Arkansas Regional Haze Planning Period II

State Implementation Plan

CHAPTER I: BACKGROUND

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I. Background

A. Impact of Pollution on Visitor Experiences at Federal Class I Areas

National parks, national forests, and national wildlife refuges are valuable assets managed by the federal government for the people of the United States. Visitors to these areas experience unique opportunities to see remarkable views of natural landscapes and wildlife and to engage in recreational activities. Tourism to these areas bolsters the local economies as visitors support outfitters, lodging, gift shops, and restaurants. Due to their size and scenic nature, 156 of these areas have been designated as protected visual environments referred to as federal Class I areas.

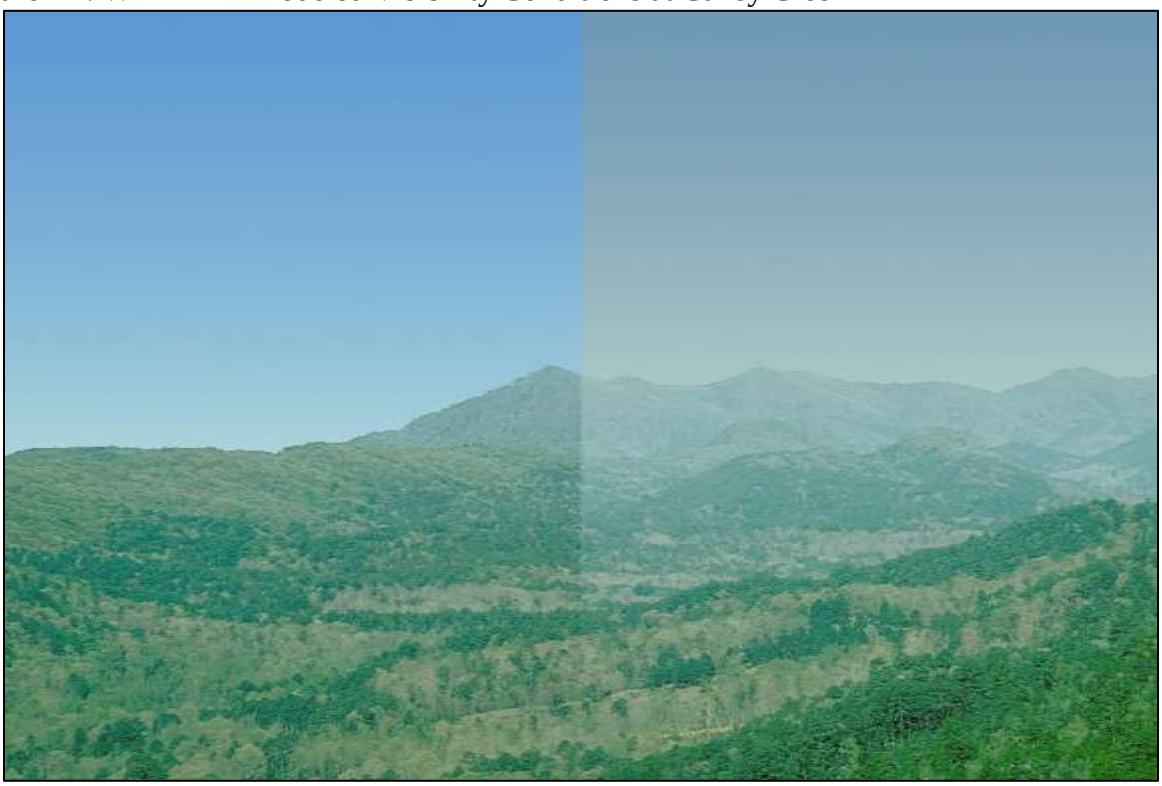
Congress has established requirements to protect and enhance the visibility of vistas in these federal Class I areas for the benefit of current and future generations.

Certain air pollutants can impair visibility by forming haze. Pollutants in haze impair visibility by absorbing and/or scattering light, which can reduce the clarity, color, and range[1] of what an observer can see. When conditions are hazy, the visibility impairment can detract from visitors' enjoyment of a federal Class I area.

Figure I-1 illustrates the impact of haze on visibility at Caney Creek, which is one of Arkansas's federal Class I areas. In the right half of the image, the hills in the distance are noticeably blurred, with attributes of the bluffs darkened by haze. The left side shows sharper ridgelines and color, a result of fewer light-scattering and light-absorbing particles between the viewer and the distant landscape.

[1] "The greatest distance at which an observer can just see a black object viewed against the horizon sky." William C. Malm. Introduction to Visibility. Page 10. https://www.epa.gov/sites/production/files/2016-07/documents/introvis.pdf.

