Alaska Department of Environmental Conservation

Amendments to: State Air Quality Control Plan

Appendix III.K.14

2026 Regional Haze Progress Report

Appendix to Section III.K: Areawide Pollutant Control Program for Regional Haze

2nd Implementation Period

February 4, 2026

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Acronyms

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
BACM	Best Available Control Measures
BACT	Best Available Control Technology
CAA	Clean Air Act
CDS	Circulating Dry Scrubbers
CFR	Code of Federal Regulations
CMAQ	Community Multiscale Air Quality
Denali	Denali National Park
DMS	Dimethyl Sulfide
DSI	Dry Sorbent Injection
dv	Deciview
ECA	Emissions Control Area
EGU	Electric Generating Unit
Eielson AFB	Eielson Air Force Base
EPA	U.S. Environmental Protection Agency
EU	Emission Unit
FED	Federal Land Manager Environmental Database
FLM	Federal Land Manager
FNSB	Fairbanks North Star Borough
FNSB NAA	Fairbanks North Star Borough Serious $PM_{2.5}$ Nonattainment Area
Fort Wainwright	U.S. Army Garrison Fort Wainwright
FR	Federal Register
FWS	U.S. Fish and Wildlife Service
GVEA	Golden Valley Electric Association
hr	hour
IMPROVE	Interagency Monitoring of Protected Visual Environments
MATS	Mercury and Air Toxics Standards
MID	Most Impaired Days
MMBTU	Million British Thermal Units
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standard
NEI	National Emissions Inventory
NH_3	Ammonia
NH_4NO_3	Ammonium Nitrate
$(NH_4)_2SO_4$	Ammonium Sulfate
NOx	Nitrogen Oxides
NPPP	Golden Valley Electric Association North Pole Power Plant
NPS	National Park Service
Nutrien	Nutrien Kenai Nitrogen Operations
Petrostar	Petro Star North Pole Refinery
PM	Particulate Matter
PM10	Particulate Matter < 10 microns
PM2.5	Particulate Matter < 2.5 microns

Q/d	Emissions in tons/year divided by distance to an affected Class I area in kilometers
RH	Regional Haze
RHR	Regional Haze Rule
RPG	Reasonable Progress Goal
RPO	Regional Planning Organization
SCR	Selective Catalytic Reduction
SDA	Spray Dry Absorber
Simeonof	Simeonof National Wildlife Refuge
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
Tuxedni	Tuxedni National Wildlife Refuge
UAFC	University of Alaska Fairbanks Campus
UAF	University of Alaska Fairbanks
ULSD	Ultra-Low Sulfur Diesel
URP	Uniform Rate of Progress
USFS	U.S. Forest Service
VOC	Volatile Organic Compounds
WFGD	Wet Flue Gas Desulfurization
WRAP	Western Regional Air Partnership

Executive Summary

Regional haze is pollution that impairs visibility over a large area, including national parks, forests, and wilderness areas. Regional Haze is caused by sources and activities emitting fine particles, and their precursors, often transported over large regions. Particles affect visibility through the scattering and absorption of light. Reducing fine particles in the atmosphere is an effective method of improving visibility. Emissions that affect visibility include a wide variety of natural (e.g., wildland fires) and anthropogenic, or man-made, sources (e.g., industrial sources and vehicles).

Congress declared in Section 169A of the 1977 Amendments to the Clean Air Act that "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution" be a national goal. Congress designated 156 areas as Class I, including national parks exceeding 6,000 acres, wilderness areas and national memorial parks exceeding 5,000 acres, and all international parks that were in existence as of August 7, 1977.

The U.S. Environmental Protection Agency (EPA) promulgated the Regional Haze Rule on July 1, 1999 (64 Federal Register (FR) 35713) and codified it in 40 Code of Federal Regulations (CFR) § 51.300-309. The Regional Haze Rule requires each state, identified in 40 CFR § 51.300(b), to submit State Implementation Plans demonstrating reasonable progress toward returning Class I areas to natural visibility conditions by 2064. The plan must provide a comprehensive analysis of natural and anthropogenic sources of haze in each mandatory Class I area within the state. The plan must include a long-term strategy, including enforceable emissions limitations, compliance schedules, and other measures necessary to achieve the reasonable progress goals by reducing the anthropogenic sources. On March 29, 2011, the Alaska Department of Environmental Conservation (ADEC) submitted its initial Regional Haze State Implementation Plan to EPA. On February 14, 2013, EPA published final approval of the Alaska State Implementation Plan in 78 FR 10546. The Second Implementation of the Alaska Regional Haze State Implementation Plan was adopted by Alaska under 18 AAC 50.030(a)[1] on July 5, 2022, and is awaiting final action from EPA.

The Regional Haze Rule also requires that states prepare periodic progress reports. The initial periodic report is due five years from submitting the initial implementation plan and every ten years thereafter. The progress reports are to evaluate progress towards the reasonable progress goal for each mandatory Class I Federal area located within the State and any Class I areas affected by emissions outside of the State. ADEC submitted the first Alaska Regional Haze Progress Report to EPA on March 10, 2016, and EPA published final approval in 83 FR 15746 on May 14, 2018. This document is intended to fulfill the requirements of paragraphs 40 CFR § 51.308(g), (h), and (i) of the Regional Haze Rule and to serve as a progress report for the second regional haze planning period, which covers the period from 2018 to 2022.

The Alaska State Regional Haze Implementation Plan describes efforts to improve visibility in three qualifying Class I areas located within the state including Denali National Park, Tuxedni National Wildlife Refuge, and Simeonof National Wildlife Refuge. The Bering Sea National Wildlife Refuge, Alaska's fourth Class I Area, is not addressed in the Regional Haze State Implementation Plans due to an absence of monitoring data. The area is remote with severe weather and no power supply available to support a monitoring station.

[1] The Alaska State Legislature. *Alaska Administrative Code*. https://www.akleg.gov/basis/aac.asp#18.50.030

Alaska is Impacted significantly by sources of haze forming emissions transported into the state which are beyond the state's control. However, unlike states located in the contiguous United States, Alaska borders no other state in America. Alaska is instead directly impacted by air pollutants outside of their control from China, Asia, Canada, Russia, and Eastern Europe. This includes pollutants from international marine traffic conducting trade between North America and Asia that operate in Emission Control Area coverage gaps. The coverage gaps allow marine vessels to combust fuel oil that is not limited to a sulfur content of 0.10%. Additionally, emissions from natural sources, such as volcanic degassing, sea salt in marine aerosols, and oceanic dimethyl sulfide are also major contributors to Alaska's haze forming emissions. However, as discussed in greater detail in the Second Implementation Period Regional Haze SIP[2], Section III.K.13.G, these emissions were not accounted for in EPA's modeling programs.

Ammonium Sulfate, a compound formed from the chemical reaction of sulfuric acids and atmospheric nitric acids in the atmosphere, is measured by EPA's monitoring network called Interagency Monitoring of Protected Visual Environments or IMPROVE stations. Based on the data collected, ammonium sulfate dominates visibility impairment in Alaska Class I areas. Between 2018 and 2022, ammonium sulfate emissions comprised over 90% of emissions classified as anthropogenic at Denali National Park and Simeonof National Wilderness Refuge, and over 80% at Tuxedni National Wildlife Refuge.

To prevent the production of ammonium sulfate, ADEC focused the second planning period's long-term strategy on one of the compound's precursors, sulfur dioxide (SO_2). One of the main sources of anthropogenic SO_2 is created and released during the combustion process of fossil fuels. Once in the atmosphere, SO_2 reacts with water, oxygen, and other substances to create sulfuric acid. SO_2 in turn reacts with atmospheric nitric acids, creating ammonium sulfate.

Electrical generation and oil and gas development industries contribute to the state's total sulfur emissions. During the second implementation period, through a two-step approach, ADEC identified anthropogenic sources potentially causing visibility impairment at all of the IMPROVE monitor sites located in Alaska's three Class I Areas. The initial step consisted of an Area of Influence and Weighted Emissions Potential analysis. The analysis identified 26 anthropogenic sources of emissions that had the potential to contribute the most to visibility impairment on the Most Impaired Days (MID) at Class I Areas in the state. The 26 facilities were advanced to the second step where a ratio was calculated comparing each facility's emissions to the facility's distance from the closest Class I Area, otherwise known as a Q/d analysis (Q = quantity of SO_2 emissions in tons and d = distance to an affected Class I area in kilometers). Six facilities with a ratio greater than the 1.0 threshold set by ADEC were identified. Tuxedni and Simeonof National Wildlife Refuges were determined to be too far from any significant pollutant sources to undergo further evaluation. All six remaining sources were in proximity to Denali National Park, were subject to analysis and were further analyzed for potential control measures. The two-step process is described in greater detail in sections III.K.13.F and III.K.13.G of Alaska's Second Implementation Regional Haze SIP[1].

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[2] Alaska Department of Environmental Conservation. (July 5, 2022*). Amendments to: State Air Quality Control Plan Vol. II: Analysis of Problems, Control Actions Section III. Area Wide Pollutant Control Program Subsection K.13 Regional Haze 2nd Implementation Period.* https://dec.alaska.gov/air/anpms/regional-haze/sip/

SO_2 emissions in Alaska have been reduced with the implementation of the federal Ultra-Low Sulfur Diesel (ULSD) requirements for on-road and non-road vehicles, railway locomotives, and domestic ships operating in Alaska's waterways. Passenger vehicle emissions have been further reduced due to the Federal Motor Vehicle Control Program which requires all new cars to meet their applicable emission standards on a standard test cycle called the Federal Test Procedure. Additionally, EPA's Tier 2 and 3 emission standards for nonroad diesel and gasoline engines resulted in reductions in visibility impairing pollutants while further enhancing the performance of this equipment.

In addition to the federal programs, Alaska has several ongoing programs and regulations that directly protect visibility or provide for improved visibility by generally reducing emissions. ADEC regulations at 18 Alaska Administrative Code (AAC) 50 and the overall Alaska Air Quality Control Plan serve to control air pollutants that can impair visibility and impact Class I areas in Alaska. Local community programs have also been implemented to address mobile source emissions that will also continue to reduce visibility impairing pollutants. Transit programs are in place that assist in reducing vehicle emissions such as vanpool/ridesharing program, which reduces overall vehicle miles travelled. Efforts to encourage the use of block heaters in the winter to reduce cold start emissions from motor vehicles have also been effective. In Fairbanks, there continues to be outreach on local plug-ins for engine block heater use along with electrification of parking lots to reduce mobile source emissions from cold starts. Fairbanks is also working to convert its transit fleet to compressed natural gas which is expected to eliminate the use of more than 120,000 gallons of diesel annually. Additionally, in both Fairbanks and North Pole, a new regulation, 18 AAC 50.078(b), went into effect on September 1, 2022, prohibiting the sale or purchase of fuel oil containing more than 1,000 parts per million for use in fuel oil-fired equipment, including space heating devices.

ADEC contends that the IMPROVE data overestimates the quantity of this pollutant categorized as anthropogenic by design. The methods used to differentiate emissions as anthropogenic versus natural/uncontrollable are designed for conditions occurring in the Lower 48 states and do not account for the unique international and naturally occurring emissions impacting Alaska's visibility.

Based on the data and discussion presented in this progress report, ADEC affirms that Alaska's regional haze State Implementation Plan for the second planning period is adequate for making reasonable progress towards the Regional Haze Rule goal of achieving natural visibility conditions at Class I areas by 2064.

ADEC will provide the Federal Land Managers with an opportunity for consultation on the contents of this progress report 60 days prior to being made available for public review and prior to submittal to EPA as required by 40 CFR 51.308(i)(2). However, per revisions made to the Regional Haze Rule in 2017 (82 FR 3078), this progress report is not being submitted as a formal State Implementation Plan revision.

A. Introduction

1. Purpose of this Document

This document is intended to fulfill the requirements of paragraphs 40 CFR § 51.308(g), (h), and (i) of the Regional Haze Rule (RHR) and to provide a status update on the progress achieved under the 2nd Implementation of the Alaska Regional Haze State Implementation planning period (SIP).

2. Regional Haze Rule

In Section 169A of the 1977 Amendments to the Clean Air Act (CAA), Congress established a program for protecting visibility in 156 mandatory Federal "Class I" areas. Class I areas consist of national parks exceeding 6,000 acres, wilderness areas and national memorial parks exceeding 5000 acres, and all international parks that were in existence on August 7, 1977. In the 1990 Amendments to the CAA, Congress added Section 169B and called on the U.S. Environmental Protection Agency (EPA) to issue rules addressing regional haze impairment from manmade air pollution and establishing a comprehensive visibility protection program for Class I areas.

The EPA promulgated the RHR on July 1, 1999 (64 FR 35713). States are required under 40 CFR 51.308 to submit SIPs to the EPA that set out each states' plan for complying with the RHR. States must demonstrate reasonable progress toward meeting the national goal of a return to natural visibility conditions by 2064. The rule directs states to graphically show what would be a "uniform rate of progress (URP)", also known as the "glide path," toward natural conditions for each Class I area within the State and certain ones outside the State.

The EPA designated five Regional Planning Organizations (RPOs) to assist with the technical support, coordination and cooperation needed to address the visibility issue for the first regional haze SIPs. The multistate RPOs were established to perform the technical regional analyses for these SIPs. The RPO supporting the western states' regional haze effort is the Western Regional Air Partnership (WRAP). WRAP is a voluntary partnership of state, tribes, Federal Land Managers (FLM), local air agencies, and the EPA whose purpose is to understand current and evolving regional air quality issues in the West. The regional planning process describes the process, goals, objectives, management and decision-making structure, and deadlines for completing significant technical analyses of the regional group.

On March 29, 2011, the ADEC submitted its initial Regional Haze (RH) SIP to EPA. On February 14, 2013, EPA published final approval of the Alaska SIP in 78 FR 10546. Provisions of the RHR also require each state to submit a progress report five years after the submittal of their initial RH SIP and every ten years thereafter. ADEC submitted the first Alaska Regional Haze Progress Report to EPA on March 10, 2016, and EPA published final approval in 83 FR 15746 on May 14, 2018.

The 2nd Implementation of the Alaska Regional Haze State Implementation Plan was adopted by Alaska on July 5, 2022[3] and a clarification memo was submitted to EPA on October 6, 2025[4]. EPA proposed to approve Alaska's RH plan for the second implementation period on October 30, 2025 (EPA-R10-OAR-2023-0348)[5]. The following updates and additional details are included in the clarification memo:

- ADEC has removed the University of Alaska Fairbanks Campus (UAFC) from ADEC's list of sources requiring further analysis because the actual emissions of SO_2 have decreased below screening levels since the replacement of their coal-fired boilers in 2019 with a modern circulating fluidized bed coal-fired boiler. Further details of that determination are included in the clarification memo.

- ADEC evaluated firing ultra-low sulfur diesel (ULSD) year-round in emission units (EUs) 1, 2, 5, and 6 at Golden Valley Electric Association (GVEA) North Pole Power Plant (NPPP) as part of the SO_2 BACT analysis in the 2024 Fairbanks North Star Borough Serious $PM_{2.5}$ Nonattainment Area (FNSB NAA) SIP Submission and calculated costs based on PTE. ADEC determined it would not be cost-effective based on actual emissions for purposes of the regional haze long-term strategy. Therefore, no reductions or emission controls were selected for NPP under the Regional Haze rule. The documentation for this determination can be found on Regulations.gov for docket no. EPA-R10-OAR-2024-0595.

- ADEC recalculated the costs for No. 1 and No. 2-fuel based on 2025 fuel prices and determined it is economically infeasible to switch to No. 1 fuel oil for EUs 1 and 2 at NPPP. Details of the calculated costs are included as an attachment to the clarification memo.

- After the 2022 Regional Haze Plan SIP Submission, GVEA's Healy Power Plant elected to install Selective Catalytic Reduction (SCR) on EU 1and continue operating the unit.

- GVEA submitted a four-factor analysis for optimizing Dry Sorbent Injection (DSI) on Healy Power Plant's EU 1 in 2023 that concluded that their DSI system could not achieve an SO_2 emissions rate lower than the unit's current emissions limit of 0.30 lb/MMBtu through increased sorbent injection rates alone.

- ADEC reevaluated whether DSI optimization is necessary on GVEA Healy Power Plant's EU1 for reasonable progress based on the four statutory factors using DSI cost estimates from sources in the 2024 FNSB NAA SIP Submission. Based on the evaluation, ADEC determined that it is not cost effective to upgrade the DSI control system reaffirming the previous BART analysis. Details of the evaluation are included as an attachment to the clarification memo.

[3] Alaska Department of Environmental Conservation. (July 5, 2022). *Second Implementation Period Combined SIP Section (Adopted 07-05-2022)(PDF).* https://dec.alaska.gov/air/anpms/regional-haze/

[4] Alaska Department of Environemtal Conservation. (October 6, 2025). *2025 Signed Alaska Regional Haze Clarification Memo Final (PDF).* https://dec.alaska.gov/air/anpms/regional-haze/

[5] Environmental Protection Agency. (October 30, 2025). *Air Plan Approval; AK; Regional Haze Plan for the Second Implementation Period*. https://www.federalregister.gov/documents/2025/10/30/2025-19713/air-plan-approval-ak-regional-haze-plan-for-the-second-implementation-period

- On April 8, 2025, GVEA Healy Power Plant's EU 1 received a Presidential Exemption[6] from Mercury and Air Toxics Standards (MATS) compliance until July 2029. It is reasonable to assume that GVEA would time any upgrade to the DSI system to coincide with work to install activated carbon injection ports for MATS compliance.

- ADEC evaluated retrofitting EUs 4 through 7 at Aurora Energy's Chena Power Plant facility with SO_2 emissions controls as part of the SO_2 BACT analyses in the FNSB NAA SIP submitted on December 4, 2024. Based on the results, ADEC determined that due to space constraints, it would not be technically feasible to install wet flue gas desulfurization (WFGD), circulating dry scrubbers (CDS), or SDA on EUs 4 through 7. ADEC also determined that for DSI on EUs 4 through 7, the SO_2 removal cost would not be economically feasible. The documentation for this determination can be found on Regulations.gov for docket no. EPA-R10-OAR-2024-0595.

- SO_2 emission limits were included in Chean Power Plant's operating permit under the FNSB NAA SIP and included as regulatory required controls in the Second Implementation Regional Haze SIP. However, further studies determined that the controls did not meaningfully contribute to reducing $PM_{2.5}$ emissions in the Nonattainment Area and therefore, the emission limits were rescinded by ADEC. The documentation for this determination can be found in the Modeling Chapter for the FNSB NAA SIP[7].

- At ADEC's request, Eielson Air Force Base (Eielson AFB) conducted a Four factor Analysis in 2023 for the installation of SO_2 emission pollution control technologies including WFGD, DSI, and Spray Dry Absorbers (SDA) on the facility's four legacy coal fired boilers, EUs 1 through 4. Based on the analysis, Eielson AFB determined retrofitting the boilers with any SO_2 emission controls would be cost prohibitive. ADEC revised the analysis using conservative assumptions and also determined any SO_2 emission controls would be cost prohibitive. More details of the analyses are included as an attachment to the clarification letter.

- ADEC further analyzed retrofitting Eielson AFB's legacy coal-fired using cost data reported in the SO_2 BACT analysis for the 2024 FNSB NAA SIP Submission. The analysis includes cost estimates for the six coal-fired boilers at U.S. Army Garrison Fort Wainwright's Central Heating and Power Plant (Fort Wainwright) that are similar in age and size to Eielson AFB's EUs 1-4. Based on the comparison, ADEC reaffirms that SO_2 controls would be cost prohibitive. The documentation for this determination can be found on Regulations.gov for docket no. EPA-R10-OAR-2024-0595.

[6] U.S. Environmental Protection Agency. (April 8, 2025). *Presidential Proclamation – Regulatory Relief for Certain Stationary Sources to Promote American Energy*. https://www.epa.gov/stationary-sources-air-pollution/presidential-proclamation-regulatory-relief-certain-stationary

[7] Alaska Department of Environmental Conservation. (November 5, 2024). *Amendments to: State Air Quality Control Plan Vol. II: III.D.7.8 Modeling*. https://dec.alaska.gov/media/rs4pmcfa/iiid708-modeling.pdf

- As noted above, the SO_2 BACT analysis for the 2024 FNSB NAA SIP Submission included a cost estimate for retrofitting Fort Wainwright's coal-fired boilers, EUs 1-6, with emission SO_2 controls. Based on the analysis, DEC determined that it is economically infeasible to install DSI, CDS, WFGD, and SDA on the coal-fired boilers. The documentation for this determination can be found on Regulations.gov for docket no. EPA-R10-OAR-2024-0595.

- SO_2 emission limits were included in Fort Wainwright's operating permit under the FNSB NAA SIP and included as regulatory required controls in the Second Implementation Regional Haze SIP. However, further studies determined that the controls did not meaningfully contribute to reducing $PM_{2.5}$ emissions in the Nonattainment Area and therefore, the emission limits were rescinded by ADEC. The documentation for this determination can be found in the Modeling Chapter for the FNSB NAA SIP[8].

