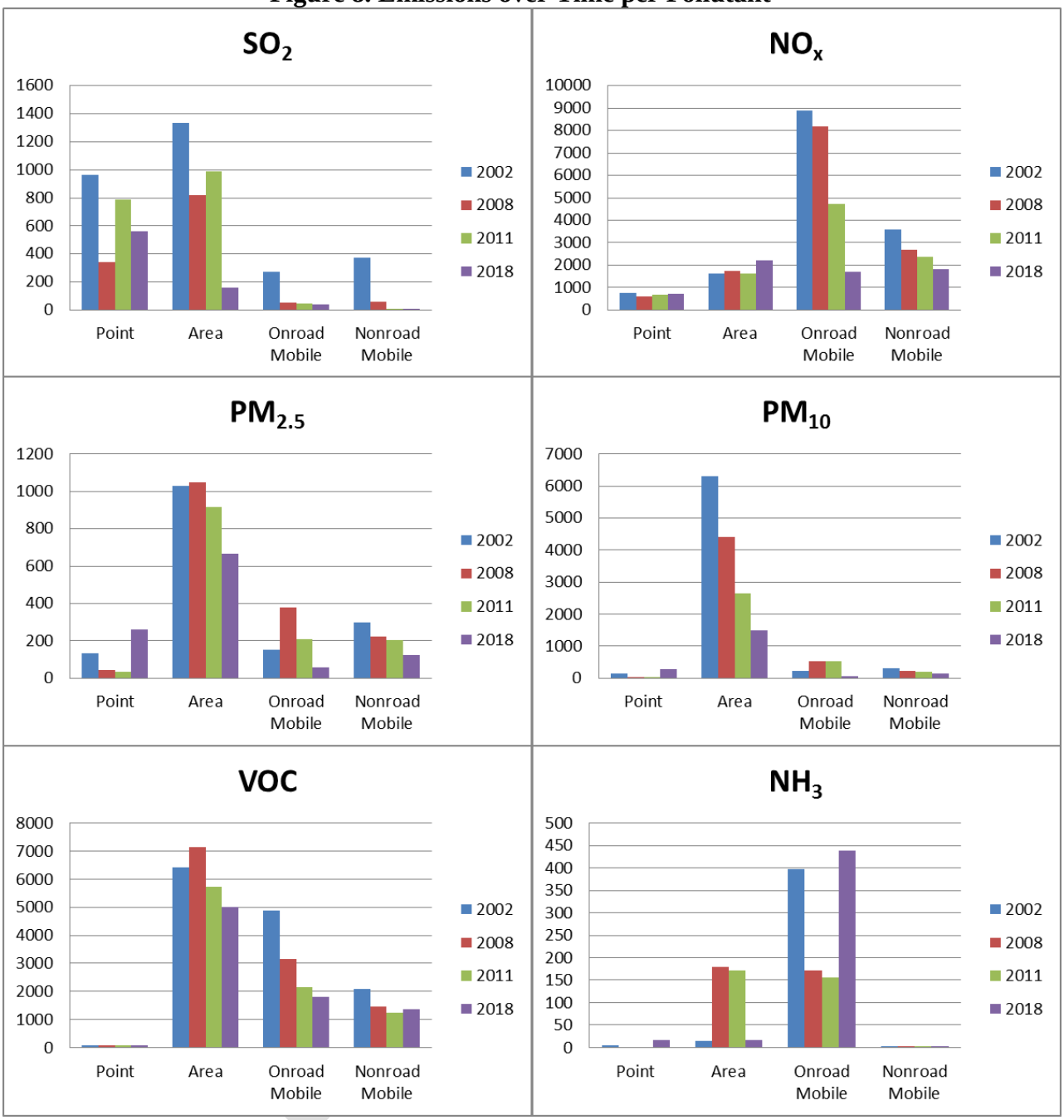
Between 2008 and 2011, SO_2 emissions increased in the point and area source sectors. In 2011, over 90% of point source SO_2 emissions were due to a spike in the use of #4 oil at EGUs. The District's remaining EGUs permanently shut down in 2012, so emissions from EGUs in 2018 should drop to zero. In the area source sector, there were increases in both ICI and residential distillate oil use, with more notable increases in the residential sector since 2002. The District expects reductions in SO_2 by 2018 through implementation of the ICI Boiler MACT and the District's ultra-low sulfur regulation.

Increases in onroad PM estimates in 2008 and 2011 are due to model changes – the MOBILE6 emissions model was used in 2002 and the Motor Emissions Vehicle Simulator (MOVES) model was used in 2008 and 2011. In general, onroad projections are expected go down by 2018 due to EPA's Tier 3 regulation.

