

## Key Takeaways: Expert Review of Southeastern States Visibility Modeling for the Second Round of Regional Haze State Implementation Plans

### Regional Haze Rule:

While most haze pollution – from industrial facilities, cars and trucks, oil and gas infrastructure and operations, and coal-fired power plants for electricity generation – does not originate in national parks, it can travel hundreds of miles from its source, thereby affecting parks and nearby communities. In fact, nearly 90% of national parks are plagued by haze pollution, and on average, park visitors miss out on 50 miles of scenery because of haze. Studies show that park visitation drops when air pollution is high, indicating the direct effect air quality has on the visitor experience. But haze pollution often has the most harmful consequences for those closest to the sources of pollution – people of color and socioeconomically disadvantaged communities. Air pollution worsens community health, drives up healthcare costs, and makes it harder for kids to learn and play and adults to work.

The Regional Haze Rule, mandated by the Clean Air Act, is a time-tested, effective program that requires federal and state agencies, as well as industry and stakeholder organizations like the National Parks Conservation Association (NPCA) to evaluate measures and work together to restore clear skies at protected national parks and wilderness areas (Class I Areas) around the country. These Class I Areas include 18 locations in the Southeast such as Great Smoky Mountains and Shenandoah National Parks and Joyce Kilmer-Slickrock and Sipsy Wilderness Areas. In order to meet the requirements, states must submit their next round of regional haze plans to the Environmental Protection Agency (EPA) in 2021, specifying the pollution reducing measures they will implement to improve air quality and visibility in these Class I Areas.

### Visibility Improvement State and Tribal Association of the Southeast (VISTAS):

VISTAS is the Regional Planning Organization (RPO) responsible for convening state, local, and tribal air pollution control agencies and collaborating on regional air quality analysis work necessary to support the development of regional haze state implementation plans (SIPs) in ten southeastern states, as well as the Eastern Band of Cherokee Indians, and Knox County, TN.<sup>1</sup> The VISTAS modeling effort was conducted to assist states in the development of the second round regional haze SIPs, with the specific goal of identifying pollution sources affecting Class I Areas (CIAs) that merit an evaluation of measures to reduce visibility impairing pollution.

### NPCA's Independent Analysis:

NPCA commissioned Howard Gebhart, an independent air modeling expert and manager of the environmental compliance section at the Air Resource Specialists (ARS), to perform a technical review of the VISTAS modeling work. In his review, Mr. Gebhart identified substantial issues in the model's performance, inputs and application. These issues affect the model's outcome, drastically reducing the number of sources identified for emission reduction evaluation by the states.

By relying on the flawed VISTAS modeling, Southeastern states are ignoring many significant emission sources that should require emission reductions. According to NPCA's independent analysis, Southeastern states have **ignored 309 sources** from consideration in their haze plans, **allowing 343,426 tons of NO<sub>x</sub> and 183,458 tons of SO<sub>2</sub> emissions**<sup>2</sup> to continue dirtying the air in our parks and communities (Table 1). Additionally, **60 of these unaddressed sources** are located in communities where a majority of residents are people of color and **89% of them** are in communities where many people live below the poverty line.<sup>3</sup>

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<sup>1</sup> AL, FL, GA, KY, MS, NC, SC, TN, VA, and WV, the Eastern Band of Cherokee Indians, and Knox County, Tennessee.

<sup>2</sup> Emissions data was obtained from EPA's 2017 National Emissions Inventory (NEI) and EPA's 2019 Air Markets Data Program (AMPD) for power plants.

<sup>3</sup> US Census Bureau's American Community Survey 5-year estimates for 2012-2016 at the county level.

Table 1. Summary of Sources Selected by NPCA, NPS, and VISTAS in the Southeast Region

State	Number of Sources Identified by NPCA <sup>4</sup>	Number of Sources Identified by the National Park Service (NPS)	Number of Sources Identified by VISTAS <sup>5</sup>	Number of Sources Identified by the State	Main Sectors of Sources Identified by NPCA
AL	45	34	1	*	Power Plants, Paper, Oil and Gas, Chemical, Iron and Steel
FL	70	27	10	4	Cement, Paper, Fertilizer, Power Plants, Airports, Cane Sugar, Oil and Gas, Chemical
GA	34	31	3	*	Power Plants, Paper, Cement, Oil and Gas, Airports, Glass
KY	29	34	2	*	Power Plants, Lime, Cement, Oil and Gas, Iron and Steel
MS	16	8	0	*	Power Plants, Oil and Gas, paper, Iron and Steel, Airports
NC	25	20	3	3	Power Plants, Paper, Iron and Steel, Airports, Glass
SC	19	19	5	*	Power Plants, Paper, Cement, Iron and Steel, Airports, Glass
TN	23	27	2	2	Power Plants, Paper, Cement, Iron and Steel, Oil and Gas, Airports, Glass
VA	30	35	2	2	Power Plants, Paper, Chemical, Cement, Oil and Gas, Lime, Airports.
WV	17	21	5	*	Power Plants, Cement, Iron and Steel, Oil and Gas, Coal, Paper
<b>TOTAL</b>	<b>342</b>	<b>256</b>	<b>33</b>	<b>*</b>	

\* States have not made public the source selection yet.