3. IMPROVE Program

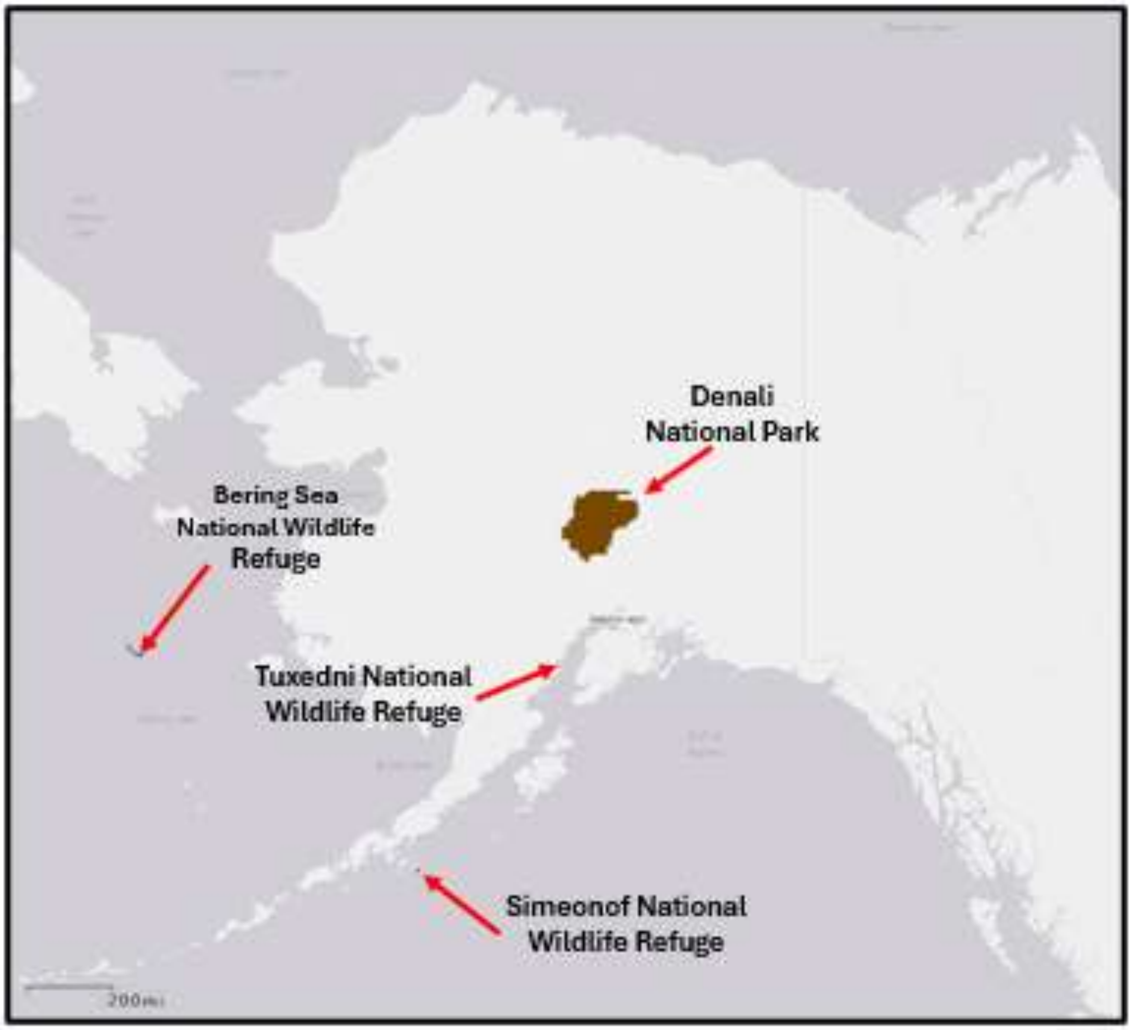
The Interagency Monitoring of Protected Visual Environments (IMPROVE) program is a cooperative measurement effort governed by a steering committee of federal, regional, and state organization representatives. The IMPROVE monitoring program was established in 1985 to aid the creation of federal and state implementation plans for the protection of visibility in Class I areas. The objectives of IMPROVE are to document current visibility and aerosol conditions in mandatory Class I areas, to identify chemical species and emission sources responsible for existing man-made visibility impairment, to document long-term trends for assessing progress towards the national visibility goal, and to provided regional haze monitoring representing all visibility-protected federal Class I areas where practical. Currently in Alaska there are four IMPROVE monitoring sites operating in three Class I areas. Two stations are collecting data for Denali National Park, one station is collecting data to represent Tuxedni National Wildlife Refuge, and one station representative of the Simeonof National Wildlife Refuge is collecting data. No station was installed representing the Bering Sea National Wildlife Refuge due to the remoteness and lack of power source in this Class I area.

[8] Alaska Department of Environmental Conservation. (November 5, 2024). *Amendments to: State Air Quality Control Plan Vol. II: III.D.7.8 Modeling*. https://dec.alaska.gov/media/rs4pmcfa/iiid708-modeling.pdf

4. **Alaska Class I Areas**

Despite Alaska's many national parks, forests, wildlife refuges, and wilderness areas, Alaska has only four qualifying mandatory Class I areas: Bering Sea National Wildlife Refuge (Bering Sea), Denali National Park (Denali), Tuxedni National Wildlife Refuge (Tuxedni), and the Simeonof National Wildlife Refuge (Simeonof). The rest of the state's national areas were set aside after the inclusion of the Class I areas in the 1977 CAA.

Figure 1. Alaska Class I Areas

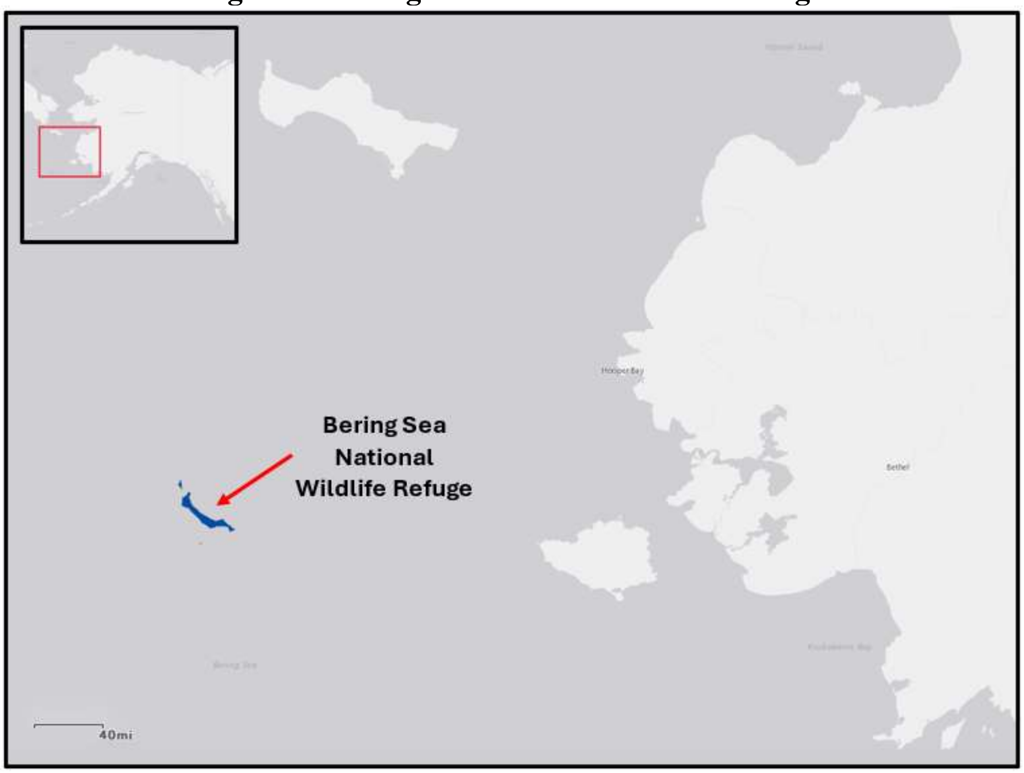


EPA Interactive Map of Air Quality Monitors
https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors

Bering Sea National Wildlife Refuge

The Bering Sea National Wildlife Refuge is located off the coast of Alaska in the Bering Sea, about 220 miles northwest of Nome. Together, St. Matthew Island, Hall Island, and Pinnacle Island encompass 41,113 acres of land. Arctic foxes, insular voles, and 125 species of birds found living on the islands are visited by the occasional polar bear brought in by pack ice. Ringed seals and Steller sea lions also often haul themselves up on the shore of the islands. Human activity near the area is minimal, apart from a rare adventurer, most of the activity in the refuge is limited to offshore trawling for king crab. Due to the remote location of the Bering Sea Class I area, and the severe weather the area experiences, accessing the islands is challenging. The maintenance of monitoring stations in the Bering Sea has proven impossible to conduct frequently enough to properly collect air emissions data. Compounding the difficulties, there is no source of power to supply the monitoring station. Therefore, no IMPROVE data by which a Baseline or Glidepath could be calculated is available for the Bering Sea National Wildlife Refuge and the area is not addressed in the Regional Haze State Implementation Plans.

Figure 2. Bering Sea National Wildlife Refuge

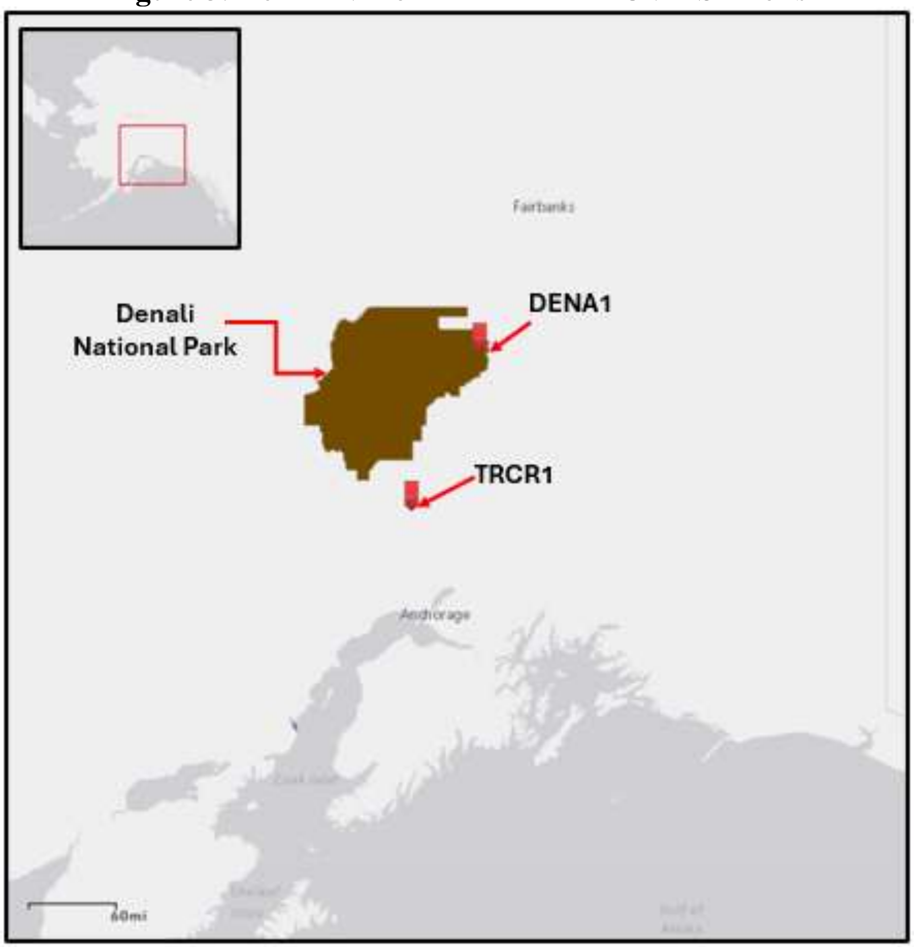


EPA Interactive Map of Air Quality Monitors
https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors

Denali National Park

Denali is in the interior of Alaska with headquarters 240 miles north of Anchorage and 125 miles southwest of Fairbanks, in the center of the Alaska Range. Denali National Park encompasses 4,740,091 acres including 2,146,270 acres of federally designated wilderness. The park draws an overage of over 600,000 recreational and non-recreational visitors every year[9]. Most of those visitors were in search of wildlife sightings. But everyone gets to enjoy the breathtaking scenery starting with the relatively low-elevation taiga forest at 2,000 feet which gives way to high alpine tundra and snowy mountains, culminating in North America's tallest peak, 20,310-foot-tall Denali. The Alaska Range divides the park into two geographic zones by blocking warm moist air from the Gulf of Alaska from getting to the interior inland side of the park. The park contains numerous glaciers, permafrost, and high mountains. Denali is the only Class I area in Alaska that is easily accessible and connected to the road system. For that reason, it has the most extensive air monitoring of Alaska's Class I areas and more detailed examinations of long-term and seasonal air quality trends are possible for this site.

Figure 3. Denali National Park IMPROVE Stations



EPA Interactive Map of Air Quality Monitors
https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors

[9] National Park Service. (September 12, 2018). Visitor Trends. https://www.nps.gov/dena/learn/nature/visitor-trends.htm. (Accessed 1/8/2026).

Two IMPROVE monitoring sites are located near Denali. The original monitor, located near Denali Park's Headquarters, is designated as DENA1. The monitor has been in use and collected data since March 1988. However, the site is installed in the most populated part of the park near a heavily travelled road, especially during the summer tourist season. The location is also in the very far northeast corner of the park and has nearby topographical barriers such as the Alaska Range, so it was determined that the headquarters site was not adequately representative of the entire Class I area. Therefore, the Trapper Creek IMPROVE monitoring station, designated as TRCR1, was established in September 2001. This station is located west of Trapper Creek, approximately twenty miles south of Denali Park's southern boundary and a quarter mile south of Petersville Road. The station is also located 100 yards east of Trapper Creek Elementary School which experiences relatively little traffic during the day, about 4 buses and 50 automobiles, and is closed June through August. This site was selected because it has year-round access to power, is relatively open, and is not directly impacted by most local pollution sources. The TRCR1 station is considered by ADEC to be the official IMPROVE site for Denali to evaluate the long-range transport of pollution into the park from the south.[10] However, the DENA1 station continues to be maintained, and data continues to be collected and reported in the Regional Haze Reports.

Note that due to budget restrictions, the IMPROVE Steering Committee has proposed reducing monitoring frequency or shutting down various IMPROVE monitoring stations throughout the country. Alaska's TRCR1 station is currently under review by the committee, but a final decision has not yet been issued.

Tuxedni National Wildlife Refuge

Tuxedni National Wildlife Refuge, at the mouth of Tuxedni Bay in Cook inlet, is made up of two islands totaling 5,556 acres. Chisik Island and Duck Island were established as a refuge for seabirds, bald eagles, and peregrine falcons in 1909 and are now managed by U.S. Fish and Wildlife Service (FWS). Most of the refuge lies on the larger of the two islands, Chisik Island. Chisik Island slopes upward out of Cook Inlet from sandy beaches on the southern end to 400-foot cliffs on the northern end. Within the wilderness area there is little human activity apart from a few kayakers and backpackers. The islands are accessible only by small planes and boats, but even then, access is risky due to unpredictable wind gusts and rough waters. During fishing season, set nets are installed around the perimeter of the island and in Tuxedni Bay. A 104-year-old cannery made up of approximately a dozen buildings lies just outside the wilderness area on the southern end of the island. The cannery's owners recently established historical recognition after being added to the National Register of Historic Places. They are currently in the process of restoring the buildings and are currently operating a small lodge that accommodates up to 12 guests.

In nearby Cook Inlet, production and exploration is actively occurring at the 28 onshore and offshore oil and gas fields with a combined production rate of approximately 15,000 barrels of oil a day. The closest oil and gas facilities are Christy Lee Platform and Drift River Terminal located approximately

[10] Alaska Department of Environmental Conservation, 'Chemical Speciation Network and Improve Sites', *Division of Air Quality Monitoring and Quality Assurance*, https://dec.alaska.gov/air/air-monitoring/instruments-sites/chemical-speciation, (accessed 17 March 2025).

31 miles to the northeast of Tuxedni on the west coast of Cook Inlet. However, these facilities were shut down and have not operated since 2018. Kustatan Production Facility, also on the west coast of Cook Inlet, is the closest operating facility at almost 48 miles to the northeast.

Pipelines starting at the Christy Lee Platform loop up the western shore of Cook Inlet with some branching off to run under the water, cutting directly across the inlet. Other pipelines follow the shoreline all the way to Anchorage before heading back down the eastern shore of Cook Inlet to Kenai. Refineries in Kenai and Valdez process the crude oil transported through the pipelines for use in Alaska and overseas markets.

Cook Inlet also supports commercial fishing and acts as a busy marine highway hosting cruise ships, barges, and oil tankers.

Tuxedni's IMPROVE monitoring site, designated TUXE1, had to be relocated after the RH program commenced. The TUXE1 monitor was installed in December 2001 on the west side of Cook Inlet next to a seasonally operated fishing lodge, approximately eight-and-a-half miles south of Chisik Island. The lodge provided the station with a power source, and the owners allowed Alaska ADEC personnel access to maintain the station. However, the owners decided to close the lodge which subsequently ended data collection at the site in December 2014. At the request of the NPS and the FWS, ADEC staff researched several possible alternative locations for the station.

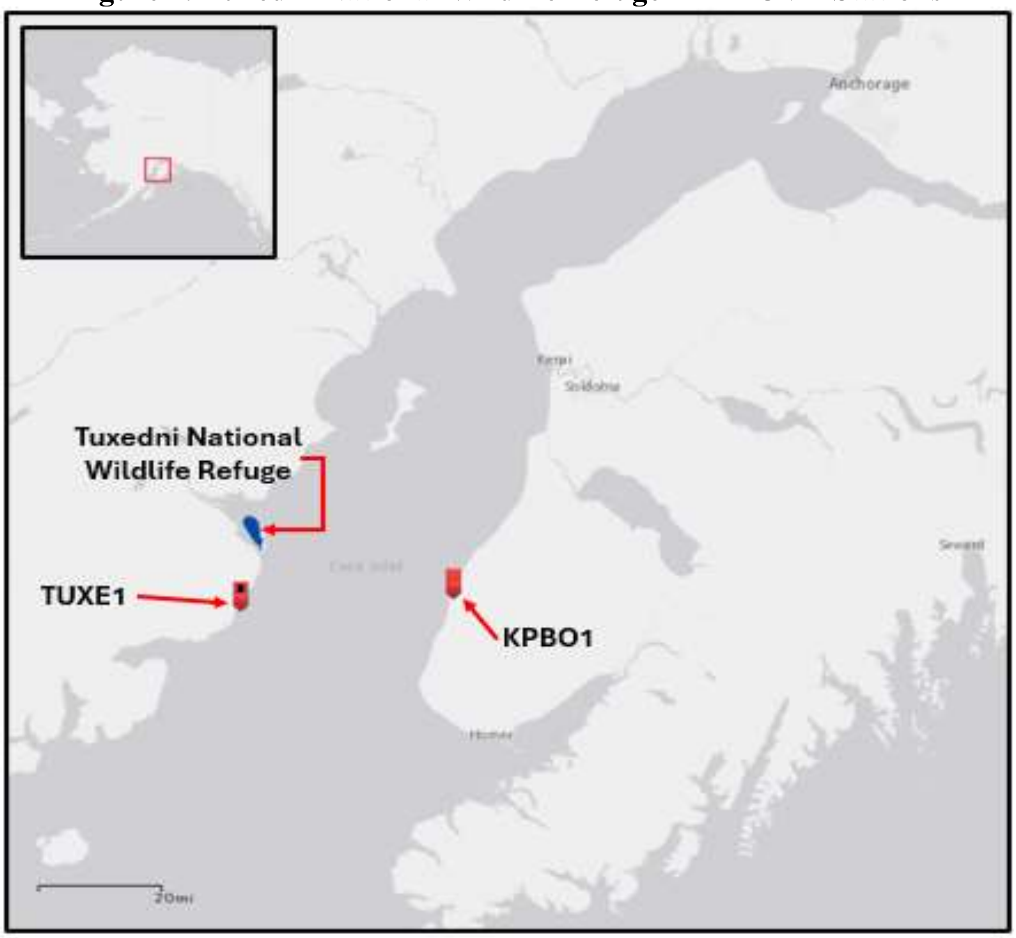
Based on research conducted, it was determined that placing another station on the west side of Cook Inlet, near the Tuxedni Class I area was too costly. Instead, a site was selected approximately thirty miles to the east of Chisik Island on the opposite side of the inlet. The replacement site, designated as KPBO1, is located approximately two miles south of the community of Ninilchik on the Kenai Peninsula just off the Sterling Highway. The new location was selected due to the accessibility of the station for maintenance and the availability to power sources. The new station began collecting data in August 2015 resulting in a data gap of one calendar year between the end of the data captured by TUXE1 and the next full calendar year of data collected from KPBO1. In addition to the data loss, the new site is impacted by both a large population and numerous industrial sources, not representative of the conditions of the remote islands comprising the Tuxedni Class I Areas. The significant changes in geography and emission sources resulted in an emissions profile shift that was substantial enough to result in a significant increase to the Baseline values. The data shift led ADEC to treat the KPBO1 and TUXE1 stations as two different sites and not as a continuation. EPA is currently working on a new calculation methodology to reconcile the data from the two stations to provide ADEC with a new Baseline and 2064 Endpoint for the Tuxedni Class I Area. However, the new points have not been made official by EPA and therefore for the purposes of fulfilling the requirements of this Progress Report, ADEC estimated the Baselines for KPBO1by following the recommendations of 40 CFR 51.308(f)(1)(i) for areas with incomplete monitoring data for 2000-2004. The ADEC calculated KPBO1 Baseline was estimated by averaging the five complete years of monitoring data closest in time to 2000-2004. In the case of KPBO1, the five years of data closest to 2000 to 2004 are 2016 to 2020. The 2064 Endpoint for the 20% Most Impaired Days at KPBO1 was assumed to be as reported in the "2064 Endpoint Updated October 2023" file available on the Colorado State IMPROVE website[11].