There was a difference in NH_3 estimates between 2002 and 2008 due to emission factor changes for residential natural gas use, developed by the Eastern Regional Technical Advisory Committee (ERTAC). NH_3 emissions may remain relatively high in 2018. Onroad NH_3 projections for 2018 should look more like the estimates for 2008 and 2011 due to model changes.

In summary, the data presented shows the progress made by the District in reduction of pollutants, including visibility impairing pollutants.

Figure 8. Emissions over Time per Pollutant



6.0 Assessment of Changes Impeding Visibility Progress

Title 40 C.F.R. Sections 51.308(g)(5) and 51.309(d)(10)(i)(E) requires an assessment of any significant changes in anthropogenic emissions within or outside the State that have occurred over the past five years that have limited or impeded progress in reducing pollutant emissions and improving visibility.

In general, anthropogenic haze-causing pollutant emissions in the District and throughout the MANE-VU region have decreased over the past five years. The analysis and summaries in the previous sections include all relevant significant emission sources and show that none have limited or impeded progress for the regional haze program during the reporting period.

7.0 Assessment of Current Strategy

Title 40 C.F.R. Sections 51.308(g)(6) and 51.309(d)(10)(i)(F) requires an assessment of whether the current implementation plan elements and strategies are sufficient to enable the State, or other States with mandatory Federal Class I areas affected by emissions from the State, to meet all established reasonable progress goals.

The analysis in Chapter 2 indicates that Class I areas in New Jersey, West Virginia, and Virginia are on track to achieve their RPGs by 2018. Based on the analyses in Chapter 3 through 5, the District determines that the existing Regional Haze SIP is sufficient to enable other states with mandatory Federal Class I areas to meet all RPGs.

8.0 Review of Visibility Monitoring Strategy

Title 40 C.F.R. Sections 51.308(g)(7) and 51.309(d)(10)(i)(G) requires, for any state with a Class I area, a review of the State's visibility monitoring strategy and any modifications to the strategy as necessary.

The District does not have a visibility monitoring strategy because there are no Class I areas within the jurisdiction. There is one IMPROVE visibility monitor operated by the U.S. Department of Interior National Park Service (NPS) at Hains Point, but it is used for federal research purposes only and is not relevant for the purposes of this report.

9.0 Determination of Adequacy

Title 40 C.F.R. Sections 51.308(h) and 51.309(d)(10)(ii) requires the determination of the adequacy of existing implementation plan. "At the same time the State is required to submit any 5-year progress report to the EPA in accordance with paragraph (g) of this section, the State must also take one of the following actions based upon the information presented in the progress report:

(1) If the State determines that the existing implementation plan requires no further substantive revision at this time in order to achieve established goals for visibility improvement and emissions reductions, the State must provide to the Administrator a negative declaration that further revision of the existing implementation plan is not needed at this time.

(2) If the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources in another State(s) which participated in a regional planning process, the State must provide notification to the Administrator and to the other State(s) which participated in the regional planning process with the States. The State must also collaborate with the other State(s) through the regional planning process for the purpose of developing additional strategies to address the plan's deficiencies.

(3) Where the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources in another country, the State shall provide notification, along with available information, to the Administrator.

(4) Where the State determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources within the State, the State shall revise its implementation plan to address the plan's deficiencies within one year."

Based on the analyses conducted for this report, the District determines that the existing SIP, as approved by EPA, is adequate for continued reasonable progress towards natural conditions by 2064 in all mandatory Class I Federal areas within 300 km of its borders. The District has no further information indicating that emissions from the District impact any specific Class I area. Therefore, the District provides a negative declaration to the EPA Administrator, specifying that no additional controls are necessary at this time to continue making reasonable progress towards meeting the visibility goals in nearby Class I areas by 2018.

10.0 Consultation with Federal Land Managers

Title 40 C.F.R. Section 51.308(i) requires that the state provide the FLMs responsible for Class I areas affected by emissions originating within the state an opportunity for consultation, in person, at least 60 days prior to any public hearing on the 5-year progress report SIP revision.

The Department of Energy & Environment (DOEE) sent a preliminary draft of the 5-year progress report SIP revision to the FLMs responsible for Class I areas in New Jersey, West Virginia, and Virginia and to EPA for review on August 13, 2015. The agencies agreed that no additional controls are necessary at this time in the District to continue making reasonable progress towards meeting the visibility goals in nearby Class I areas by 2018.

The District reaffirms that emissions from the District are not influencing the visibility impairment of any Class I area in the MANE-VU or VISTAS areas, as previously determined for the Regional Haze SIP that EPA approved in 2012.

The District will continue to coordinate and consult with the FLMs and EPA on future regional haze SIP revisions and on the implementation of programs having the potential to affect visibility at the state's mandatory Class I federal areas.