Figure I-1: WinHAZE Modeled Visibility Conditions at Caney Creek[2]



A number of aerosol species, including solid particles and liquid droplets, contribute to haze formation. These particle types (or "species") include ammonium sulfate, ammonium nitrate, organic mass, elemental carbon, soil, coarse mass, and sea salt. Each species of particulate matter (PM) results from emissions of various pollutants from a number of natural and anthropogenic sources. The following paragraphs discuss sources of each PM species that contributes to visibility impairment at federal Class I areas.

Natural sources of sulfate include sea spray and the oxidation of sulfur gases emitted from volcanoes, wetlands, oceans, and wildfires. The primary anthropogenic source of sulfate PM is fossil fuel combustion. The oxidized sulfur gases combine with ammonia in the atmosphere to form ammonium sulfate.

Natural nitrate PM results from the oxidation of nitrogen oxides (NOx) emitted from soils, wildfires, and lightning. Anthropogenic sources of NOx include motor vehicle exhaust, prescribed burning, and other fossil fuel combustion. NOx combines with ammonia in the atmosphere to form ammonium nitrate.

Organic mass comes from both natural and anthropogenic sources. Natural sources include

[2] Retrieved modeled images via http://vista.cira.colostate.edu/Improve/winhaze/ on June 6, 2019, using Regional Haze Metrics for Caney Creek Wilderness Area, "light extinction." Average 20% Best Visibility Days, 2015 (Left) and Average 20% Worst Visibility Days, 2015 (Right)

wildfires and the oxidation of hydrocarbons emitted by vegetation. Anthropogenic sources include open burning, wood burning, prescribed fires, cooking, motor vehicle exhaust, incineration, tire wear, and the oxidation of hydrocarbons emitted from various types of burning, fuel storage and transport, and solvent usage.

Elemental carbon is emitted naturally from wildfires. Manmade sources include motor vehicle exhaust, wood burning, prescribed fires, and cooking.

Soil particles including aluminum, silicon, calcium, titanium, and iron, as well as their oxides that are emitted from mining and quarrying activities, construction, agriculture, and fugitive road dust. Soil particles contribute to both fine and coarse particulate fractions.

Coarse mass may be emitted naturally by wind erosion and re-entrainment of deposited particles. Anthropogenic sources of coarse mass include fugitive dust from paved and unpaved roads, agricultural operations, construction and demolition activities, forestry, mining and quarrying activities, and some industrial processes.[3]

In addition to inhibiting visibility, the pollutants that contribute to haze may also increase illnesses in susceptible populations.[4] Individuals may inhale or ingest small particles and then experience adverse reactions. Physical symptoms from pollutants on hazy days can also detract from visitors' enjoyment of a federal Class I area.

B. Regional Haze Program Overview

In 1977, Congress amended the Clean Air Act to include requirements to address existing visibility impairment resulting from anthropogenic air pollution and prevent future visibility impairment in federal Class I areas.[5] Part of these amendments included the addition of requirements to ensure that new major sources of air pollution do not cause significant deterioration of air quality, including air quality impacts on visibility in federal Class I areas. Other amendments added requirements for monitoring and reporting on visibility conditions as well as developing programs to remedy existing visibility impairment in federal Class I areas.

The Regional Haze Program, established in response to Clean Air Act 169A, is a joint air quality management effort among federal and state partners that seeks to preserve and improve visibility at federal Class I areas. The United States (U.S.) Environmental Protection Agency (EPA) promulgates rules and guidance that advise states on how to develop and implement air quality protection plans to reduce the pollution that causes visibility impairment. The requirements for state plans codified by EPA's Regional Haze Regulations (RHR), as amended, can be found in

[3] Visibility in Mandatory Federal Class I Areas, 1994–1998, A Report to Congress. https://www.epa.gov/visibility/visibility-report-congress-november-2001

[4] States implement programs pursuant to Clean Air Act § 110 to ensure attainment and maintenance of EPA-set health-based standards referred to as national ambient air quality standard or NAAQS.

[5] Clean Air Act 160–169B

40 CFR § 51.308. Federal land managers (FLMs) from the National Park Service (NPS), U.S. Fish and Wildlife Service (FWS), and the U.S. Forest Service (FS) monitor visibility in federal Class I areas through the Interagency Monitoring of Protected Visual Environments (IMPROVE) network and provide advice on state regional haze plan development. States are responsible for developing and implementing regional haze plans, called state implementation plans (SIPs), for each ten-year planning period and evaluating how these plans impact progress towards natural visibility conditions. States also consult with each other at a regional level when emissions from one state impact visibility in a federal Class I area in another state. These federal and state partners work together to achieve the Regional Haze Program's goal of eliminating visibility impairment from man-made air pollution at federal Class I areas.