[11] Interagency Monitoring of Protected Visual Environments, Colorado State University, "2064 Endpoint Updated October 2023", accessed February 2024, http://vista.cira.colostate.edu/Improve/rhr-summary-data/

The emission profile increase at KPBO1 is due to the presence of large population centers and industrial sites on the eastern side of Cook Inlet. Along the Kenai Peninsula there are also natural gas-fired power generation plants, and the Sterling Highway (Alaska 1) runs between Homer, Kenai, Soldotna, and Anchorage. This highway brings a significant amount of mobile source emissions. The Average Annual Daily Traffic in 2021 on the stretch of Sterling Highway adjacent to the KPBO1 station was determined to be 3,780 vehicles. This is in stark contrast with both the TUXE1 site and Chisik Island, neither area has roads making their Average Annual Daily Traffic count zero vehicles. Mobile vehicles at the TUXE1 site and the Tuxedni Class I Area are limited to a few All-Terrain Vehicles, snowmobiles, small boats, and the occasional small airplane.

Note that due to budget restrictions, the IMPROVE Steering Committee has proposed reducing monitoring frequency or shutting down various IMPROVE monitoring stations throughout the country. Alaska's KPBO1 station is currently under review by the committee, but a final decision has not yet been issued.

Figure 4. Tuxedni National Wildlife Refuge IMPROVE Stations

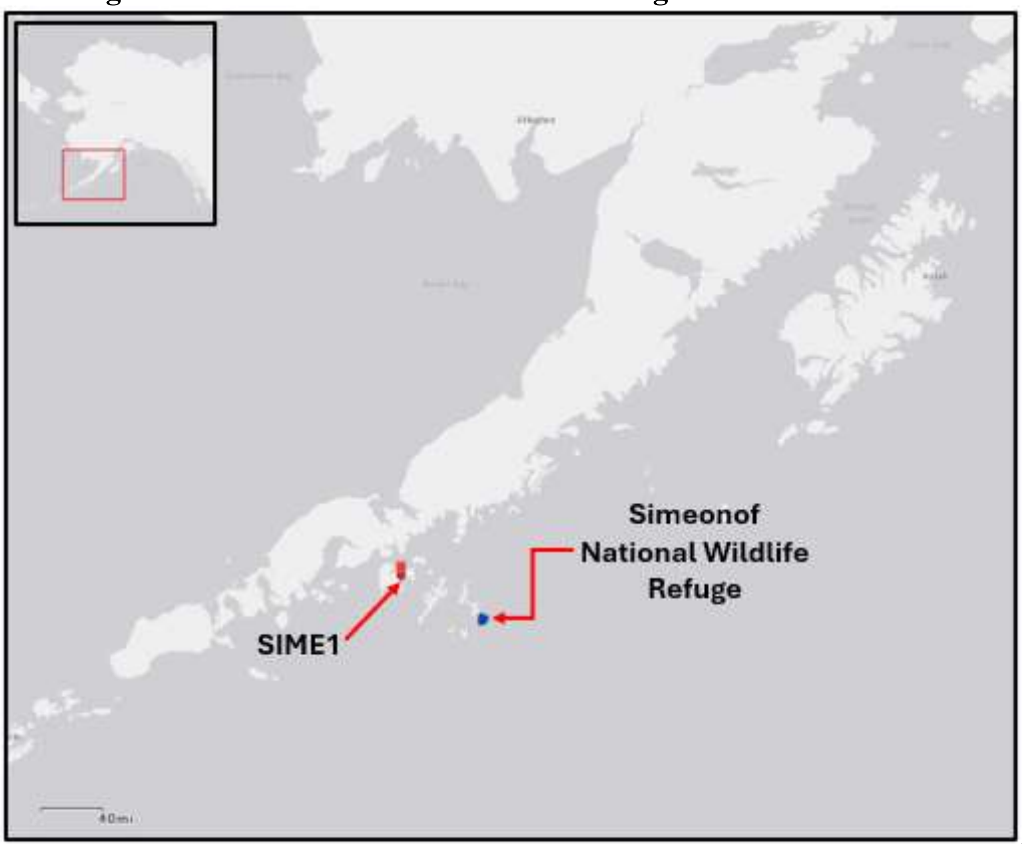


EPA Interactive Map of Air Quality Monitors
https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors

Simeonof National Wildlife Refuge

The Simeonof Class I area consists of 25,141 acres located in the Aleutian Chain, 58 miles from the mainland. It is one of 30 islands that make up the Shumagin Group on the western edge of the Gulf of Alaska. Access to Simeonof is difficult due to its remoteness and the unpredictable weather. It is home to greater than 55 species of birds as well as sea otters, hair seals, walruses, Arctic foxes, ground squirrels, and at least 17 species of whales. The vegetation is naturally treeless with wetlands mixed with coastal cliffs, meadows, and dune environments. There are 188 taxa of lichens in the park. Winds are mostly from the north and northwest as part of the midlatitude westerlies. Occasionally winds from Asia blow in from the west. Simeonof is represented by an IMPROVE monitor, designated as SIME1, that was installed by the FWS in September 2001 in the community of Sand Point. The community is on a nearby, more accessible island, approximately 60 miles northwest of Simeonof. The IMPROVE site has more potential impact from local pollution than if it were located at the Class I area, but it is not possible or practical to service such a remote site.

Figure 5. Simeonof National Wildlife Refuge IMPROVE Station



EPA Interactive Map of Air Quality Monitors
https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors

Class I Areas Outside of Alaska

Alaska is a non-contiguous state with a small population and minimal industrial base. The closest Class I areas outside of Alaska are Olympic National Park and North Cascades National Park in the state of Washington. Using Chisik Island (Tuxedni National Wildlife Refuge) as the Alaska point of reference, Olympic National Park is 1,426 miles away and the North Cascades National Park is 1,462.06 miles away. Therefore, ADEC has determined that there are no Class I areas in other states affected by Alaska's emissions, likewise, visibility in Alaska is not affected by Class I areas in other states. Therefore, no emission sources or Class I areas outside Alaska are reviewed in this report.

Figure 6. United States Mandatory Class I Areas Map

Mandatory Class I Areas, USEPA, OAR, OAQPS Map

https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors

5. Requirements for Periodic Reports

This document is intended to fulfill the requirements of paragraphs 40 CFR § 51.308(g), (h), and (i) of the RHR and to serve as a progress report for the 2nd Implementation of the Alaska Regional Haze State Implementation planning period. This progress report assesses progress made toward the RPG through 2022 and details the following as required by 40 CFR § 51.308(g), (h), and (i):

- The status of implementation of all control measures included in the 2nd Implementation of the Alaska Regional Haze SIP. (40 CFR § 51.308(g)(1))
- A summary of emission reductions achieved throughout the State through the implementation of control measures. (40 CFR § 51.308(g)(2))
- An assessment of visibility conditions and changes, with values for Most Impaired and Clearest days. (40 CFR § 51.308(g)(3))
- An analysis of the change in emissions of visibility impairing pollutants. (40 CFR § 51.308(g)(4))
- An assessment of significant changes in anthropogenic emissions that may have limited or impeded progress in improving visibility. (40 CFR § 51.308(g)(5))
- An assessment of whether the current SIP elements and strategies are sufficient to meet reasonable progress goals. (40 CFR § 51.308(g)(6))
- A review of the state's visibility monitoring strategy (40 CFR § 51.308(g)(8))
- Determination of the adequacy of the existing implementation plan. (40 CFR § 51.308(h))
- Federal Land Management (FLM) Progress Report Comments (40 CFR § 51.308(i)(3))

As required by 40 CFR §51.308(i)(3), during the development of both the First and Second Regional Haze SIPs, FLMs were provided an opportunity for consultation. The information and recommendations provided by the FLMs were taken into consideration in the long-term strategy. All comments provided were responded to and attached to the SIP.

Similarly, FLMs were given the opportunity to consult during the development of this progress report. Comments and recommendations are incorporated as appropriate. All comments and ADEC responses will be included in Section J of this report.

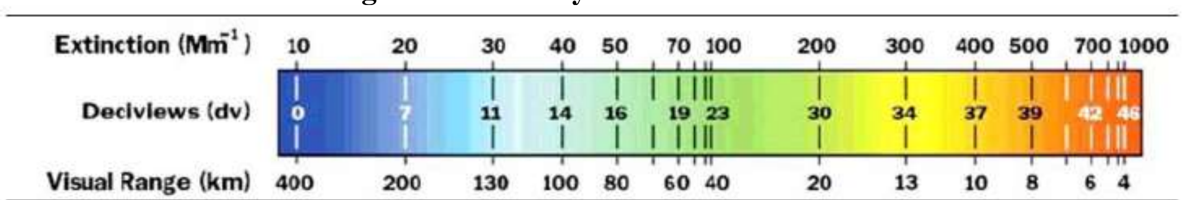
The State of Alaska reaffirms its commitment to participate in a Regional Planning Process with Arizona, California, Colorado, Idaho, Montana, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming, the United States Department of Interior FWS and National Park Service (NPS), and the United States Department of Agriculture Forest Service. Consultation through WRAP also includes consultation with other regional planning organizations.

In addition to consultation with the FLMs, the State continues to work with tribes in Alaska. Tribes can provide input on this plan during the public comment period offered by the state and have the opportunity for consultation with EPA on this report.

6. Alaska's Visibility

Light extinction caused by haze species can be calculated using the extinction coefficient and the measured concentration of the pollutant in the air. Light extinction is measured in inverse Megameters (Mm^{-1}). The deciview (dv) is the unitless visibility measurement used in the RH Rule to track visibility. Deciviews are calculated by taking the natural logarithm of measured inverse megameters. While the deciview value describes overall visibility levels, light extinction calculations can describe the contribution of each component haze species to measured visibility. The relationship between units of light extinction (Mm^{-1}), haze index (dv), and visual range (km), is indicated by the scale in Figure 7 below. Visual range is the distance at which a given object can be seen with the unaided eye. The deciview scale is zero for pristine conditions and increases as visibility degrades. EPA established a Baseline Emission Point to demonstrate the starting point for each Class I Area's visibility and a 2064 End Point indicating only natural sources are contributing to visibility impairment at each Class I Area. Using the two values as a start and end point, a straight line can be drawn to show the "Glidepath", or Uniform Rate of Progress (URP) expressed in deciviews. The Glidepath at each Class I Area is a tool each state can use to gauge if their long-term strategy is resulting in sufficient progress to effectively attain the 2064 Endpoint.

Figure 7. Visibility Measurement Scale



The Baseline Emission Point for each IMPROVE Station was estimated by averaging the annual 20% Most Impaired Days' (MID) or 20% Clearest Days' data for the period of 2000 to 2004. Those five data points are then averaged together to get the final Baselines for the MID and Clearest Days. Data was collected between 2000 and 2004 for DENA1, but for the SIME1, TRCR1, and TUXE1, the IMPROVE stations were not established and data was not available until 2002. So instead, their Baselines are calculated using data collected between 2002 and 2004. Additionally, due to the physical change in location for the Tuxedni stations and the data gap for calendar year 2015, the Baseline and End Point provided for the TUXE1 monitor are not representative of conditions at KPBO1. Instead, EPA is working on a new calculation method to determine the two points and the MID Glidepath for the KPBO1 station. However, as of the preparation of this report, no official determination has been issued. So, to fulfil the requirements for this progress report, ADEC calculated the Baselines for the MID and Clearest Days by averaging the annual values for the five complete years of monitoring data closest in time to 2000-2004 as described in 40 CFR 51.308(f)(1)(i). For KPBO1, the five complete years closest to 2000-2004 was 2016-2020. The 2064 Endpoint for the MID at KPBO1 was assumed to be as listed in the file entitled "2064 Endpoint Updated October 2023" on the Colorado State Improve website[12].

Table 1 depicts each Class I Area's Baseline and 2064 End Point, including the ADEC estimated points for KPBO1. The table also includes the visibility improvement, in deciviews, necessary to

[12] Interagency Monitoring of Protected Visual Environments, Colorado State University, "2064 Endpoint Updated October 2023", accessed February 2024, http://vista.cira.colostate.edu/Improve/rhr-summary-data/

achieve the 2064 End Points. As indicated in the table, both Denali and Tuxedni have less than three deciviews to improve from their background visibility. Also depicted by the data in Table 1 is that Simeonof, the most isolated Class I Area of the three. Simeonof has the highest Baseline and the largest margin of improvement to achieve the 2064 End Point. This data supports DEC's argument that uncontrollable emissions, both natural and international, are not properly accounted for in the modeling available for Alaska. Therefore, the data inaccurately represents the deciviews caused by anthropogenic sources and requires the state to improve emissions outside of their ability to control.

Table 1. Baseline and Endpoint for Alaska Class I Areas Most Impaired Days (dv)

Class I Area	Denali Nationa l Park	Denali National Park	Tuxedni National Wilderness Refuge	Tuxedni National Wilderness Refuge	Simeonof National Wilderness Refuge
IMPROVE Station	**DENA1**	**TRCR1**	**TUXE1[2]**	**KPBO1**	**SIME1**
Baseline[1]	7.08475	9.11354	10.46848	11.46634	13.66871
2064 End Point	4.72274	6.35727	6.96201	8.76500[3]	8.50625
Visibility Reduction Required	2.36201	2.75627	3.50647	2.70134	5.16246

1. The Baseline for DENA1 is based on the annual average of the 20% Moist Impaired Days data collected by the respective IMPROVE monitors between 2000 and 2004 averaged together. The Baseline for TRCR1, TUXE1, and SIME1 is based on data collected between 2002 and 2004. The Baseline for KPBO1 is an unofficial estimate by ADEC based on directions in 51.308(f)(1)(i) using data from 2016-2020, an official determination will be provided for the 3rd Implementation Period.
2. The IMPROVE monitor TUXE1 was decommissioned in December 2014 and replaced by KPBO1 that began operating in August 2015. No data was gathered by the TUXE1 station during the Current Reporting Period.
3. The 2064 Endpoint for the MID at KPBO1 was assumed to be as listed in the file entitled "2064 Endpoint Updated October 2023" on the Colorado State IMPROVE website (http://vista.cira.colostate.edu/Improve/rhr-summary-data/).

B. Status of Control Strategies (51.308(g)(1))[13]

51.308(g)(1) requires "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." In its regional haze SIP for the second planning period, Alaska determined that the Air Pollution Programs summarized below are necessary to reduce emissions within the state:

- Best Available Retrofit Technology (BART) Controls
- Best Available Control Technology (BACT) Controls
- Prevention of Significant Deterioration/New Source Review Regulations
- Operating Permit Program
- Local State and Federal Mobile Source Control Programs
- Implementation of Programs to Meet Particulate Matter National Ambient Air Quality Standards
- International Marine Organization low-sulfur marine diesel regulation and the North America Emissions Control Area
- Source Selection from Second Implementation of the Alaska Regional Haze SIP

These measures were adopted into Alaska's Long-Term Strategy to address RH as permanent and enforceable measures. These measures and their original implementation are described in detail in Section III.K.13.H of Alaska's regional haze SIP for the second planning period. The control measures described below were either already in effect prior to the reporting period or implemented as described by their regulatory deadline. However, some of the SO_2 control requirements were rescinded by ADEC in September 2023.

1. Best Available Retrofit Technology Controls

One of the primary strategy approaches taken in the first RH Plan was the Best Available Retrofit Technology Control Program, which required visibility analyses for facilities constructed between 1962 and the passage of the 1977 CAA Amendment and prescribed control technologies for those with measurable impacts on Class I Areas. This was a central part of Alaska's visibility review program in the first RH SIP period. In Alaska, BART applied to a narrow group of sources, mostly power generation and petrochemical refineries located in Southcentral and Interior Alaska.

ADEC originally identified seven industrial facilities with units determined to be eligible for BART in the first RH SIP. Of the seven, all but two were eliminated from further BART application. The remaining two facilities were the GVEA Healy Power Plant and the Nutrien Kenai Nitrogen Operations (Nutrien) (Formerly operated as Agrium Urea Chemical plant). Of these two, GVEA Healy has been consistently operational while Nutrien has been in stand-by mode.

The Nutrien facility underwent a New Source Review (NSR) permit update to allow it to operate should its owners choose to reactivate it. The current permit that has been approved by ADEC required a Best Available Control Technology (BACT) analysis and determination that resulted in the requirement for the most stringent available emissions controls should the facility be reactivated. Based on the BACT review, the Department concluded that the proposed Nutrien Facility is

[13] Sections 51.308(g)(1) and 51.309(d)(10)(i)(A)

technologically consistent with recent BACT determinations and therefore finds that the technology does not require additional top down BACT review beyond that in the existing record. However, in February 2024, ADEC granted Nutrien a second permit extension to delay construction commencement under the PSD permit to as late as September 26, 2025. In Nutrien's request for the extension, they explained that they were having difficulties securing the necessary contracts with natural gas suppliers to ensure that sufficient natural gas will be available for the facility to meet its target production levels at the time the plant begins operation. Nutrien has worked to secure necessary natural gas contracts for the facility since the issuance of this permit, for a variety of reasons these negotiations are still on-going. Nutrien continues to believe that it will ultimately be able to obtain contracts for sufficient natural gas to assure viable operations at the facility.

The other facility for which BART applies is the GVEA Healy Power Plant near the Denali Class I area. This is a coal-fired electric generating unit which has been operational for the last half-century and provides electrical power to the Interior and Fairbanks North Star Borough (FNSB); the facility also maintains a fleet of local diesel and coal-fired generators. Further discussions on the GVEA Healy Power Plant and analyses of its current emissions footprint can be found in the four-factor facility analysis section of the Second RH Implementation Plan, Section III.K.13.F.

All other BART-eligible facilities have either had retrofits which abrogated the BART requirement, were determined to be too small or too distant from a Class I area to have a significant impact on visibility or have not been actively operated in the last decade. For example, the Anchorage Municipal Light and Power George Sullivan Plant 2 has undergone complete replacement of the BART eligible emission units and has been reopened with updated emissions controls and operational practices.

All facilities within the state which have BART requirements from the first implementation period will continue to have these requirements in place until final emissions unit retirement has been registered with the state. As a result, BART remains a functional part of the state's long-term strategy as it applies to specific stationary sources.

2. Best Available Control Technology

Per federal requirement, ADEC evaluated all point sources with emissions greater than 70 tons per year of $PM_{2.5}$ or any individual $PM_{2.5}$ precursors, NOx, SO2, Ammonia (NH_3), or Volatile Organic Compounds (VOCs) within the Fairbanks North Star Borough 24-hour $PM_{2.5}$ nonattainment area boundary. ADEC has submitted and EPA has approved a comprehensive NOx and VOC precursor analysis showing that those pollutants do not contribute to the 24-hr $PM_{2.5}$ nonattainment and therefore was not required to conduct NO_X or VOC BACT on these sources[14]. There are not any Ammonia emissions from the sources within the 24-hr $PM_{2.5}$ nonattainment area and therefore no control analysis was required[15]. ADEC prepared a major stationary source SO_2 precursor analysis that demonstrates the stationary sources SO_2 emissions do not contribute to the 24-hr $PM_{2.5}$ nonattainment area. The sources identified as meeting the 70 tons per year of PM2.5 criteria included GVEA Zehnder, GVEA North Pole, Aurora Energy's Chena Power Plant, U.S. Army Garrison Fort Wainwright and Doyon Utilities, and the University of Alaska Fairbanks Campus Power Plant. These sources within the nonattainment area have undergone BACT analysis to improve air quality

[14] Federal Register, Vol. 88, December 5, 2023, at 84635
[15] Federal Register, Vol. 88, December 5, 2023, at 84765

in the Fairbanks PM2.5 nonattainment area. The non-attainment BACT analyses were used to inform Regional Haze decisions on applicable sources under RHR, as BACT analyses are stringent enough to be used for RHR. Sources that are impacted by both RHR and non-attainment area rules were determined via Q/D.

3. Prevention of Significant Deterioration/New Source Review Regulations

The primary regulatory programs for addressing visibility impairment from industrial sources are the Prevention of Significant Deterioration (PSD) and New Source Review (NSR) rules. These rules protect visibility in Class I areas from new industrial sources and major changes to existing sources. Alaska's regulations (18 Alaska Administrative Code 50 Article 3) and RH SIP require visibility impact assessment and mitigation associated with emissions from new and modified major stationary sources through protection of Air Quality Relative Values. Air Quality Relative Values are scenic and environmentally related resources that may be adversely affected by a change in air quality, including visibility, odor, noise, vegetation, and soils. These visibility requirements were approved by EPA in 1983.

ADEC's continued implementation of the PSD and NSR requirements for Class I areas, along with FLM involvement in the impact review, continue to assure that no Class I area experiences degradation in visibility resulting from expansion or growth of stationary sources in the state.