**NPCA's independent analysis found the following problems with the VISTAS modeling:**

1. **VISTAS computer model does not accurately reflect what the air quality is like in the Southeast region. Therefore, Southeastern states are excusing heavy polluters from proper review.**
  - The computer model (CAMx) used by VISTAS did not account for the actual amount of sulfate polluting the CIAs in the Southeast. Specifically, the model underpredicted sulfate concentrations by up to 32%.

<sup>4</sup> [www.npca.org/regionalhaze](http://www.npca.org/regionalhaze)

<sup>5</sup> <https://www.metro4-sesarm.org/content/vistas-regional-haze-program>

- The sulfate underprediction was found to be higher during the summer months when the pollutant is known to be the greatest contributor to visibility impairment. The model results inaccurately predicted the sulfate levels during the period when visibility is most problematic at CIAs.
  - This modeling error resulted in exclusion of sources for sulfur dioxide (SO<sub>2</sub>) emission reduction evaluations.
  - **Key Takeaway:** Unless the sulfate underprediction is corrected, the VISTAS modeling results are not reliable. And states should not use the model results without accurately accounting for the known sulfate bias.
2. **VISTAS model makes inaccurate assumptions on the projected future emissions from power plants.**
- To estimate the expected emissions from Electric Generating Units (EGUs) in 2028, the end of the second regional haze planning period, VISTAS utilized 2011 data to project the hourly, daily, and seasonal emissions profiles, inaccurately assuming EGUs will operate in 2028 as they did in 2011. However, given the shifts in the electric utility industry over the last decade, EGUs are being used to balance peak loads as opposed to meeting the normal baseline electric load on the grid as they were in years past.
  - While many EGUs are scheduled to be retired or operate at considerably less capacity by 2028, these retirements or capacity reductions are uncertain. Unless there are enforceable obligations to ensure these pollution reductions, sources should not be excluded from analysis on this basis.
  - **Key Takeaway:** Due to the inaccurate EGU emission projections, the VISTAS model did not properly reflect EGUs contribution to CIAs visibility impairment. Therefore, Southeastern states are failing to select the appropriate number of EGU sources they should consider for emission reductions. NPCA's analysis identified 56 EGUs potentially affecting visibility in CIAs, 51 of which are coal-fired. In contrast, VISTAS identified only 14 coal-fired EGUs.
3. **VISTAS model failed to select the most current pollution levels for future emission projections.**
- The VISTAS modeling used monitoring data from 2009-2013 to analyze visibility impacts at CIAs in the Southeast. But this approach is flawed because the nitrate contribution to visibility impairment has shifted dramatically since 2009-2013 in these areas.
  - According to more recent observations (2014-2018), the nitrate contribution to visibility impairment in the Southeast has doubled and even tripled compared to the 2009-2013 period used by VISTAS. Since the future emissions modeled by VISTAS were based on a period when the nitrate levels were lower, the significant shift of nitrate is not being accurately reflected in the future emission projections.
  - **Key Takeaway:** By relying on VISTAS flawed modeling, Southeastern states have failed to identify large sources of nitrogen oxides (NO<sub>x</sub>) emissions, particularly coal-fired EGUs, as significant contributors to visibility impairment at CIAs in the region.
4. **VISTAS modeling used high thresholds and filters resulting in an unreasonably low number of sources selected by each state for an emission control analysis.**
- VISTAS modeling used a screening analysis (Area of Influence, AOI) to identify potential sources of visibility impairment impacting CIAs. Those identified sources were further screened using the Particulate Matter Source Apportionment Technology (PSAT). Both screening methods used arbitrary and high thresholds that substantially restricted the total number of sources analyzed. NPCA's independent analysis identified 342 sources. The National Park Service (NPS) identified 256 sources. But VISTAS identified only 33 sources.
  - The PSAT analysis evaluated sulfate and nitrate contributions separately. However, these pollutants do not exist separately and their contributions to visibility impairment are additive. Despite this fact, VISTAS did not calculate or evaluate the combined total impact of sulfate and nitrate on visibility.

- The impact from other visibility impairing pollutants, such as particulate matter (PM) and volatile organic compounds (VOCs), were not included in the VISTAS analysis.
- **Key Takeaway:** VISTAS modeling limited the number of sources subject to emissions control analysis through a faulty methodology and the use of high thresholds. The use of the high and improper thresholds resulted in too few sources being selected in the Southeast region, which will allow many of the non-selected sources to continue emitting pollution without emission reduction measures intended to protect CIAs. The result of the modeling is fundamentally flawed and contrary to the intent of the EPA Regional Haze regulations and will stymie states in making reasonable progress to reduce haze emissions.

**NPCA's Recommendations:**

1. States should lower the threshold for source selection, such that all southeastern states evaluate sources that represent a significant level of their visibility impairing emissions. The 2016 Proposed Regional Haze Guidance issued by EPA suggested states select sources that represent 80% of visibility impairing emissions, a target NPCA believes is reasonable.
2. States should not (and are not obligated to) solely rely on the VISTAS model in development of their SIPs, and should instead account for the current actual emissions of SO<sub>2</sub> and NO<sub>x</sub> (2014-2019 data is readily available) and require reductions of these pollutants to help clean up air in protected national parks and wilderness areas throughout the Southeast.
3. Southeastern states must not excuse 37 coal-fired EGUs from review, but instead assess and make the retirement of coal units enforceable or require other emission reduction measures.
4. Southeastern states must create regional haze SIPs that are compliant with the Regional Haze Rule and Clean Air Act, otherwise, EPA will need to replace deficient state haze plans with federal provisions.