1. Planning Period I Implementation Overview

First planning period SIPs established the metrics for gauging progress toward natural visibility conditions, a commitment to monitoring and documenting emissions reductions in the state, a control strategy, and goals for visibility improvement by 2018. Control strategies for the first planning period primarily focused on certain sources required by statute to install best available retrofit technology (BART). States also performed a reasonable progress analysis to determine whether any additional controls beyond installation of BART were necessary to ensure reasonable progress during the first planning period.

DEQ worked closely with states and tribes in the Central Regional Air Planning Association (CENRAP), as well as EPA Region 6 and the FLMs of federal Class I areas in the Central States region[6] in developing a SIP for the first implementation period (2008–2018). CENRAP, with input and guidance from its state, tribal, and federal members, prepared technical support documents, for member states to use in SIP development. DEQ relied upon these CENRAP technical support documents as well as EPA guidance in its decision-making for the SIP. DEQ also engaged in formal consultation on proposed SIPs with Missouri Department of Natural Resources (Missouri DNR) and the FLMs.

On September 9, 2008, DEQ submitted a SIP covering 2008–2018 to comply with RHR requirements for the first planning period. In the 2008 SIP submission, DEQ:

- Determined that sources in Arkansas affect the following federal Class I areas: Caney Creek Wilderness Area, Upper Buffalo Wilderness Area, Hercules Glades Wilderness Area, and Mingo National Wildlife Refuge;
- Established baseline and natural visibility conditions and determined a uniform rate of progress (URP) necessary to achieve natural visibility conditions by 2064 in each of the Arkansas federal Class I areas (Caney Creek and Upper Buffalo);
- Evaluated and determined which sources were subject to RHR BART requirements;

[6] State and tribal areas in Arkansas, Kansas, Minnesota, Nebraska, Texas, Iowa, Louisiana, Missouri, Oklahoma

- Performed source-specific analyses to determine NOx, sulfur dioxide (SO_2), and PM BART emission limits for each subject-to-BART source. The Arkansas Pollution Control and Ecology Commission (APC&EC) adopted these emission limits, compliance schedules, and recordkeeping and reporting requirements into APC&EC Regulation No. 19;
- Determined that no additional controls beyond BART were necessary to achieve reasonable progress and established 2018 reasonable progress goals (RPGs) based on this determination; and
- Described the state's consultation with the FLMs and other states, its plan for coordination of regional haze and reasonable attributable visibility impairment (RAVI), its monitoring strategy, and its commitment to submit periodic SIP revisions and progress reports.

In 2012, EPA partially approved and partially disapproved the 2008 SIP submission.[7] While EPA approved many of the SIP elements described above, EPA specifically disapproved the compliance dates, the list of BART-eligible and subject-to-BART sources, select BART control determinations, the RPGs, and the long-term strategy of the 2008 SIP submission. This partial approval/partial disapproval of the 2008 SIP submission triggered a requirement for EPA to either approve a SIP revision submitted on behalf of Arkansas or promulgate a federal implementation plan (FIP) within twenty-four months of the 2012 partial approval/partial disapproval of the 2008 SIP submission.

On June 2, 2015, DEQ submitted a progress report assessing progress towards RPGs established for Caney Creek and Upper Buffalo and examined the adequacy of existing implementation measures in achieving reasonable progress. EPA approved the progress report on October 1, 2019 after taking action on the Phase I and Phase II SIP revisions described below.[8]

On September 27, 2016, EPA finalized a FIP for Arkansas for the first planning period (2016 FIP).[9] The 2016 FIP established new BART requirements for sources with BART determinations in the 2008 SIP submittal that EPA disapproved. EPA also required installation of additional controls at a power plant that was not subject to BART for the purposes of achieving reasonable progress.