4. Operating Permit Program and Minor Permits

ADEC implements a Title V operating permit program as required by 40 CFR 70 and 18 AAC 50 Article 3, as well as a minor source permit program per 18 AAC 50 Article 5 for stationary sources of air pollution. Sources that may be required to obtain minor permits include asphalt plants, thermal soil remediation units, rock crushers, incinerators, coal preparation plants, or a Port of Anchorage stationary source. Minor permits are required for new or existing sources with a potential to emit above specific thresholds before construction, before relocating a portable oil and gas operation, or before beginning a physical change or change in the method of operation. Details are included in the state regulations.

These permit programs, coupled with PSD/NSR requirements, serve to ensure that stationary industrial sources in Alaska are controlled, monitored, and tracked to minimize air pollution.

5. Local State and Federal Mobile Source Control Programs

Mobile source emissions are primarily controlled by federal regulations. During the writing of the first RH SIP, Alaska was exempted from imposition of federal on-road ULSD requirements. However, Alaska is now fully compliant with the federal ULSD requirements for on-road and non-road uses. In addition to the ULSD requirements, lower-sulfur content diesel use has been mandated for ships operating within the North American Emissions Control Area (ECA), which includes Southeast Alaska and the Gulf of Alaska west to the northern end of Kodiak Island.

The Federal Motor Vehicle Control Program is the federal certification program that requires all new cars sold in 49 states to meet specific emission standards. (California is excluded because it has its own state-mandated certification program). As part of the program, all new cars must meet their applicable emission standards on a standard test cycle called the Federal Test Procedure. These standards vary according to vehicle age, with the newer vehicles required to be considerably cleaner than older models. The result of this decline over time in allowable emissions from newly manufactured vehicles has been a drop in overall emissions from the vehicle fleet, as older, dirtier vehicles are replaced with newer, cleaner vehicles.

EPA's Tier 2 and 3 emission standards for passenger cars, light trucks, and larger passenger vehicles are focused on reducing emissions most responsible for ozone, Carbon Monoxide (CO), and Particulate Matter (PM) (i.e., Nitrogen Oxides (NO_X), SO_2, and hydrocarbon emissions). The fuels and control equipment introduced to meet these standards will result in reductions in visibility impairing pollutants. Mandated reductions in the sulfur content of gasoline will further enhance the performance of this equipment. This will also reduce emissions from the existing fleet of gasoline-powered vehicles by reducing the deterioration of catalytic converters.

In addition to these federal programs, the two CO maintenance areas in Fairbanks and Anchorage have local programs continuing through 2024 to address mobile source emissions that will also continue to reduce visibility impairing pollutants. Both communities have transit programs that assist in reducing vehicle emissions in their respective areas. In Anchorage, specific local programs included in the SIP are a vanpool/ridesharing program, which reduces overall vehicle miles travelled; and efforts to encourage the use of block heaters in the winter to reduce cold start emissions from motor vehicles. In Fairbanks, there continues to be outreach on local plug-ins for engine block heater use, and electrification of parking lots also assists with reducing mobile source emissions from cold starts. Fairbanks is also working to convert its transit fleet to compressed natural gas.

6. Implementation of Programs to Meet Particulate Matter National Ambient Air Quality Standards

In the years following the promulgation of the first RH Plan, the Fairbanks Fine Particulate Matter <2.5 microns ($PM_{2.5}$) Nonattainment Area has undergone several rounds of SIP revisions. The Fairbanks $PM_{2.5}$ Serious SIP was adopted in November 2019, a result of the area's failure to attain the National Ambient Air Quality Standards for $PM_{2.5}$ per the CAA deadline for Moderate Nonattainment Areas. Fairbanks is the second largest city in Alaska and the closest to the Denali Class I Area at approximately 65 miles to the northwest. The infrastructure required to transfer fuel to the city is limited. Fairbanks and the surrounding communities rely on coal boilers to produce electricity, and the public often turns to wood burning stoves for heat. Therefore, emission sources in and near Fairbanks became a focus of the RH Second Implementation Plan.

ADEC has been operating a series of local air quality monitors within the Fairbanks area to provide real-time data during weather inversions and instances when local air quality can deteriorate significantly. The largest contribution to the PM air pollution in the Fairbanks nonattainment area is residential wood smoke even though area homes predominately rely on home heating oil for space heating needs. Due to infrastructure issues and an isolated power grid, there are limited energy options for the Interior, with oil and coal being the primary available fuels for power generation. Significant efforts have been made to expand natural gas availability in the area to benefit residential, commercial, and industrial sources. Natural gas is now starting to provide cleaner burning options for primary space heating. Furthering efforts to reduce emissions from home heating, a new regulation, 18 AAC 50.078(b), went into effect on September 1, 2022, prohibiting the sale or purchase of fuel oil containing more than 1,000 parts per million for use in fuel oil-fired equipment, including space heating devices in both Fairbanks and North Pole. This reduction represents over a

50% reduction in sulfur from the affected sources.

Additionally, over the last 14 years, the Fairbanks North Star Borough has operated a wood stove changeout program. Using financial incentives, residents are encouraged to replace older and more polluting wood-burning appliances with EPA certified catalytic appliances or heating appliances that burn cleaner fuel alternatives such as oil or natural gas.

The preceding brief discussion on control strategies for the Fairbanks nonattainment area is to illustrate that there are ongoing air pollution control requirements in close vicinity to a Class I area and is not comprehensive. For a complete discussion of control requirements see Chapter 7.7 Control Strategies of the Fairbanks 2024 Amendments[16].

7. International Marine Organization low-sulfur marine diesel regulation and the North America Emissions Control Area.

There are a small number of internationally enforced emissions control programs which the United States has signed onto via treaty and adoption of requirements into federal regulations. For RH planning purposes in Alaska, the primary control program considered as part of the state's Long-Term Strategy is the International Marine Organization's low-sulfur diesel program established in 2010 under the MARPOL convention. Because of the significance of marine generated sulfur for Alaska regional haze planning, this control program was considered a large element of the state's visibility improvement approach during the second planning period.

As of January 1, 2020, all marine vessels from countries participating in the MARPOL convention and all marine vessels operating in the jurisdiction of a country participating in the MARPOL convention are required to burn low-sulfur marine fuel. Prior to the low-sulfur marine fuel rule, high-sulfur fuel oil, bunker oil, and other less refined fuels were sold and burned by vessels in many developing countries. The rule limits the sulfur in the fuel oil used on board ships to 0.5% mass by mass - a significant reduction from the previous limit of 3.5%.

The reduction in marine fuel sulfur under the MARPOL convention in 2020 was anticipated to have a positive impact on reducing visibility impairing pollutants as measured at the IMPROVE monitoring stations. However, due to the wildfire smoke and increased volcanic activity near Simeonof since 2020, it's not possible to assess yet what if any impact the marine fuel sulfur content limit will have on visibility.

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[16] Alaska Department of Environmental Conservation, *Amendments to: State Air Quality Control Plan Vol. II: III.D.7.7 Control Strategies Public Notice Draft*, August 19, 2024, https://dec.alaska.gov/air/anpms/sip/2024-fbks-pm2-5-serious-sip-amends/

8. Source Selection from Second Implementation of the Alaska Regional Haze SIP

During the process of developing the Second Implementation Plan further study was deemed necessary for Aurora Energy's Chena Power Plant, U.S. Army Garrison Fort Wainwright's Doyon Utilities, University of Alaska Fairbanks' Campus Power Plant, Golden Valley Electric Associations' North Pole Power Plant, Golden Valley Electric Associations' Healy Power Plant, and Eielson Air Force Base facilities. The determinations from the analyses are summarized below and described in further detail in Section III.K.13.H of Alaska's Second Implementation of the Regional Plan. Note that

Aurora Energy, Chena Power Plant

The Chena Power Plant is an electric generating facility owned and operated by Aurora Energy, LLC. The Chena Power Plant is a co-generation power plant that is designed to supply the local power grid with up to 27.5 megawatts of electrical power and to provide steam and hot water heat to commercial and residential customers in the city of Fairbanks. The power producing units consist of three 76.8 Million British Thermal Units (MMBtu) per hour (hr) coal-fired boilers and one 254.7 MMBtu/hr coal-fired boiler.

As part of the FNSB NAA SIP, adopted November 19, 2019, amendments adopted November 18, 2020,[17] the stationary source went through an emissions control analysis for SO_2, which is a precursor pollutant for $PM_{2.5}$. Large stationary sources are a subgroup of emissions sources that are given special attention in the required Best Available Control Measures (BACM)/BACT analysis. Per federal requirement, ADEC evaluated all major stationary sources for $PM_{2.5}$ and its precursor pollutant SO_2. Based on this analysis, the Regional Haze SIP adopted on July 5, 2022, required the following SO_2 emissions controls on Chena Power Plant's Coal-Fired Boilers:

- Sulfur content of the coal received at the stationary source is limited to 0.25% sulfur by weight.
- SO_2 emissions from the common stack at the Chena Power Plant shall not exceed 0.301 lb/MMBtu (3-hour average).

However, with the 2024 FNSB NAA SIP Amendments,[18] ADEC rescinded the SO_2 BACT limits from the 2019/2020 FNSB NAA SIP because a major stationary source precursor demonstration showed that SO_2 emissions from these sources were not meaningfully contributing to $PM_{2.5}$ in the Non-Attainment Area (NAA). Therefore, there is no underlying basis for ADEC's previous SO_2 finding for the Chena Power Plant in the 2022 Regional Haze SIP. Instead, ADEC evaluated retrofitting EUs 4 through 7 at this facility with SO_2 emissions controls as part of the SO_2 BACT analyses in the FNSB NAA SIP submitted on December 4, 2024. Based on the analysis, ADEC determined that due to space constraints, it would not be technically feasible to install WFGD, circulating dry scrubbers (CDS), or SDA on EUs 4 through 7. Additionally, ADEC determined that installing DSI would not be cost effective, the SO_2 removal cost would be $13,368/ton based on

[17] Background and detailed information regarding the 2019/2020 FNSB NAA SIP can be found at http://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-serious-sip/.
[18] Background and detailed information regarding the 2024 FNSB NAA SIP Amendments can be found at https://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-2024-amendment-serious-sip/.

potential to emit.[19] Therefore, no further emissions reductions or emissions controls were selected for the coal-fired boilers at Chena Power Plant. Further analysis is described in the Alaska Regional Haze Second Implementation Period State Implementation Plan Clarification Memo[20].

U. S. Army Garrison Fort Wainwright, Doyon Utilities

U.S. Army Garrison Fort Wainwright (Fort Wainwright) is a military installation located within and adjacent to the city of Fairbanks, Alaska, in the Tanana River Valley. The EUs located within the military installation at Fort Wainwright are co-owned and operated by a private utility company, Doyon Utilities, LLC. The two entities comprise a single stationary source operating under two permits. The shared emission sources include coal-fired boilers for a combined heat and power plant, diesel-fired emergency generator engines, diesel firewater pump engines, backup diesel-fired boilers, and waste oil-fired boilers.

As part of the FNSB NAA SIP, adopted November 19, 2019, amendments adopted November 18, 2020,[21] the stationary source went through an emissions control analysis for SO_2, which is a precursor pollutant for $PM_{2.5}$. Large stationary sources are a subgroup of emissions sources that are given special attention in the required BACM/BACT analysis. Per federal requirement, ADEC evaluated all major stationary sources for $PM_{2.5}$ and its precursor pollutant SO_2. Based on this analysis, the Regional Haze SIP adopted on July 5, 2022, required the following SO_2 emissions controls on Fort Wainwright's Coal-Fired Boilers:

- Sulfur content of the coal received at the stationary source is limited to 0.25% sulfur by weight.
- SO_2 emissions from the EUs shall not exceed 0.12 lb/MMBtu (3-hour average).
- DSI system shall be installed and operated on the boilers.

However, with the 2024 FNSB NAA SIP Amendments,[22] ADEC rescinded the SO_2 BACT limits from the 2019/2020 FNSB NAA SIP because a major stationary source precursor demonstration showed that SO_2 emissions from these sources were not meaningfully contributing to $PM_{2.5}$ in the NAA. Therefore, there is no underlying basis for ADEC's previous SO_2 finding for Fort Wainwright in the 2022 Regional Haze SIP. With no underlying basis for our previous finding, ADEC evaluated retrofitting the coal-fired boilers at this facility with a DSI system as part of the SO_2 BACT analyses in the FNSB NAA SIP submitted on December 4, 2024. ADEC estimated that for DSI, the SO_2 removal cost would be $6,636/ton based on potential to emit. ADEC also determined the cost effectiveness of retrofitting the coal-fired boilers with CDS, WFGD, and SDA ranged from over $13,000 per ton to over $20,000 per ton of SO2 removed based on potential to emit.[23]
Based on the cost, ADEC determined that retrofitting the boilers with a DSI system, CDS, WFGD, and SDA is not economically feasible. Therefore, no further emission reductions or emission

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[19] United States Government. Docket EPA-R10-OAR-2024-0595. December 23, 2024. https://www.regulations.gov/document/EPA-R10-OAR-2024-0595-0078

[20] Alaska Department of Environmental Conservation. (October 6, 2025). *2025 Signed Alaska Regional Haze Clarification Memo Final (PDF).* https://dec.alaska.gov/air/anpms/regional-haze/

[21] See Footnote 17.

[22] Background and detailed information regarding the 2024 FNSB NAA SIP Amendments can be found at https://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-2024-amendment-serious-sip/.

[23] United States Government. Docket EPA-R10-OAR-2024-0595. December 23, 2024. https://www.regulations.gov/document/EPA-R10-OAR-2024-0595-0078

controls were selected for the boilers. Further analysis is described in the Alaska Regional Haze Second Implementation Period State Implementation Plan Clarification Memo[24].

University of Alaska Fairbanks Campus

UAFC is owned and operated by the University of Alaska Fairbanks (UAF), and UAF is the Permittee for the stationary source's Title V Operating Permit AQ0316TVP03 Revision 1. The UAFC is a co-generation power plant that is designed to supply electrical power and heat to the campus. The UAF inventory consists of two dual fuel-fired 180.9 MMBtu per hour boilers, a medical/pathological waste incinerator, and diesel-fired generators and boilers. UAF began installing a new coal/woody biomass-fired circulating fluidized bed boiler in 2016 and it officially replaced two 1962 coal-fired boilers in 2020. The retirement of the existing boilers caused a drop of stationary source wide SO_2 emissions from an average of 190.0 tons per year between 2014 through 2019 to 20.8 tons in 2020, an 89% decrease in emissions.

As part of the FNSB NAA SIP, adopted November 19, 2019, amendments adopted November 18, 2020,[25] the stationary source went through an emissions control analysis for SO_2, which is a precursor pollutant for $PM_{2.5}$. Large stationary sources are a subgroup of emissions sources that are given special attention in the required BACM/BACT analysis. Per federal requirement, ADEC evaluated all major stationary sources for $PM_{2.5}$ and its precursor pollutant SO_2. Based on this analysis, the Regional Haze SIP adopted on July 5, 2022, required the following SO_2 emissions controls on UAFC's Coal-Fired Boiler EU 113:

- Sulfur content of the coal received at the stationary source is limited to 0.25% sulfur by weight.
- SO_2 emissions from EU 224 shall not exceed 0.20 lb/MMBtu (3-hour average).

However, with the 2024 FNSB NAA SIP Amendments,[26] ADEC rescinded the SO_2 BACT limits from the 2019/2020 FNSB NAA SIP because a major stationary source precursor demonstration showed that SO_2 emissions from these sources was not meaningfully contributing to $PM_{2.5}$ in the NAA. Therefore, there is no underlying basis for ADEC's previous SO_2 finding for UAF in the 2022 Regional Haze SIP. Additionally, UAFC's SO_2 emissions have shown a dramatic reduction with the start-up of EU ID 113. Therefore, ADEC reviewed UAFC's 2023 SO_2 emissions and recalculate Q/d to determine if the source still requires a four-factor analysis. The UAF Campus emitted 7.4 tons of SO_2 emissions in 2023 and is located approximately 117 kilometers from Denali National Park resulting in a Q/d value of just 0.06, well below the 1.0 threshold triggering further analysis. Therefore, ADEC considers the source "effectively controlled" and eliminated the source from further evaluation. Further analysis is described in the Alaska Regional Haze Second Implementation Period State Implementation Plan Clarification Memo[27].

[24] Alaska Department of Environmental Conservation. (October 6, 2025). *2025 Signed Alaska Regional Haze Clarification Memo Final (PDF).* https://dec.alaska.gov/air/anpms/regional-haze/

[25] Background and detailed information regarding the 2019/2020 FNSB NAA SIP can be found at http://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-serious-sip/.

[26] See Footnote 22.

[27] Alaska Department of Environmental Conservation. (October 6, 2025). *2025 Signed Alaska Regional Haze Clarification Memo Final (PDF).* https://dec.alaska.gov/air/anpms/regional-haze/

Golden Valley Electric Association, North Pole Power Plant

The NPPP is an electric utility owned and operated by GVEA, under Operating Permit AQ0110TVP04 Rev. 1. The stationary source is an electric generating facility that provides power to the GVEA grid. The EU inventory consists of two fuel oil-fired turbines, two dual fuel-fired turbines (one is not yet installed), one emergency diesel-fired generator, and two propane-fired boilers.

As part of the FNSB NAA SIP, adopted November 19, 2019, and amendments adopted November 18, 2020,[28] the stationary source went through an emissions control analysis for SO_2, a precursor pollutant for $PM_{2.5}$. Large stationary sources are a subgroup of emissions sources that are given special attention in the required BACM/BACT analysis. Per federal requirement, ADEC evaluated all major stationary sources for $PM_{2.5}$ and its precursor pollutant SO_2. Based on this analysis, the 2019/2020 FNSB NAA SIP required the following SO_2 emissions controls on the turbines at the NPPP:

- Immediately after an Air Quality Stage Alert 1 or 2 is announced, fuel orders for the Fuel Oil Turbines (EUs 1 and 2) are to switch to fuel oil with a maximum sulfur content of 1,000 parts per million by weight and receive the first fuel shipment no later than 18 hours after the Air Quality Stage Alert was announced. The fuel switch is to continue until the Air Quality Alert is cancelled.
- Beginning no later than October 1, 2023, the sulfur content of fuel oil combusted in EUs 1 and 2 is limited to no greater than 15 parts per million by weight between October 1 and March 31.
- Beginning June 9, 2021, sulfur content of fuel combusted in the dual fuel-fired turbines (EUs 5 and 6) are limited to 50 parts per million by weight sulfur except during startup.

When ADEC evaluated the NPPP for the 2nd implementation period of Regional Haze, it was assumed that these SO_2 limits from the FNSB NAA SIP were in effect. However, with the 2024 FNSB NAA SIP Amendments,[29] ADEC rescinded the SO_2 BACT limits from the 2019/2020 FNSB NAA SIP because a major stationary source precursor demonstration showed that SO_2 emissions from these sources were not meaningfully contributing to $PM_{2.5}$ in the NAA. Therefore, these limits listed above have since been rescinded.

Separate from the decisions made in the FNSB NAA SIP, ADEC conducted a four-factor analysis for fuel switches on EUs 1 and 2, as well as EUs 5 and 6 in the Regional Haze SIP adopted on July 5, 2022. This four-factor analysis determined that it was both cost effective and feasible for GVEA to switch EUs 1 and 2 (Simple Cycle Gas Turbines) at the NPPP to fuel oil with a maximum sulfur content of 0.1 percent by weight (1,000 parts per million by weight, No. 1 fuel oil). The requirement was predicated on the assumption that GVEA would be able to purchase No. 1 fuel oil from the Petro Star North Pole Refinery (Petro Star), as that was the fuel source used for the four-factor analysis. If the North Pole Refinery cannot supply GVEA with No. 1 fuel oil due to shortages in supply, the power plant may continue to burn No. 2 fuel oil in EUs 1 and 2 until such time as No. 1

[28] Background and detailed information regarding the 2019/2020 FNSB NAA SIP can be found at http://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-serious-sip/.

[29] Background and detailed information regarding the 2024 FNSB NAA SIP Amendments can be found at https://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-2024-amendment-serious-sip/.

fuel oil is again available.

However, Petro Star is no longer allowed to sell No. 2 fuel oil to the public in the FNSB due to the requirements of the FNSB NAA SIP. Therefore, Petro Star has shifted production to more No. 1 fuel oil. Due to the facility's limited sulfur removal capabilities, this change in operations resulted in an increase to the sulfur content of their No. 1 fuel oil more than 1 percent by weight, the limit set for EUs 1 and 2 in the Regional Haze SIP adopted on July 5, 2022.

Because of this change in fuel options, ADEC obtained updated fuel costs in 2025 for the various fuel types provided to GVEA from Petro Star. These updated fuel prices included a change in the price difference between No. 1and No. 2 fuel. The increased cost of No. 1 fuel oil makes it economically infeasible to fire it in EUs 1 and 2 Therefore, the North Pole Power Plant will no longer have a requirement to switch to No. 1 fuel oil on EUs 1 and 2. Further analysis is described in the Alaska Regional Haze Second Implementation Period State Implementation Plan Clarification Memo[30].

ADEC also re-evaluated firing ULSD year-round in EUs 1 and 2 and EUs 5 and 6 at this facility as part of the SO_2 BACT analysis in the 2024 FNSB NAA SIP Submission. Based on each unit's potential to emit and depending on price of ULSD, the SO_2 removal cost for EU 1 would be between \$6,629 and \$13,932/ton and between \$6,723 and \$14,026/ton for EU 2. ADEC estimated the SO_2 removal cost for EUs 5 and 6 would be over \$2.5 million per ton of SO_2 removed based on potential to emit.[31] Both EUs 5 and 6 currently fire light-straight run, or naphtha, an inherently low sulfur fuel. Based on the cost analyses, ADEC determined that it is economically infeasible to fire EUs 1, 2, 5, or 6 on ULSD.

Based on the rescinded SO_2 emission control requirements, no reductions or emission controls were selected for NPP under the Regional Haze rule.

<u>Golden Valley Electric Association, Healy Power Plant</u>

The Healy Power Plant is an electric power generating facility located at Mile 2.5 on Healy Spur Road in Healy, Alaska, GVEA's closest Stationary source to the Denali Class I Area. The primary power generating units include two coal-fired steam generators: the 25-MW Foster-Wheeler Unit No. 1 (EU 1) and the 54-MW TRW Integrated Entrained Combustion System (EU 2). EU 1 has the highest SO_2 emissions per MMBtu of energy consumed in all GVEA's emissions unit inventory. SO_2 controls already in place at the Healy Power Plant include DSI on EU 1 and SDA on EU 2. The Healy Power Plant has been under a federally enforced Consent Decree since 2012. Under the stipulations of the Consent Decree, the Healy facility installed SCR equipment on EU 2 in 2015 and on EU 1 in 2024.

In the Regional Haze SIP adopted on July 5, 2022, ADEC determined that the coal-fired boiler EU 2 at GVEA's Healy Power Plant is considered "effectively controlled," with an existing SO_2 emissions rate of 0.10 lb/MMBtu achieved using an SDA control system.

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[30] Alaska Department of Environmental Conservation. (October 6, 2025). *2025 Signed Alaska Regional Haze Clarification Memo Final (PDF).* https://dec.alaska.gov/air/anpms/regional-haze/

[31] United States Government. [Docket EPA-R10-OAR-2024-0595](https://www.regulations.gov/document/EPA-R10-OAR-2024-0595-0078). December 23, 2024. https://www.regulations.gov/document/EPA-R10-OAR-2024-0595-0078

As required by ADEC for the Second Implementation Plan, GVEA was given the choice of three options for EU 1; retire the unit, submit a Four Factor Analysis for dry sorbent injection optimization, or take an enforceable SO_2 limit of 0.20 lb/MMBtu. GVEA initially submitted a Four-Factor Analysis for optimizing DSI on June 30, 2023, with the conclusion that their DSI system could not achieve a lower SO_2 emissions rate then their current limit of 0.30 lb/MMBtu through increased sorbent injection rates alone. ADEC reviewed the June 30, 2023, GVEA submittal and subsequently issued an incomplete finding on January 25, 2024, requesting that GVEA expand their four-factor analysis to include site-specific vendor/manufacturer quotes that include modifications to the existing DSI system.

GVEA responded to the ADEC's incompleteness finding with a letter on June 4, 2024, that proposed the 0.20 lb/MMBtu SO_2 limit on EU 1, the limit that ADEC had previously provided as an option in the 2022 Regional Haze SIP. ADEC reviewed the submittal and concurred with GVEA that Healy EU 1 would be considered "effectively controlled" with a DSI system upgrade and an SO_2 emissions limit of 0.20 lb/MMBtu. ADEC then presented the proposed SO_2 limit of 0.20 lb/MMBtu to the NPS on July 10, 2024.

On April 8, 2025, GVEA Healy EU 1 received a Presidential Exemption[32] from the MATS rule compliance until July 2029. It is reasonable to assume that GVEA would time any upgrade to the DSI system to coincide with work to install activated carbon injection ports for MATS compliance. As stated in the 2022 Regional Haze Plan SIP Submission, further SO_2 control technology retrofits on EU 1 are not necessary for reasonable progress.

EU 1 remains effectively controlled based on the existing 0.30 lb/MMBtu SO_2 limit embodied in a 2012 federal consent decree and approved by the EPA as BART.

<u>Eielson Air Force Base</u>

Eielson AFB is located approximately 23 miles southeast of Fairbanks, Alaska. The base provides forward air control for joint United States Air Force and United States Army contingencies in overall Alaskan military operations, and in support of the United States Air Force Pacific Air Forces. Eielson AFB consists of an operational airfield, residential housing, office buildings, gas stations, utilities, military police and fire Departments, public schools, chapels, hospital facilities, retail stores, recreational facilities, and more. Primary heating and power generation is accomplished using six large coal-fired boilers and associated steam and generating equipment. The emission unit inventory includes six coal fired boilers currently installed at the source, which includes the four legacy boilers EUs 1, 2, 3, and 4, and two of the planned five replacement boilers, EUs 5A and 6A.

On August 9, 2010, ADEC issued Minor Permit AQ0264MSS05 authorizing Eielson AFB to do a phased replacement of the six existing older coal-fired boilers (EUs 1 through 6) without SO_2 emissions controls replacing them with five new boilers (EUs 1A, 2A, and 4A through 6A) installed with DSI systems to control SO_2 emissions. The sixth boiler, EU 3, is to be removed without a replacement. All five boilers were expected to be replaced by October 2019. However, the timeline

[32] U.S. Environmental Protection Agency. (April 8, 2025). *Presidential Proclamation – Regulatory Relief for Certain Stationary Sources to Promote American Energy*. https://www.epa.gov/stationary-sources-air-pollution/presidential-proclamation-regulatory-relief-certain-stationary

for the replacement of the boilers has since stalled. The first boiler, EU 6, was replaced and EU 6A started up its place on October 28, 2014. The second boiler to be replaced, EU 5, was exchanged with EU 5A and started on October 10, 2016. The four original boilers (EUs 1-4) remain onsite and continue to operate with baghouses to control particulate matter but without SO_2 emission controls. With the boiler replacement project halted and no plans to move forward, ADEC required the facility to do a Four Factor Analysis in 2023. The analysis examined the potential installation of SO_2 pollution control technologies including WFGD, DSI, and SDA. Based on the results, Eielson concluded that retrofitting the boilers with any SO_2 emission controls would be cost prohibitive. ADEC revised Eielson's cost analysis with more conservative assumptions which also showed that retrofitting the older coal-fired boilers with new SO_2 emissions controls would be cost prohibitive for Regional Haze. Further details of this analysis are described in the Alaska Regional Haze Second Implementation Period State Implementation Plan Clarification Memo[33].

To further analyze the costs of retrofitting SO_2 controls on Eielson's four legacy coal-fired boilers, EUs 1 through 4, ADEC reviewed the SO_2 BACT analysis that was conducted as part of the 2024 FNSB NAA SIP Submission. Specifically, ADEC revisited the actual cost estimates for retrofitting the boilers of similar size and era located at Fort Wainwright. As noted above, ADEC estimated that the lowest cost control option of DSI for the Fort Wainwright boilers would cost $6,636/ton of SO_2 removed based on potential to emit. However, this BACT analysis was based on the Fort Wainwright coal-fired boiler's combined potential emissions of 1,470 tons of SO_2. Eielson's 2023 actual emissions that would be used in a four-factor analysis were substantially lower at 212 tons of combined SO_2 from EUs 1 through 4. Therefore, Eielson's cost per ton of SO_2 would be even higher.

Based on these analyses, ADEC concludes that SO_2 controls would be cost prohibitive to install on Eielson's EUs 1 through 4 for the regional haze second implementation period. The documentation for this determination can be found on Regulations.gov for docket no. EPA-R10-OAR-2024-0595[34].

ADEC notes that Eielson AFB has equipped and operates the newer coal-fired boilers, EUs 5A and 6A, with DSI emission control technology for the purpose of reducing SO_2 emissions. The units operate under an existing SO_2 emissions limit of 0.20 lb/MMBtu to comply with the performance standard for industrial-commercial-institutional steam generating units (NSPS Db). SO_2 emissions from EUs 5A and 6A have been extremely low (5.9 tons in 2017, 22 tons in 2018, and 3.7 tons in 2019). Because this limit is embodied in a Federal NSPS standard and emissions from EUs 5A and 6A are documented in the submission as being extremely low, the existing limit is not necessary for reasonable progress in the regional haze second implementation period.

C. Emissions Reductions from Regional Haze SIP Strategies (51.308(g)(2))[35]

RHR paragraph 51.308(g)(2) requires "A summary of the emissions reductions achieved throughout the State through implementation of the measures described in paragraph (g)(1)" and discussed in Section B of this progress report.

[33] Alaska Department of Environmental Conservation. (October 6, 2025). *2025 Signed Alaska Regional Haze Clarification Memo Final (PDF).* https://dec.alaska.gov/air/anpms/regional-haze/
[34] United States Government. Docket EPA-R10-OAR-2024-0595. December 23, 2024. https://www.regulations.gov/document/EPA-R10-OAR-2024-0595-0078
[35] Sections 51.308(g)(2) and 51.309(d)(10)(i)(B)

The direct and precursor pollutants that can impair visibility include SO_2, NO_X, $PM_{2.5}$ and coarse particulate matter less than 10 microns (PM_{10}), VOCs, and NH_3. EPA's 2019 RH SIP guidance states that when selecting sources for analysis of control measures, a state may focus on the PM species that dominate visibility impairment at the Class I areas. Then select only sources with emissions of those dominant pollutants and their precursors. Also, it may be reasonable for a state to not consider measures for control of the remaining pollutants from sources that have been selected based on their emissions of the dominant pollutants.

Haze-causing PM species are classified by whether they were released directly or were formed in the atmosphere. $PM_{2.5}$ or PM_{10} emitted directly into the atmosphere is referred to as primary particulate which includes crustal materials referred to as soil, elemental carbon, sea salt, and coarse mass. PM produced in the atmosphere from photochemical reactions of gas-phase precursors and subsequent condensation to form secondary particulates is referred to as secondary particulate which includes ammonium nitrate (NH_4NO_3) and ammonium sulfate ($(NH_4)_2SO_4$). Organic mass carbon can be either primary or secondary. Secondary $PM_{2.5}$ is generally smaller size distribution than primary $PM_{2.5}$, and because the ability of $PM_{2.5}$ to scatter light depends on particle size with light scattering for fine particles being greater than for coarse particles, secondary $PM_{2.5}$ plays an especially important role in visibility impairment. Secondary NH_4NO_3 and $(NH_4)_2SO_4$ $PM_{2.5}$ are also hygroscopic, and their extinction efficiency increases as they take on water so the light scattering efficiency increases with increasing relative humidity. Moreover, the smaller secondary $PM_{2.5}$ can remain suspended in the atmosphere for longer periods and is transported long distances, thereby contributing to regional-scale impacts of pollutant emissions on visibility.

EPA guidance[36] allows for the elimination of pollutants from consideration in a four-factor analysis. States can focus on the PM species that "dominate visibility impairment at the Class I areas affected by emissions from the state and then select only sources with emissions of those dominant pollutants and their precursors". Further, EPA guidance states that it may be reasonable for a state to not consider measures for control of the remaining pollutants from sources that have been selected based on emissions of the dominant pollutants.

Based on that guidance, the selection of sources in Alaska to undergo further analysis under the Second Implementation Period of the RH Program was based solely on SO_2 emissions. SO_2 is a precursor pollutant of $(NH_4)_2SO_4$ which dominates visibility impairment at Alaska Class I areas. As in the first RH planning period, elimination of less important haze species allows for focus on the most influential species by state regulators. Given the dominance of sulfate to visibility at Alaska Class I areas, ADEC elected to focus on SO_2 sources.

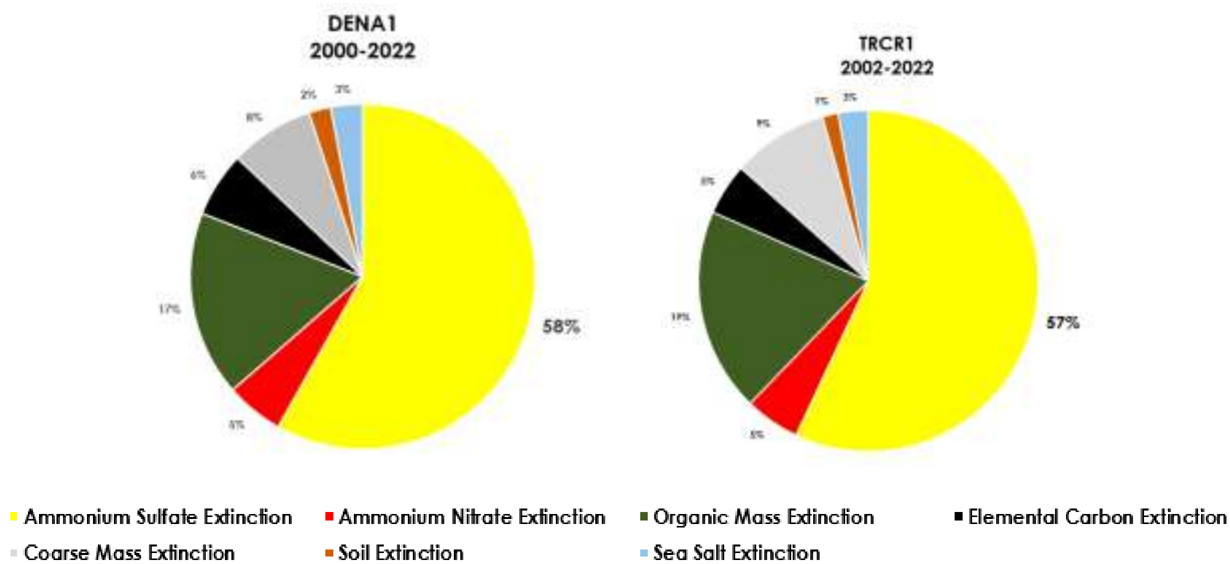
As shown in Figures 8 through 10 below from the FLM Environmental Database Extinction Composition Summary by Group Report[37], $(NH_4)_2SO_4$ emissions make up the largest percentage of pollutants impacting visibility across Alaska. In fact, except for KPBO1, the station closest to a city center, IMPROVE station data indicates that more $(NH_4)_2SO_4$ was measured at each station than all other pollutants combined.

[36] EPA, *Guidance on Regional Haze State Implementation Plans for the Second Implementation Period*, 2019. Page 9, Step 3.

[37] National Park Service and U.S. Forest Service. (2024, June 19). *Air Quality Related Values (AQRV)-Express Tools*. Federal Land Manager Environmental Database. https://views.cira.colostate.edu//fed/Express/AqrvTools.aspx#Visibility

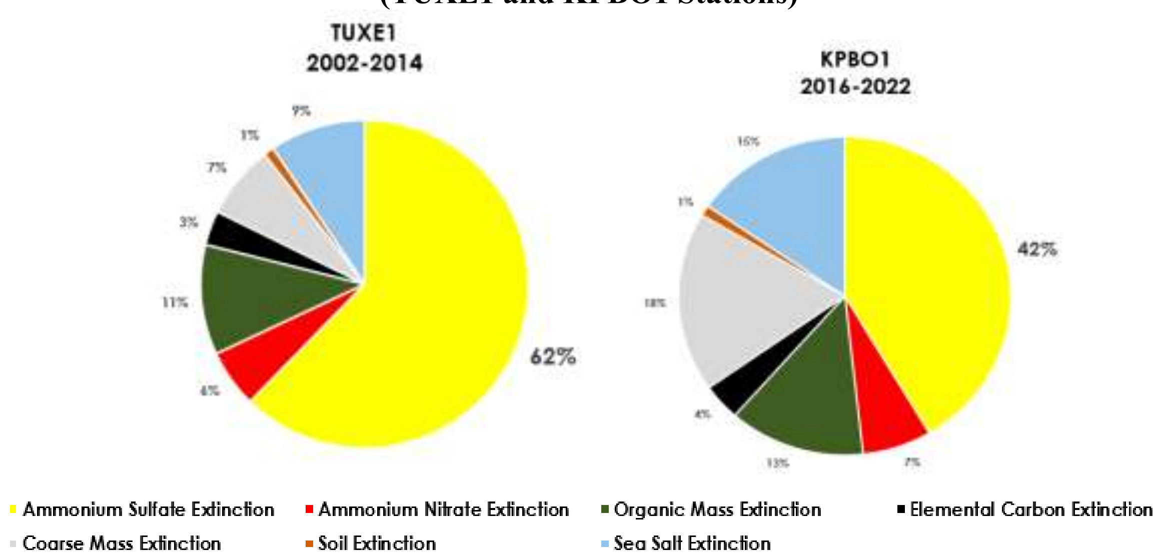
The fraction of the pollutants recorded at both of Denali's IMPROVE stations are consistent with one another as demonstrated in Figure 8.

Figure 8. Denali National Park Total Extinction Composition (DENA1 and TRCR1 IMPROVE Stations)



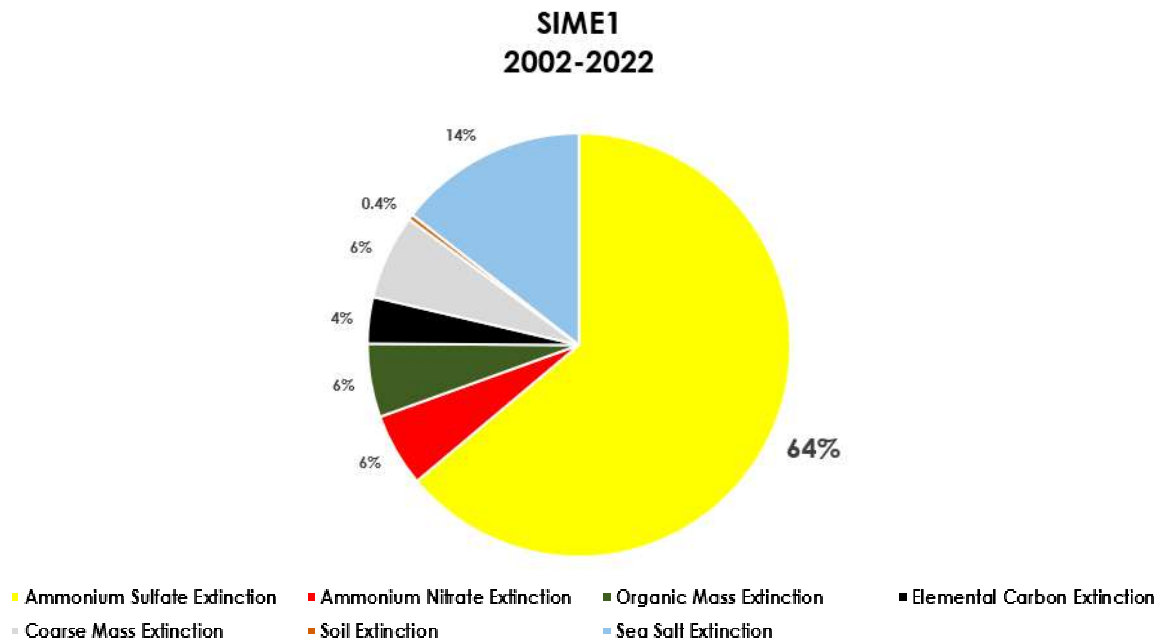
In 2015, Tuxedni's new IMPROVE station was set up across Cook Inlet and began collecting data as KPBO1. As Figure 9 shows, the proportion of the pollutants changed significantly with the move from TUXE1 on the west side of Cook Inlet to the east side of the inlet near the Sterling Highway and the city of Ninilchik, however, $(NH_4)_2SO_4$ continues to be the primary pollutant recorded.

Figure 9. Tuxedni National Wildlife Refuge Total Extinction Composition (TUXE1 and KPBO1 Stations)



Data from Simeonof's IMPROVE station, SIME1, in Figure 10, illustrates the dominance of $(NH_4)_2SO_4$ most clearly. With very little industry and only a small community nearby, it is apparent Simeonof's visibility is significantl
y impacted by uncontrollable SO_2 emission sources.

Figure 10. Simeonof National Wildlife Refuge Total Extinction Composition (SIME1 Station)



Sources of SO_2, a precursor pollutant of $(NH_4)_2SO_4$, can be from natural or anthropogenic origins. Significant natural SO_2 sources in Alaska include wildfires, volcanoes, and oceanic Dimethyl Sulfide (DMS). Within Alaska, anthropogenic SO_2 comes primarily from electrical generation and oil and gas development. But additional significant sources of uncontrollable anthropogenic SO_2 emissions that have been difficult to account for are international industry operations including energy production and marine shipping.

After completing the two-step source selection process for the second implementation of the Alaska Regional Haze SIP, six facilities were identified that warranted further evaluation. Of the six facilities, three were determined to be effectively controlled with existing permit limits and pollution control devices implemented to achieve compliance with other federal programs. No further controls were necessary under the RH plan. These facilities included Aurora Energy's Chena Power Plant, Fort Wainwright's Doyon Utilities, and the University of Alaska Fairbanks Campus.

To determine if added controls have improved emissions, 2017 and 2023 data compiled by ADEC for EPA's National Emission Inventory (NEI) were compared. However, most new controls went into effect in 2021, and no changes would be reflected in the 2020 report data. Therefore, the data in Tables 2 through 7 below is preliminary and subject to change. Note that many of the SO_2 controls originally selected and implemented as part of the FNSB NAA SIP in 2021 were rescinded by ADEC in the fall of 2023 after additional modelling demonstrated that SO_2 from major stationary sources did not meaningfully contribute to $PM_{2.5}$ concentrations in the FNSB NAA.