On October 31, 2017, DEQ submitted a SIP revision to address NOx requirements for the first planning period from electric generating units (EGUs) that are subject to the Cross-State Air

[7] Approval and Promulgation of Implementation Plans; Regional Haze State Implementation Plan; Interstate Transport State Implementation Plan to Address Pollution Affecting Visibility and Regional Haze. (77 FR 14604, March 12, 2012)

[8] Air Plan Approval; Arkansas; Regional Haze Five-Year Progress Report State Implementation Plan, (84 FR 51986, October 1, 2019)

[9] Promulgation of Air Quality Implementation Plans; State of Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan; Final Rule (81 FR 66332, September 27, 2016)

Pollution Rule (CSAPR). DEQ refers to the 2017 SIP revision as the Phase I SIP revision. EPA approved the Phase I SIP revision on February 12, 2018 and simultaneously rescinded NOx BART requirements for EGUs included in the 2016 FIP.[10]

On August 8, 2018, DEQ submitted a SIP revision to replace SO_2 and PM BART requirements for EGUs included in the 2016 FIP. DEQ refers to the 2018 SIP revision as the Phase II SIP revision. This SIP also included NOx, SO_2, and PM BART requirements for an auxiliary boiler, a revised reasonable progress analysis, and revised 2018 reasonable progress goals for Caney Creek and Upper Buffalo Wilderness Areas. EPA approved the Phase II SIP revision on September 27, 2019 and simultaneously rescinded SO_2 and PM requirements for EGUs included in the 2016 FIP.[11]

On August 14, 2019, DEQ submitted a SIP revision to replace BART requirements for Domtar Ashdown Mill that were included in the 2016 FIP. DEQ refers to the 2019 SIP submission as the Phase III SIP revision. With EPA's approval of the Phase III SIP revision and withdrawal of the remaining elements of the 2016 FIP, Arkansas's Regional Haze SIP for the first planning period has been fully approved.[12] DEQ refers to the approved elements of the 2008 SIP submittal, the Phase I SIP revision, the Phase II SIP revision, and the Phase III SIP revision, collectively, as the Planning Period I SIP.[13]

2. Requirements for Planning Period II

The RHR at 51.308(f) details requirements for second planning period SIPs (Planning Period II SIPs). The RHR establishes a due date of July 31, 2021. However, states may submit completed SIPs at any time prior to July 31, 2021. Appendix A provides a checklist of required elements for Planning Period II SIP, RHR citations, and where the requirement is addressed in this SIP narrative. The following paragraph provides an overview of Planning Period II SIP requirements.

In Planning Period II SIPs, each state must demonstrate how they have and will continue to make progress toward natural visibility conditions at federal Class I areas. Due to revisions in the RHR

[10] Approval and Promulgation of Implementation Plans; Arkansas; Approval of Regional Haze State Implementation Plan Revision for NOx for Electric Generating Units in Arkansas: Final Rule (83 FR 5927, February 12, 2018)
Approval and Promulgation of Implementation Plans; Arkansas; Regional Haze and Interstate Visibility Transport Federal Implementation Plan Revisions; Withdrawal of Federal Implementing Plan for NOx for Electric Generating Units in Arkansas: Final Rule (83 FR 5915, February 12, 2018)

[11] Air Quality State Implementation Plans; Approvals and Promulgations: Arkansas; Approval of Regional Haze State Implementation Plan Revision for Electric Generating Units in Arkansas (84 FR 51033, September 27, 2019)
Air Quality State Implementation Plans; Approvals and Promulgations: Arkansas; Regional Haze Federal Implementation Plan Revisions; Withdrawal of Portions of the Federal Implementation Plan, (84 FR 51056, September 27, 2019)

[12] 86 FR 15104, March 22, 2021

[13] All Regional Haze SIP documentation for Planning Period I, including Phases I - III submissions, may be accessed through DEQ's website: https://www.adeq.state.ar.us/air/planning/sip/regional-haze.aspx

and associated guidance, states must update their calculations of baseline visibility conditions, natural visibility conditions, current visibility conditions and the URP toward natural visibility conditions for each federal Class I area.[14] States must perform four-factor analyses[15] to determine what control measures should be included in the state's long-term strategy for Planning Period II. After establishing the long-term strategy, states must set 2028 goals for visibility improvement on the twenty percent most impaired days and ensure no degradation from baseline conditions for the twenty percent clearest days. States must also include a monitoring strategy for characterizing and reporting visibility impairment at federal Class I areas. In addition, states must report progress on implementation of control strategies from first planning period SIPs, emissions trends, and visibility trends. States must also evaluate whether any significant changes in anthropogenic emissions of visibility-impairing pollutants are limiting or impeding progress. In developing Planning Period II SIPs, each state must consult with the FLMs and any other state air quality agency with federal Class I areas impacted by sources in the state.

[14] EPA (2018). Technical Guidance on Tracking Visibility Progress for the Second Implementation Period of the Regional Haze Program. Pgs. 5–14. https://www.epa.gov/sites/production/files/2018-12/documents/technical_guidance_tracking_visibility_progress.pdf

[15] The four factors that must be evaluated are cost of compliance, time necessary for compliance, energy and Non-air quality environmental impacts of compliance, remaining useful life of any existing source subject to compliance.