Aurora Energy, Chena Power Plant

The FNSB NAA SIP, adopted November 19, 2019, amendments adopted November 18, 2020,[38] required the Chena Power Plant to limit the sulfur content of the coal received at the stationary source as well as an SO_2 limit on the coal-fired boilers themselves. The new limits resulted in over a 60% reduction in annual SO_2 emissions.

Table 2. Chena Power Plant SO_2 Emissions (tons)

Year	SO_2
2017	628
2023	229
Change in Emissions	**-399**

U. S. Army Garrison Fort Wainwright, Doyon Utilities

As a result of the emissions control analysis conducted at Fort Wainwright for the 2019/2020 FNSB NAA SIP, sulfur content limits were implemented on the coal received at the stationary source. In addition, a DSI system was required to be installed, and emission rates were established for each of the coal-fired boilers. However, as discussed in Section B8 of this document, the SO_2 section of the 2019/2020 FNSB NAA SIP was rescinded with the 2024 Amendment. Therefore, DSI controls and the associated lower SO_2 emissions rate never went into effect at the stationary source. Sulfur content limits were also put in place for the diesel combusted in the engines, generators, and firewater pumps at the base. These emission controls along with the others determined to be necessary by the analysis lead to an annual decrease of over 60 tons of SO_2.

Table 3. Fort Wainwright SO_2 Emissions (tons)

Year	SO_2
2017	460
2023	398
Change in Emissions	**-62**

[38] Background and detailed information regarding the 2019/2020 FNSB NAA SIP can be found at http://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-serious-sip/.

University of Alaska Fairbanks' Campus Power Plant

The Campus Power Plant completed a major renovation project in late 2018 in response to impending failure of their existing coal-fired boilers. The project replaced the original boilers with one coal-fired circulating fluidized bed boiler EU 113, that is expected to produce the lowest rates of $PM_{2.5}$ of any coal plant in the US. Additionally, EU 113 is equipped with fluidized bed limestone injection (FBLI), which the EPA Air Pollution Control Cost Manual[39] considers to be a control for SO_2 emissions and has resulted in a dramatic drop in overall SO_2 emissions for the stationary source. Further emission reductions occurred in response to an emissions control analysis as part of the 2019/2020 FNSB NAA SIP, including a diesel sulfur content limit, coal sulfur limit, and emission limits for many of the permitted units. With the new boiler and all the new controls in place, SO_2 emissions fell over 90% between 2017 and 2023.

Table 4. Campus Power Plant SO_2 Emissions (tons)

Year	SO_2
2017	164
2023	7
Change in Emissions	**-156**

Golden Valley Electric Association, North Pole Power Plant

The FNSB NAA SIP, adopted November 19, 2019, amendments adopted November 18, 2020,[40] required the NPPP to limit the sulfur content of the fuel oil combusted by the simple cycle gas turbines. The result, a decrease of over 200 tons of SO_2 emissions from 2017 to 2023. However, as discussed in Section B8 of this document, the SO_2 section of the 2019/2020 FNSB NAA SIP was rescinded with the 2024 Amendment. Additionally, the Regional Haze SIP adopted on July 5, 2022, included fuel switches on EUs 1 and 2 that never went into effect. Therefore, no reductions or emission controls were selected for NPP under the Regional Haze rule.

Table 5. North Pole Power Plant SO_2 Emissions (tons)

Year	SO_2
2017	269
2023	36
Change in Emissions	**-234**

[39] EPA Air Pollution Control Cost Manual: Section 5 – SO_2 and Acid Gas Controls, Chapter 1, Page 1-12: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution#cost%20manual.

[40] Background and detailed information regarding the 2019/2020 FNSB NAA SIP can be found at http://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-serious-sip/.

Golden Valley Electric Association, Healy Power Plant

No changes in emissions nor emission controls have yet been implemented at Healy Power Plant. ADEC is working closely with GVEA to establish appropriate controls that benefit RH while also aiding the plant in achieving compliance with new hazardous air pollutant and PM emission limits under EPA's Mercury and Air Toxics Standards rule. Limiting emissions without causing an unnecessary economic burden on the residents of North Star Borough dependent on the plant for electricity is a priority to both ADEC and GVEA.

Table 6. Healy Power Plant SO_2 Emissions (tons)

Year	SO_2
2017	296
2023	319
Change in Emissions	**+23**

Eielson Air Force Base

Eielson AFB's coal-fired boiler replacement project stalled out and no progress has been made on the four remaining boilers since 2016. Eielson completed a Four-Factor Analysis on the boilers in 2023 and concluded that retrofitting the boilers with any emission controls would be cost prohibitive. ADEC reviewed the USAF analysis for SO_2 controls on EUs 1 through 4, and along with recent cost data received as part of a BACT analysis on the similar coal-fired boilers at Fort Wainwright, has determined that no further controls are warranted for these EUs. Therefore, ADEC does not anticipate any further reductions in SO_2 emissions from the Eielson AFB.

Table 7. Eielson Air Force Base SO_2 Emissions (tons)

Year	SO_2
2017	263
2023	234
Change in Emissions	**-30**

D. Visibility Progress (51.308(g)(3))[41]

Per RHR paragraph 51.308(g)(3), states with Class I areas must assess the visibility conditions and changes, expressed in terms of five-year averages of the annual haze index values, in deciviews, for the 20% Most Impaired and Clearest days. Visibility assessments are to include data for Current visibility, the difference between current conditions and Baseline conditions, and the change in visibility impairment since the 2nd Implementation Plan.

The technical data included in this progress report was provided by the Federal Land Manager Environmental Database (FED)[42]. Per the website's overview, FED is an online repository of air quality data and metadata sponsored by the National Park Service and the U.S. Forest Service (USFS). It was developed to help states, tribes, FLMs, scientists, planners, and students evaluate air quality and visibility in federally protected ecosystems using a variety of national and regional air quality datasets.

FED imports and maintains data from over two dozen monitoring networks and is constantly updating these datasets as new data becomes available from the source providers. The FED team also develops and maintains the IMPROVE website, the WRAP Technical Support System, and the Intermountain West Data Warehouse, all of which utilize the foundational database and software architecture developed for FED. Ongoing development and maintenance of FED is conducted by Colorado State University's Cooperative Institute for Research in the Atmosphere in Fort Collins, Colorado[43].

1. Current Conditions and Difference from Baseline Conditions

To satisfy items 51.308(g)(3)(i) and 51.308(g)(3)(ii), Current conditions, Baseline conditions, and the difference between the two are shown in Tables 8 and 9 for the 20% Clearest days and the 20% Most Impaired days respectively. All the haze indexes presented below are based on data that was measured and analyzed as part of the IMPROVE program and the data was accessed using the Federal Land Manager Environmental Database[44].

[41] Sections 51.308(g)(3) and 51.309(d)(10)(i)(C)
[42] Federal Land Manager Environmental Database, National Park Service, U.S. Forest Service, and Colorado State University, Accessed October 2024, https://views.cira.colostate.edu/fed/
[43] Federal Land Manager Environmental Database, National Park Service, U.S. Forest Service, and Colorado State University, Accessed October 2024, https://views.cira.colostate.edu/fed/About/Default.aspx
[44] Federal Land Manager Environmental Database, U.S. Bureau of Land Management and Colorado State University, Accessed October 2024, https://views.cira.colostate.edu/fed/

Clearest Days

As depicted in Table 8, no degradation in visibility for the 20% Clearest Days as compared to the Baseline period was observed during the 2018-2022 reporting period at any of the three Class I Areas in Alaska.

Table 8: Baseline & Current Conditions for Alaska's Class I Areas, 20% Clearest Days (dv)

Class I Area	Denali National Park	Denali National Park	Tuxedni National Wildlife Refuge	Tuxedni National Wildlife Refuge	Simeonof National Wildlife Refuge
IMPROVE Station	**DENA1**	**TRCR1**	**TUXE1[1]**	**KPBO1**	**SIME1**
Baseline[2]	2.43257	3.46248	3.99058	6.01997	7.60272
Current Reporting Period 2018-2022[3]	2.27544	3.47616	---	5.90086	7.48286
Visibility Change Between Current and Baseline Period[4]	-0.15713	**0.01368**	---	-0.11911	-0.11987

Notes:

1. The IMPROVE monitor TUXE1 was decommissioned in December 2014 and replaced by KPBO1 that began operating in August 2015.
2. The Baseline is calculated using data from 2000-2004 for DENA1 and 2002-2004 for TUXE1, TRCR1, and SIME1. The Baseline for KPBO1 is an unofficial estimate by ADEC based on directions in 51.308(f)(1)(i) using data from 2016 through 2020, an official determination will be provided by EPA for the 3rd Implementation Period.
3. The Current Reporting Period visibility is the average of the annual average deciviews for 2018 through 2022 as reported on the Federal Land Manager Environmental Database. (https://views.cira.colostate.edu//fed/QueryWizard/Default.aspx)
4. Difference = Current Reporting Period minus Baseline; therefore, negative differences indicate an improvement in visibility since the Baseline period and positive differences (marked in bold text) indicate visibility degradation since the Baseline period.

Most Impaired Days

The data in Table 9 shows a continued improvement in the visibility of the MID data at both of Denali's IMPROVE stations. Data taken from the Tuxedni and Simeonof stations show a slight decrease in visibility during the current reporting period when compared to the Baseline.

As described in more detail in Section A of this report, the KPBO1 monitor replaced TUXE1 beginning in 2016 and ADEC has chosen to treat the two stations as two different sites rather than a continuation. ADEC calculated KPBO1's Baseline to be 11.8 dv compared to TUXE1's Baseline of 10.5 dv. The new monitoring site, KPBO1, is impacted by both a large population and numerous industrial sources neither of which are factors impacting TUXE1 nor the Tuxedni Class I area. Both the location in which the TUXE1 station was located and the remote islands comprising the Tuxedni Class I Area have very few visitors, no industry, and no year-round inhabitants. Additionally, a record fire year caused a peak in the annual average deciviews in 2019 at KPBO1. The largest fire that season being the Swan Lake Fire on the Kenai Peninsula not far from KPBO1.

Data in Table 9 also shows a slight decrease in visibility for Simeonof due to emission sources outside the scope of Regional Haze. The region near Simeonof is sparsely populated with limited industrial sources that operate only seasonally. Therefore, as discussed in more detail in Section F, visibility degradation at SIME1 can only be attributed to haze caused by uncontrollable sources. Natural impairments to visibility during the current reporting period not properly accounted for in the IMPROVE data included record wildfires in both Alaska[45] and Russia[46], continuous volcanic activity in the area[47], oceanic dimethyl sulfide, Arctic haze, and Asian dust events. The area is also impacted by marine vessels passing nearby and the international transport of air pollutants into the state from Russia, China, other parts of Asia, Europe, and Canada[48]. International-origin emissions cannot be regulated, controlled, or prevented by the state and therefore are beyond the scope of this planning document. Any reductions in international origin anthropogenic emissions would likely fall under the purview of the U.S. EPA through international diplomatic activities. More details about the studies done on international transport of pollutants are available in the Second Implementation SIP (Volume II, Section III.K.13.E.5).

Table 9: Baseline & Current Conditions for Alaska's Class I Areas, 20% Most Impaired Days (dv)

Class I Area	Denali National Park	Denali National Park	Tuxedni National Wildlife Refuge	Tuxedni National Wildlife Refuge	Simeonof National Wildlife Refuge
IMPROVE Station	**DENA1**	**TRCR1**	**TUXE1[1]**	**KPBO1**	**SIME1**
Baseline[2]	7.08475	9.11354	10.46848	11.46634	13.66871
Current Reporting Period 2018-2022	6.41822	8.99907	---	11.75865	14.06610
Visibility Change Between Current and Baseline Period[3]	-0.66653	-0.11447	---	**0.29231**	**0.39739**

Notes:

1. The IMPROVE monitor TUXE1 was decommissioned in December 2014 and replaced by KPBO1 that began operating in August 2015.
2. The Baseline is calculated using data from 2000-2004 for DENA1 and 2002-2004 for TUXE1, TRCR1, and SIME1. The Baseline for KPBO1 is an unofficial estimate by ADEC based on directions in 51.308(f)(1)(i) using data from 2016 through 2020, an official determination will be provided by EPA for the 3rd Implementation Period.
3. Difference = Current Reporting Period minus Baseline; therefore, negative differences indicate an improvement in visibility since the Baseline period and positive differences (marked in bold text) indicate visibility degradation since the Baseline period.

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[45] Maisch, John "Chris" (2019, August 17). "Alaska's summer 2019 fire season was one for the record books." Peninsula Clarion. Retrieved from https://www.peninsulaclarion.com/opinion/alaskas-summer-2019-fire-season-was-one-for-the-record-books/

[46] Roth, Andrew (2021, September 22). "Russia forest fire damage worst since records began, says Greenpeace." The Guardian. Retrieved from https://www.theguardian.com/world/2021/sep/22/russia-forest-fire-damage-worst-since-records-began-says-greenpeace

[47] "Alaska Volcano Observatory." USGS, Geophysical Institute University of Alaska Fairbanks, and State of Alaska Division of Geological & Geophysical Surveys, 2024, https://avo.alaska.edu/.

[48] Polissar, A.V., Hopke, P.K. and Harris, J.M., 2001. Source regions for atmospheric aerosol measured at Barrow, Alaska. Environmental science & technology, 35(21), pp.4214-4226

2. Current Conditions and Most Recent Planning Period

For 51.308(g)(3)(iii), Tables 10 and 11 repeat the current conditions and present the conditions that were most recent at the time that the second planning period regional haze SIPs were drafted (these are labeled as "Most Recent Plan").

<u>Clearest Days</u>

Table 10 demonstrates that the 20% clearest days remained very consistent between the 2018-2022 period and the most recent planning period of 2014-2018. A tenth of a deciview increase differentiates the two reporting periods at Denali's stations but both stations remain at or below the Baseline as shown in Table 9 above. Monitors at Tuxedni and Simeonof are also consistent between the two reporting periods with both showing small improvements in the visibility when compared to the most recent planning period.

Table 10: Most Recent Plan & Current Conditions for Alaska's Class I Areas, 20% Clearest Days (dv)

Class I Area	Denali National Park	Denali National Park	Tuxedni National Wildlife Refuge	Tuxedni National Wildlife Refuge	Simeonof National Wildlife Refuge
IMPROVE Station	**DENA1**	**TRCR1**	**TUXE1[1]**	**KPBO1**	**SIME1**
Most Recent Plan 2014-2018[2]	2.18697	3.36127	3.92512	6.01997	7.74240
Current Reporting Period 2018-2022	2.27544	3.47616	---	5.90086	7.48286
Visibility Change Between Current Period and 2nd Implementation Plan[3]	**0.08847**	**0.11489**	---	-0.11911	-0.25954

Notes:

1. The IMPROVE monitor TUXE1 was decommissioned in December 2014 and replaced by KPBO1 that began operating in August 2015.
2. The first complete calendar year of data collection for KPBO1 was 2016 and the Most Recent Plan value was estimated based on 2016-2018 data.
3. Difference = Current minus Most Recent Plan; therefore, negative differences indicate an improvement in visibility since the Baseline period and positive differences (marked in bold text) indicate visibility degradation since the Baseline period.

Most Impaired Days

As with the 20% clearest days, Alaska's Class I areas also remained consistent for the 20% MID between the current reporting period and the most recent planning period, as seen in Table 11, with a change of only tenths of a deciview between the two periods seen at each station.

Table 11: Most Recent Plan & Current Conditions for Alaska's Class I Areas, 20% MID (dv)

Class I Area	Denali National Park	Denali National Park	Tuxedni National Wildlife Refuge	Tuxedni National Wildlife Refuge	Simeonof National Wildlife Refuge
IMPROVE Station	**DENA1**	**TRCR1**	**TUXE1[1]**	**KPBO1**	**SIME1**
Most Recent Plan 2014-2018[2]	6.55020	8.81824	9.96669	11.46634	13.89307
Current Reporting Period 2018-2022	6.41822	8.99907	---	11.75865	14.06610
Visibility Change Between Current Period and Most Recent Plan[3]	-0.13198	**0.18083**	---	**0.29231**	**0.17303**

Notes:

1. The IMPROVE monitor TUXE1 was decommissioned in December 2014 and replaced by KPBO1 that began operating in August 2015.
2. The first complete calendar year of data collection for KPBO1 was 2016 and the Most Recent Plan value was estimated based on 2016-2018 data.
3. Difference = Current minus Most Recent Plan; therefore, negative differences indicate an improvement in visibility since the Baseline period and positive differences (marked in bold text) indicate visibility degradation since the Baseline period.

3. Current Conditions and Glidepath

Figures 11 through 20 were provided on the IMPROVE website under the report titled "URP Glidepath – M.I.D. or Clearest" available at: https://views.cira.colostate.edu/fed/Express/AqrvTools.aspx#Visibility.

Denali National Park

Figures 11 and 12 also show that the 20% Clearest Days continue to trend along the Baseline.

Figure 11. Denali National Park Annual Average Clearest Days and Glidepath (dv) (DENA1 IMPROVE Station)

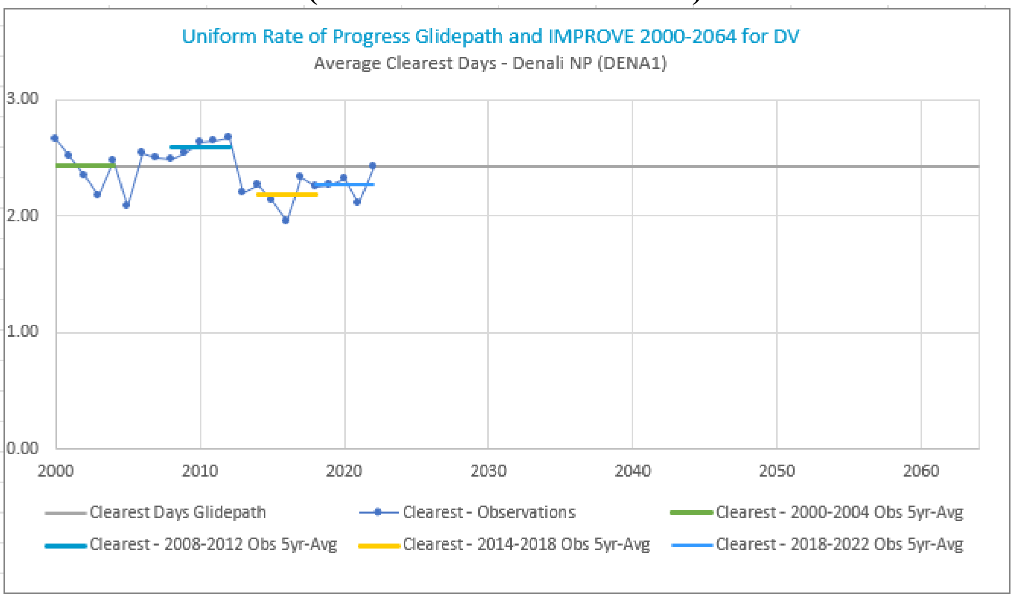
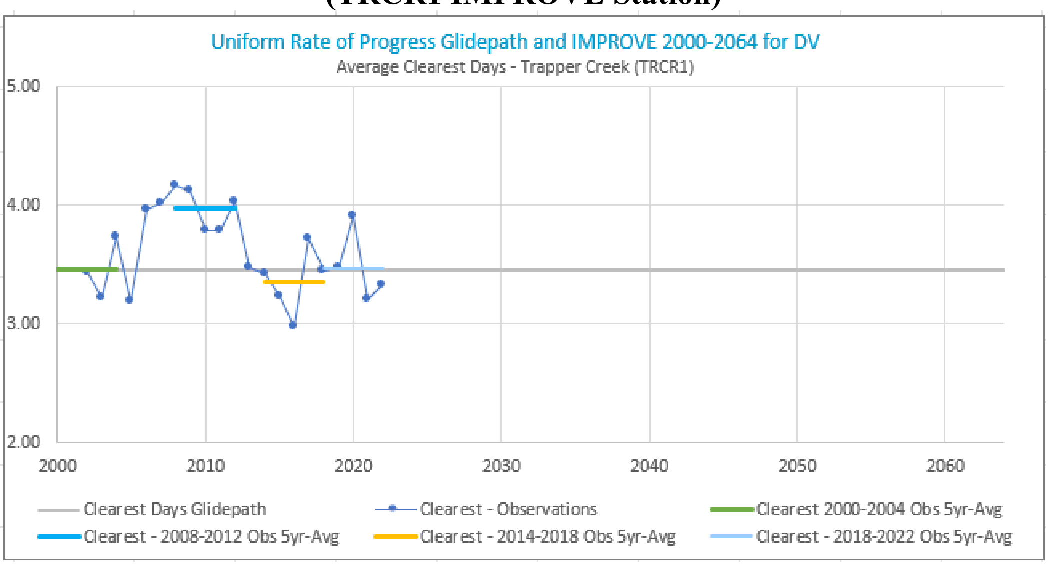


Figure 12. Denali National Park Annual Average Clearest Days and Glidepath (dv) (TRCR1 IMPROVE Station)



The Denali IMPROVE Stations continue to demonstrate an improvement in visibility impairment on the most impaired days, closely following the URP as demonstrated in Figures 13 and 14. The annual average results have shown significant spikes in 2019 and 2021 coinciding with high wildfire years. 2019 was a record-setting year in Alaska for both high temperatures and wildfires with over 2 million acres burned. The 2021 fire season was less significant, but fires and high temperatures most impacted the region in and around Denali.

Figure 13. Denali National Park Annual Average MID and Glidepath (dv) DENA1 IMPROVE Station

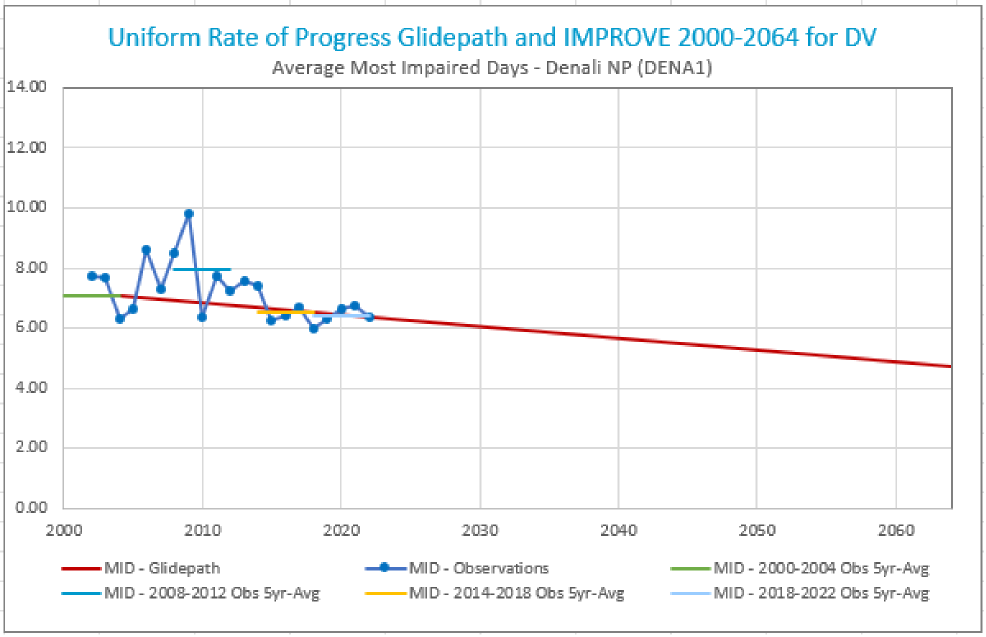
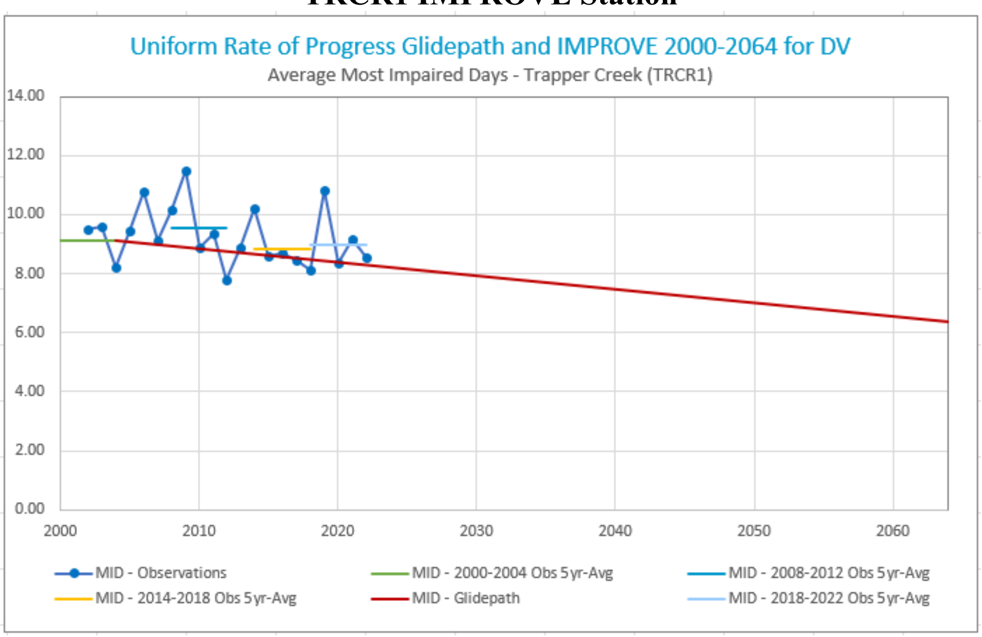


Figure 14. Denali National Park Annual Average MID and Glidepath (dv) TRCR1 IMPROVE Station



Tuxedni National Wildlife Refuge

As discussed previously, ADEC continues to separate the TUXE1 and KPBO1 stations as two separate data sets until an official decision is made by EPA. Data has not been collected at TUXE1 since December 2014 as demonstrated in Figure 15. Annual results from the KPBO1 IMPROVE station shown in Figure 16 indicate that the clearest days continue to be consistent with the Baseline during the 2018 to 2022 reporting period. Note that the Baseline in Figure 16 was estimated by ADEC for the purposes of this report using only data collected at KPBO1.

Figure 15. Tuxedni National Wildlife Refuge Annual Average Clearest Days and Glidepath (dv) (TUXE1 IMPROVE Station)

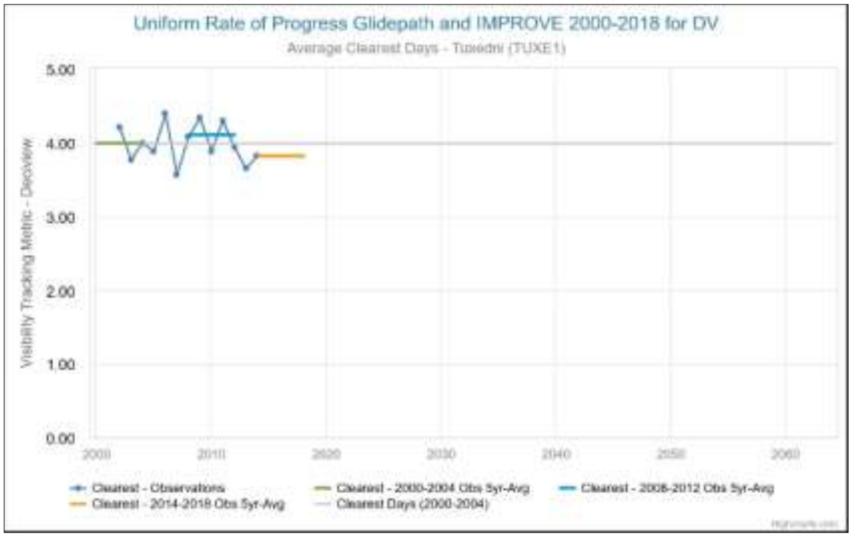
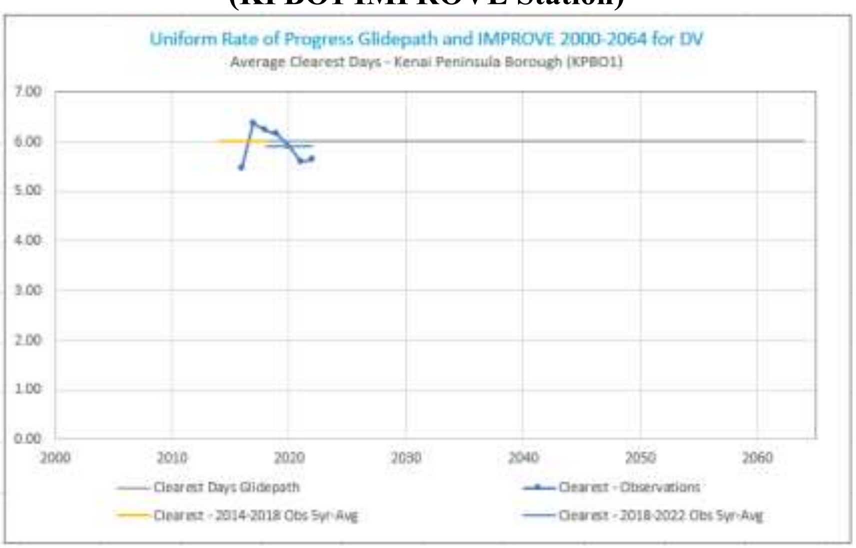


Figure 16. Tuxedni National Wildlife Refuge Annual Average Clearest Days and Glidepath (dv) (KPBO1 IMPROVE Station)



Note: TUXE1 ceased data collection in December 2014 and a new IMPROVE station representing the Tuxedni National Wildlife Refuge was installed across the inlet and designated KPBO1. No official Baseline has been defined by EPA, therefore for the purposes of this report, ADEC assumed the Baseline in the KPBO1 figure above based on directions in 51.308(f)(1)(i) using data from 2016 through 2020, an official determination will be provided by EPA for the 3rd Implementation Period.

Similarly to Denali, the Tuxedni stations have also experienced an improvement in visibility as demonstrated by an overall downward trend in deciviews on the MID as shown in Figure 18. As described above, 2019 was a record setting wildfire year in Alaska. One of the largest fires, the Swan Lake Fire, burned over 170,000 acres and was not contained for almost four months. The fire burned within approximately 55 miles of the KPBO1 station and significantly impacted results as demonstrated by a significant spike in deciviews in the MID results.

Figure 17. Tuxedni National Wildlife Refuge Annual Average MID and Glidepath (dv) (TUXE1 IMPROVE Station)

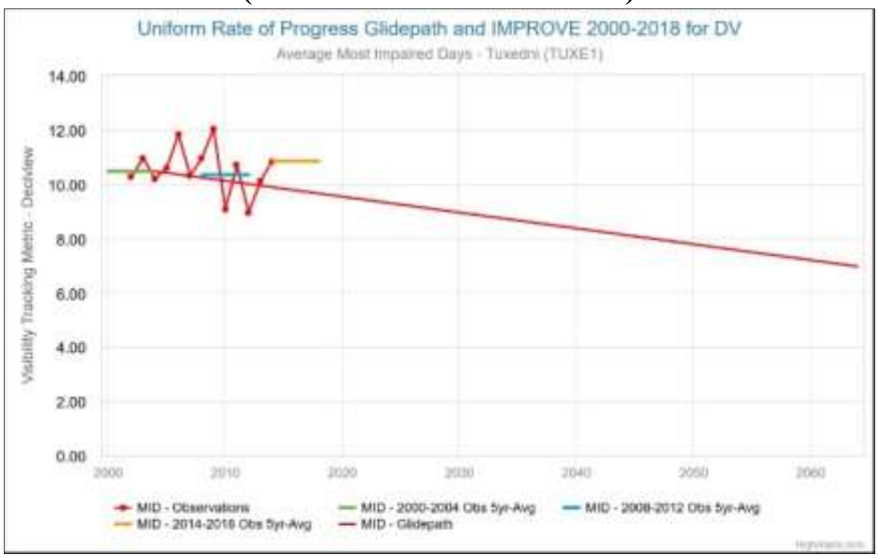
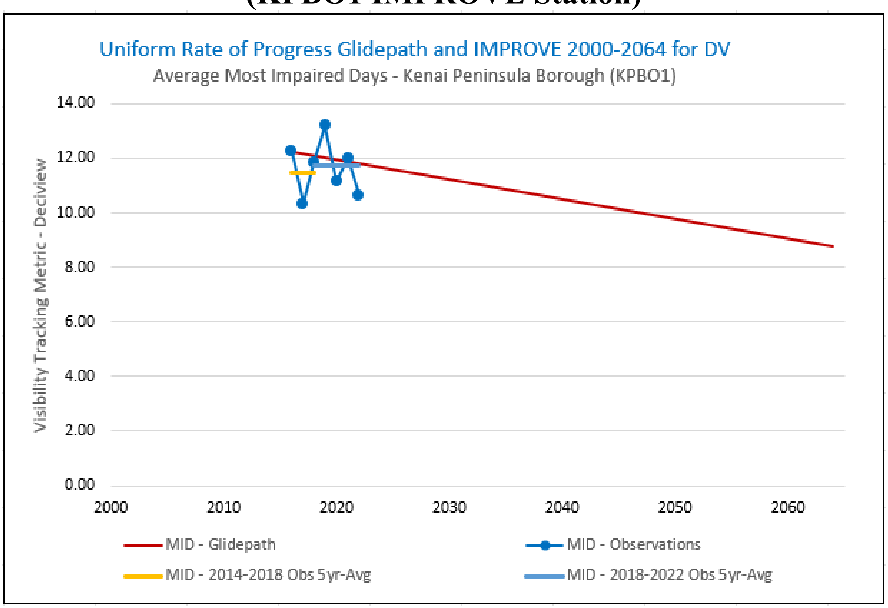


Figure 18. Tuxedni National Wildlife Refuge Annual Average MID and Glidepath (dv) (KPBO1 IMPROVE Station)

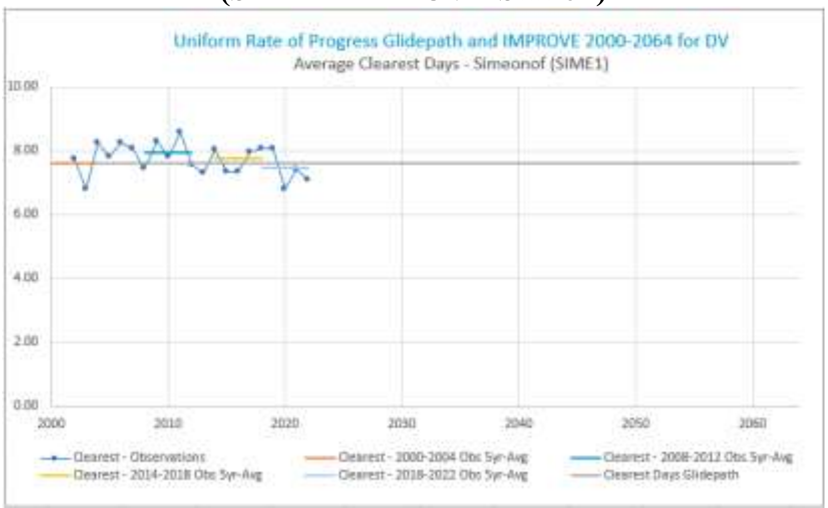


Note: TUXE1 ceased collecting data in December 2014 and a new IMPROVE station representing the Tuxedni National Wildlife Refuge was installed across the inlet and designated KPBO1 in August 2015. No official Baseline nor 2064 Endpoint has been defined by EPA, and therefore, no glidescope has been officially established. Instead, for the purposes of demonstrating changes in visibility for this Progress Report, ADEC estimated the Glidepath. The Baseline was estimated by averaging data from 2016 through 2020 using the method described in 51.308(f)(1)(i). The 2064 Endpoint for the MID at KPBO1 was assumed to be as reported in the file entitled "2064 Endpoint Updated October 2023" on the Colorado State IMPROVE website.

Simeonof National Wildlife Refuge

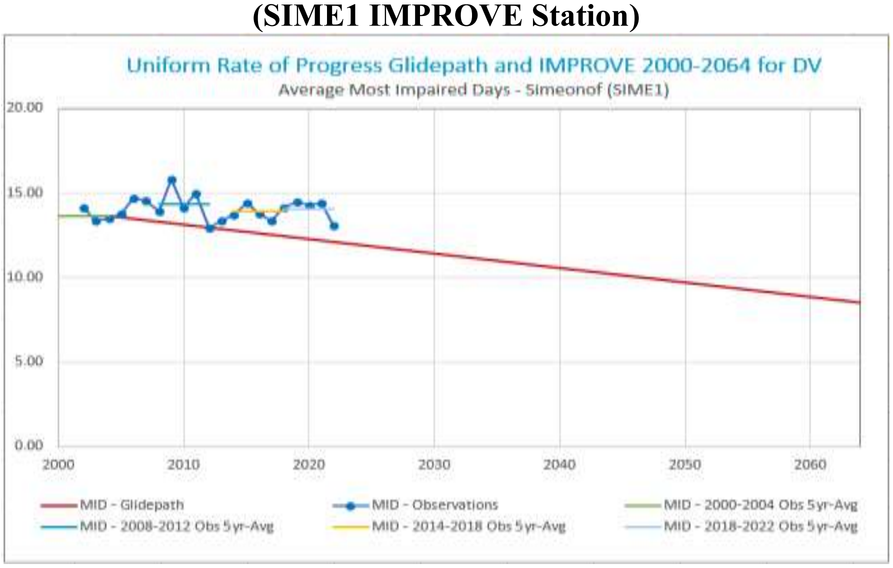
Simeonof is remote and lacks industrial sources that would significantly impact visibility. The source of haze in the area can be attributed to uncontrollable sources such as international marine vessels, volcanic activity, and oceanic DMS. However, there is currently no methodology available which accurately accounts for any one of those sources in Alaska, let alone all three impacting a site at once. The 20% clearest days have remained consistent with the Baseline during the Most Current Reporting Period of 2018-2022.

Figure 19. Simeonof National Wildlife Refuge Annual Average Clearest Days and Glidepath (dv)
(SIME1 IMPROVE Station)



Simeonof's IMPROVE MID data, shown in Figure 16, indicates improvement in visibility in 2022 as compared to the last five-year annual averaging periods and continues to trend down overall.

Figure 20. Simeonof National Wildlife Refuge Annual Average Most Impaired Days and Glidepath (dv)
(SIME1 IMPROVE Station)



E. Emissions Progress (51.308(g)(4))[49]

RHR paragraph 51.308(g)(4) requires an analysis tracking the change in emissions of pollutants contributing to visibility impairment from all sources in the state. The emissions changes should be identified by source type or activity. The emissions analysis should cover the time frame since the previous regional haze SIP planning period. Paragraph 51.308(g)(4) requires data from two sources in order to appropriately analyze the change in emissions since the first implementation period and ending with the most recent year for which data was available 6 months preceding the required date of the progress report.

Emissions from all sources and activities: The primary source of this data is the NEI, which is compiled and released on a triennial basis by the EPA[50]. The NEI is comprised of emissions estimates submitted by state, local, and tribal air agencies supplemented with EPA's own estimates. For the 51.308(g)(4) requirement, the analysis must extend at least through the most recent NEI year for which data is available six months prior to the required date of the progress report.

Emissions from sources that report to a centralized EPA database:
In the guidance document provided by EPA for the compilation of this progress report[51], each state is to identify the sources reporting to the Clean Air Markets Program Data and use the most recent data to discuss the state's emission trends. However, Alaska does not participate in this program.

The paragraphs below detail the change in emissions since the time of the second planning period regional haze SIPs for all emissions sources. The following visibility impairing pollutants are covered in the summaries:

- Ammonia (NH_3)
- Nitrogen Oxides (NO_X)
- Carbon Monoxide (CO)
- Particulate Matter < 10 microns (PM_{10})
- Particulate Matter < 2.5 microns ($PM_{2.5}$)
- Sulfur Dioxide (SO_2)
- Volatile Organic Compounds (VOC)

As described above, the source of this emissions data in Tables 12 through 18 below is EPA's NEI. The most recent NEI Report available from EPA within six months prior to the due date of the second planning period progress reports (i.e., this submittal) is the 2020 NEI. The tables below compare emissions estimates from the 2020 NEI with those from the 2017 NEI, which was the most recently available NEI at the time of the second planning period regional haze SIPs. Note that the Rail emissions data was based on ADEC calculations and Prescribed Fires emissions data was taken from ADEC's annual Alaska Fire Inventory reports for 2017 and 2020.

[49] Sections 51.308(g)(4) and 51.309(d)(10)(i)(D)

[50] U.S. Environmental Protection Agency (2024, May 6). *National Emission Inventory (NEI).* https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei

[51] U. S. Environmental Protection Agency, Office of Air Quality Planning and Standards, *Overview of Elements for the Regional Haze Second Planning Period State Implementation Plan Progress Reports Due in 2025,* July 2024. https://www.epa.gov/system/files/documents/2024-07/final_rh_2025_progress_report_requirements_document_7-30-2024.pdf

Although some variability exists for each pollutant, Tables 12 through 18 show an overall downward trend in emissions across Alaska between the 2017 and 2020 NEI reports. However, due to the unforeseen circumstances surrounding the COVID epidemic in 2020, many differences in the emissions between the two reporting years are difficult to explain. It should be noted however that anthropogenic emissions in 2020 were dominated by the prescribed fires category. Prescribed fires are conducted around the state to reduce fuel load while also creating firebreaks. This prevention technique is intended to limit larger uncontrolled wildfires from with far higher emissions from occurring in the future. In 2017, thirteen prescribed burns were conducted burning 30,355 acres. In 2020, only three prescribed burns were conducted, but they were significantly larger burning a total of 79,965.5 acres[52]. Emissions are modeled and quantified based on vegetation burned with grass burning significantly cleaner than black spruce. The decrease in emissions from on-road vehicles and rail can most likely be attributed to the drastic decrease in travel during the pandemic while communities sheltered in place. Additionally, both on-road and non-road emissions experienced benefits from federal control programs implemented for diesel and gasoline vehicles. Similarly, Commercial Marine Vessels emissions also saw a drop in emissions most likely due to recently implemented federal regulations on fuel. Other changes can be accounted for with changes to EPA's emission factors and potential errors within EPA's database.

[52] Alaska Department of Environmental Conservation, Air Quality Division Non-Point Mobile Sources Program, "2020 Alaska Fire Emissions Inventory", September 2021, Page 7. https://dec.alaska.gov/air/anpms/projects-reports/fire-emission-inventory/

Ammonia

Overall, NEI emission categories saw decreases in ammonia emissions in 2020 as compared to 2017 as demonstrated in Table 12.

Table 12. 2017 and 2020 Anthropogenic Ammonia Emissions for Alaska (tons)

Source Category	Alaska Anthropogenic Ammonia Emissions (tons/year)		
	2017	**2020**	**Difference[1]**
Agriculture	117	21	-96
Airports[2]	0	0	0
Rail[3]	0	0	0
Commercial Marine Vessels	8	4	-4
Non-road	3	7	**4**
On-road	183	181	-2
Non-point	222	236	**14**
Residential Wood Combustion	408	171	-237
Fugitive Dust	0	0	0
Oil & Gas	9	0	-9
Electric Generating Units	58	53	-5
Other Points	113	453	**340**
Prescribed Fires	239	19,190	**18,951**

Notes:
1. Difference = 2020 minus 2017 emissions; therefore, negative differences indicate a reduction in emissions. Positive values indicate an increase in emissions (depicted in bold text).
2. Airports data could not be obtained for the 2020 reporting period due to a lack of response from the airlines assumed to be associated with a lack of personnel due to the COVID pandemic. Emissions were conservatively assumed to remain the same as in 2017 due to a decrease in flights and passengers.
3. Rail data was misrepresented in the EPA NEI report and was corrected to reflect actual data available to DEC.

Nitrogen Oxides

Most NEI emission categories saw decreases in NO_X emissions in 2020 as compared to 2017 as demonstrated in Table 13.

Table 13. 2017 and 2020 Anthropogenic Nitrogen Oxide Emissions for Alaska (tons)

Source Category	Alaska Anthropogenic Nitrogen Oxide Emissions (tons/year)		
	2017	**2020**	**Difference[1]**
Agriculture	0	0	0
Airports[2]	2,949	2,949	0
Rail[3]	480	348	-131
Commercial Marine Vessels	14,624	6,603	-8,021
Non-road	2,606	1,893	-713
On-road	11,119	5,167	-5,952
Non-point	52,845	50,156	-2,689
Residential Wood Combustion	5,057	4,872	-185
Fugitive Dust	99	0	-99
Oil & Gas	2,291	2,476	**185**
Electric Generating Units	16,747	14,492	-1,805
Other Points	40,306	8,550	-31,756
Prescribed Fires	398	7,806	**7,408**

Notes:

1. Difference = 2020 minus 2017 emissions; therefore, negative differences indicate a reduction in emissions. Positive values indicate an increase in emissions (depicted in bold text).
2. Airports data could not be obtained for the 2020 reporting period due to a lack of response from the airlines assumed to be associated with a lack of personnel due to the COVID pandemic. Emissions were conservatively assumed to remain the same as in 2017 due to a decrease in flights and passengers.
3. Rail data was misrepresented in the EPA NEI report and was corrected to reflect actual data available to DEC.

Carbon Monoxide

CO emissions in the NEI show a little more variability than the other pollutants between 2020 as compared to 2017 as demonstrated in Table 14.

Table 14. 2017 and 2020 Anthropogenic Carbon Oxide Emissions for Alaska (tons)

Source Category	**Alaska Anthropogenic Nitrogen Oxide Emissions (tons/year)**		
	2017	**2020**	**Difference[1]**
Agriculture	0	0	0
Airports[2]	9,604	9,604	0
Rail[3]	195	142	-53
Commercial Marine Vessels	1,716	864	-852
Non-road	33,707	40,887	**7,180**
On-road	67,424	55,426	-11,998
Non-point	412,558	421,971	**9,413**
Residential Wood Combustion	230,738	202,472	-28,266
Fugitive Dust	108	0	-108
Oil & Gas	3,005	4,608	**1,603**
Electric Generating Units	4,543	4,747	**204**
Other Points	8,308	40,250	**31,942**
Prescribed Fires	14,347	1,179,022	**1,164,675**

Notes:
1. Difference = 2020 minus 2017 emissions; therefore, negative differences indicate a reduction in emissions. Positive values indicate an increase in emissions (depicted in bold text).
2. Airports data could not be obtained for the 2020 reporting period due to a lack of response from the airlines assumed to be associated with a lack of personnel due to the COVID pandemic. Emissions were conservatively assumed to remain the same as in 2017 due to a decrease in flights and passengers.
3. Rail data was misrepresented in the EPA NEI report and was corrected to reflect actual data available to DEC.

Particulate Matter <10 Microns

Table 15 demonstrates that PM_{10} emissions also saw some variability between 2017 and 2020. In the case of Other Point sources, the increase is assumed to be due in part to a change that EPA made to SCC codes and emission factors for solid waste. It's also likely that EPA duplicated emissions by pulling data from the ADEC Solid Waste Database and summing them with ADEC's NEI submittal.

Table 15. 2017 and 2020 Anthropogenic PM_{10} Emissions for Alaska (tons)

Source Category	**Alaska Anthropogenic PM_{10} Emissions (tons/year)**		
	2017	**2020**	**Difference[1]**
Agriculture	133	467	**334**
Airports	252	252	0
Rail[3]	0.4	0.3	-0.1
Commercial Marine Vessels	481	198	-283
Non-road	375	304	-71
On-road	881	399	-482
Non-point	114	119	**5**
Residential Wood Combustion	37,830	37,647	-183
Fugitive Dust	31,590	39,788	**8,198**
Oil & Gas	324	43	-281
Electric Generating Units	964	767	-197
Other Points	1,940	8,771	**6,831**
Prescribed Fires	1,641	112,545	**110,904**

Notes:

1. Difference = 2020 minus 2017 emissions; therefore, negative differences indicate a reduction in emissions. Positive values indicate an increase in emissions (depicted in bold text).
2. Airports data could not be obtained for the 2020 reporting period due to a lack of response from the airlines assumed to be associated with a lack of personnel due to the COVID pandemic. Emissions were conservatively assumed to remain the same as in 2017 due to a decrease in flights and passengers.
3. Rail data was misrepresented in the EPA NEI report and was corrected to reflect actual data available to ADEC.

Particulate Matter <2.5 Microns

Table 16 demonstrates that $PM_{2.5}$ emissions saw some variability between 2017 and 2020 for similar reasons to PM_{10}.

Table 16. 2017 and 2020 $PM_{2.5}$ Emissions for Alaska (tons)

Source Category	Alaska Anthropogenic $PM_{2.5}$ Emissions (tons/year)		
	2017	**2020**	**Difference[1]**
Agriculture	28	94	**66**
Airports[2]	228	228	0
Rail[3]	13	9	-4
Commercial Marine Vessels	447	188	-259
Non-road	350	284	-66
On-road	532	187	-345
Non-point	102	106	**4**
Residential Wood Combustion	37,086	36,616	-470
Fugitive Dust	3,431	4,277	**846**
Oil & Gas	151	42	-109
Electric Generating Units	434	191	-243
Other Points	1,074	7,797	**6,723**
Prescribed Fires	1,390	95,377	**93,987**

Notes:
1. Difference = 2020 minus 2017 emissions; therefore, negative differences indicate a reduction in emissions. Positive values indicate an increase in emissions (depicted in bold text).
2. Airports data could not be obtained for the 2020 reporting period due to a lack of response from the airlines assumed to be associated with a lack of personnel due to the COVID pandemic. Emissions were conservatively assumed to remain the same as in 2017 due to a decrease in flights and passengers.
3. Rail data was misrepresented in the EPA NEI report and was corrected to reflect actual data available to ADEC.

Sulfur Dioxide

Most NEI emission categories saw decreases in SO_2 emissions in 2020 as compared to 2017 as demonstrated in Table 17. Commercial Marine Vessels saw the most drastic drop in SO_2 which can be attributed to the lower-sulfur content diesel use mandated for ships operating within the North American ECA as of January 1, 2020. Federal control programs for diesel and gasoline-fired engines have contributed to improved emissions in on-road and non-road vehicles, electric generating units, and other point categories. Additionally, as on-road vehicles age, more polluting vehicles are retired and newer, cleaner vehicles are phased into the fleet. Point source SO_2 emissions have also declined due to the permanent and enforceable measures described earlier in Sections B and C, as well as other the implementation of other state and federal programs. The COVID pandemic can also be credited for decreased SO_2 emissions from both on-road and rail categories due to a decrease in travel as communities sheltered in place.

Table 17. 2017 and 2020 Anthropogenic SO_2 Emissions for Alaska (tons)

Source Category	Alaska Anthropogenic SO_2 Emissions (tons/year)		
	2017	2020	Difference[1]
Agriculture	0	0	0
Airports[2]	364	364	0
Rail[3]	0.3	0.3	0
Commercial Marine Vessels	1,800	261	-1,539
Non-road	18	2	-16
On-road	25	11	-14
Non-point	27	12	-1
Residential Wood Combustion	688	673	-15
Fugitive Dust	7	0	-7
Oil & Gas	358	3,259	**2,901**
Electric Generating Units	1,825	1,554	-275
Other Points	1,887	835	-1,052
Prescribed Fires	169	6,328	**6,159**

Notes:

1. Difference = 2020 minus 2017 emissions; therefore, negative differences indicate a reduction in emissions. Positive values indicate an increase in emissions (depicted in bold text).
2. Airports data could not be obtained for the 2020 reporting period due to a lack of response from the airlines assumed to be associated with a lack of personnel due to the COVID pandemic. Emissions were conservatively assumed to remain the same as in 2017 due to a decrease in flights and passengers.
3. Rail data was misrepresented in the EPA NEI report and was corrected to reflect actual data available to ADEC.

Volatile Organic Compounds

Most NEI emission categories saw decreases in VOC emissions in 2020 as compared to 2017 as demonstrated in Table 18.

Table 18. 2017 and 2020 VOC Emissions for Alaska (tons)

Source Category	2017	2020	Difference[1]
Agriculture	10	2	-8
Airports[1]	1,460	1,460	0
Rail	24	18	-7
Commercial Marine Vessels	611	230	-381
Non-road	7,970	6564	-1,406
On-road	7,709	2859	-4,850
Non-point	1,791,530	1,788,061	-3,469
Residential Wood Combustion	8,410	3,777	-4,633
Fugitive Dust	27	0	-27
Oil & Gas	3,742	9,742	**6,000**
Electric Generating Units	708	491	-217
Other Points	7,006	12,622	**5,616**
Prescribed Fires	3,441	275,855	**272,414**

Notes:

1. Difference = 2020 minus 2017 emissions; therefore, negative differences indicate a reduction in emissions. Positive values indicate an increase in emissions (depicted in bold text).
2. Airports data could not be obtained for the 2020 reporting period due to a lack of response from the airlines assumed to be associated with a lack of personnel due to the COVID pandemic. Emissions were conservatively assumed to remain the same as in 2017 due to a decrease in flights and passengers.

F. Assessment of Changes Impeding Visibility Progress (51.308(g)(5))[53]

RHR Paragraph 51.308(g)(5) requires an assessment of any significant changes in anthropogenic emissions within or outside the state since the period addressed in the most recent plan (in this case, the regional haze SIPs for the second planning period), including whether those changes were anticipated in the most recent plan and whether they have limited or impeded in reducing pollutant emissions and improving visibility.

An examination of Tables 12 through 18 in Section E demonstrates that emissions for visibility impairing pollutants are generally trending downward in Alaska. Note that 2020 NEI data was impacted by the unforeseen circumstances surrounding the COVID pandemic.

Table 19 below provides emissions from point sources reported directly to ADEC for the most recent nine years of available emission inventories. Operating facilities regulated under ADEC's Air Permitting Program are required to submit annual emission estimates to the Department which allows ADEC to assess emission fees. Additionally, every three years (2014, 2017, 2020, etc.), ADEC conducts an analysis to quantify emissions from smaller operations in support of EPA's triennial NEI report. The emission quantities for each reporting source are summed together by ADEC to provide an approximation of state-wide sources of anthropogenic emissions. It should be noted that EPA's data collection methodology and emission factors have changed over time for the triennial reporting. The NEI has also incorporated new data sources as data availability has improved. The values in Table 19 reveal that state-wide emissions have gradually decreased as new state and federal programs have been implemented. Note that triennial years are marked with an asterisk and appear inflated compared to consecutive years because they include the additional emissions from the smaller point sources.

Based on the data available and assessed in this report, no significant changes in anthropogenic emissions, within Alaska, that would limit or impede progress in reducing pollutant emissions and improving visibility occurred, nor was expected to occur, since the period addressed in the most recent plan.

Table 19: 2014 to 2022 Stationary Source Emissions for Alaska (tons)

Year	CO	NO_X	VOC	SO_2	PM_{10}	$PM_{2.5}$	NH_3
2014*	30,000	61,272	4,222	5,354	2,966	2,288	45
2015	27,633	61,489	6,095	4,392	2,907	1,755	10
2016	7,319	38,013	1,714	1,565	1,374	292	12
2017*	12,814	54,135	3,842	3,794	2,494	821	74
2018	6,543	36,020	1,743	1,642	947	241	30
2019	6,953	37,122	1,633	1,825	1,003	245	32
2020*	11,998	52,265	2,481	3,839	2,026	491	68
2021	5,288	35,402	1,223	1,318	986	218	14
2022	5,424	35,356	1,393	1,208	1,068	217	14

[53] Sections 51.308(g)(5) and 51.309(d)(10)(i)(E)

As demonstrated more clearly in Table 20 below, a comparison of the 2017 and 2020 data from Table 19 shows a decrease in emissions for every pollutant except SO_2

Table 20: Comparison of 2017 to 2020 Stationary Source Emissions for Alaska (Tons)

Year	CO	NO_X	VOC	SO_2	PM_{10}	$PM_{2.5}$	NH_3
2017*	12,814	54,135	3,842	3,794	2,494	821	74
2020*	11,998	52,265	2,481	3,839	2,026	491	68
Difference between 2020 and 2017	-816	-1,870	-1,361	**45**	-468	-330	-6
Percent Difference Between 2020 and 2017	-6%	-3%	-35%	**1%**	-19%	-40%	-8%

Note:

1. Difference = 2020 minus 2017 emissions; therefore, negative differences indicate a reduction in emissions. Positive values indicate an increase in emissions (depicted in bold text).

In summary, controllable anthropogenic emissions of CO, NO_X, VOC, PM_{10}, $PM_{2.5}$, and NH_3 have decreased significantly in Alaska since 2014. Overall, SO_2 emissions have substantially decreased since 2014 despite a slight increase in 2020 as compared to 2017.

Simeonof Visibility Challenges

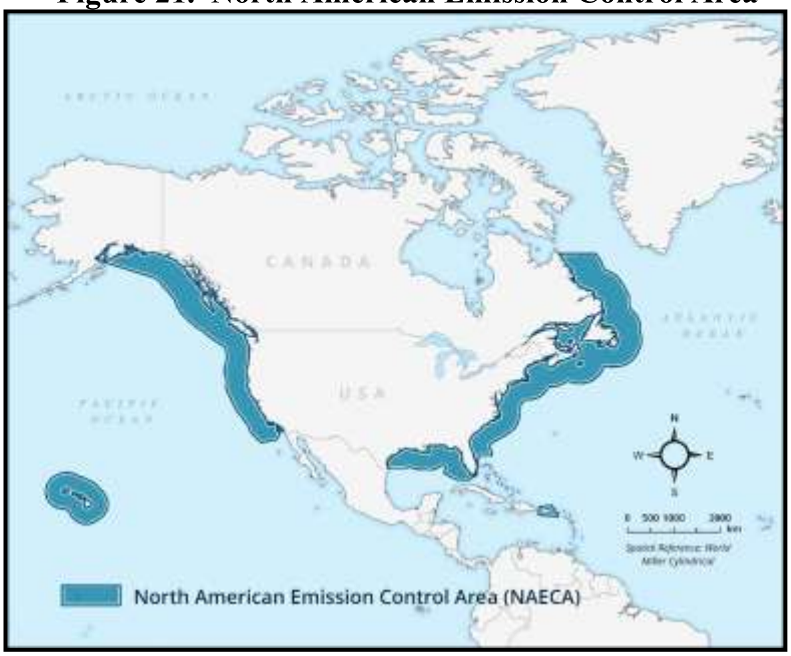
Continued emission reductions from Alaska's point sources are expected to contribute to improved visibility at Denali and Tuxedni consistent with the state's RPG. However, Simeonof stands alone in that no significant industrial sources impact the region's air quality. Instead, the area is impacted by numerous uncontrollable sources of haze causing pollutants not accurately excluded from the anthropogenic IMPROVE data. Consequently, Simeonof's Baseline is significantly higher than Alaska's other Class I Areas and the discrepancy between the Baseline and 2064 End Point is much more significant. This means the expectation to improve Simeonof's visibility is greater than either of Alaska's other two Class I Areas despite Simeonof being the most isolated and the least pollution sources.

The SIME1 station is located 60 miles northwest of Simeonof Class I area in Sand Point, a community of approximately 600 people on Popof Island in the Aleutians. The only industry in the area is the small, seasonally operated, fish processing plant. Therefore, it can be presumed that pollutants collected by SIME1 are predominantly produced by other emission sources outside of Alaska's control.

One of the largest sources of haze impairment at SIME1 are pollutants transported into the state. However, Alaska borders no other state in America and is instead directly impacted by air pollutants from China, Asia, Canada, Russia, and Eastern Europe. Due to the winter conditions at high latitudes, namely a lack of sunlight and liquid water, typical atmospheric chemical reactions of the international pollutants do not occur. This can cause emissions which have been transported hundreds or thousands of miles to appear in analyses as though from a local source. International transport of pollutants into Alaska has been documented through a variety of research studies. In particular, the research has focused on Arctic haze and Asian dust events. More information on the research is described in the Second Implementation of the Regional Haze SIP (Volume II, Section III.K.13.E).

Additionally, a gap in coverage leaves Simeonof outside of the North American ECA. The ECA implemented a sulfur standard in 2015 limiting fuel oil burned in marine vessels to a maximum sulfur concentration of 0.5% in designated areas. These provisions are similar to other sulfur control areas in Western Europe and the Baltic Sea where marine sulfur has been linked to air quality and public health problems for several decades. The declaration of the North American ECA and its subsequent enforcement has already been linked to improved air quality and visibility increases at coastal Class I areas in the western United States. However, as shown in Figure 17, the North America ECA extends only to a small portion of Alaska's coast including the Inside Passage and the Gulf of Alaska. ECAs are not established in Western Alaska, Northern Alaska, nor the Aleutian Islands.

Figure 21. North American Emission Control Area



https://wwf.ca/stories/arctic-needs-emission-control-area/

But most likely the biggest impact to Simeonof's visibility is the naturally occurring pollutants that occur in abundance in Alaska but cannot be accounted for by either the EPA's or the University of Alaska Fairbanks' models. Specifically, of Alaska's 140 volcanoes, 15 have been active since 2000. These volcanoes can sometimes release sulfur dioxide gas for months before being detected and even when discovered, it is difficult and often dangerous to quantify. According to the Alaska Volcano Observatory website, seven volcanoes in Alaska's Aleutians have been actively erupting and degassing since the Second Implementation Period began in 2018[54]. The three closest active volcanoes to the SIME1 Station are Mount Veniamoff located approximately 75 miles to the northeast, Mount Shishaldin 143 miles to the southwest, and Pavlof Volcano 55 miles to the west. Mount Veniamoff Volcano began erupting in September 2018 and did not return to background levels until April 2019. During that time lava and ash clouds were observed and according to the

[54] U.S. Geological Survey, University of Alaska Fairbanks Geophysical Institute, State of Alaska Division of Geological & Geophysical Surveys. (2024, July 8). *Alaska Volcano Observatory*. https://avo.alaska.edu/explore/eruptions

Alaska Volcano Observatory website, the Ozone Monitoring Instrument measured 300 tons of SO_2 emitted on October 18th, 2018. SO_2 emissions were detected regularly during the unrest period, but no other release quantities were documented on the website. Veniamoff erupted again in February 2021, this time ash emissions and lava continued for just a month. Mount Shishaldin Volcano began erupting in July 2019 and continued through the end of the year with lava flows and sporadic ash clouds observed through November. The unrest culminated with a collapse event in December of the same year, sending a large ash plume to 23,000 feet. An explosion at Pavlof Volcano was recorded in August 2021 followed by intermittent explosions accompanied by bursts of ash continuing through October. In November 2021 from Pavlof, lava was spotted and the flow continued to be observed through December 2022.

Another natural pollutant unaccounted for by the models is oceanic DMS. DMS is produced by marine bacteria and phytoplankton in the ocean. It is exchanged to the atmosphere where it reacts with hydroxyl radicals during the daytime and nitrates at night to form sulfur dioxide and sulfate. Globally, dimethyl sulfide emissions from the world's oceans contribute 15% of total sulfur emissions and 50% of natural sulfur emissions[55].

No modeling program currently exists that can accurately quantify all the uncontrollable emissions affecting Simeonof's visibility. In addition, ADEC has neither the funding nor the manpower to study the impacts of all these pollutant sources on the Class I Areas. Therefore, while there are no plans for new emission units to be constructed near Simeonof nor any expectation that existing units will increase emissions in the future, it is DEC's stance that meeting the RPG for Simeonof is completely dependent on reduced volcanic activity and the implementation of fuel standards on international marine vessels.

[55]Sharma, S., Barrie, L.A., Plummer, D., McConnell, J.C., Brickell, P.C.,Levasseur, M., Gosselin, M, and T. S. Bates, T.S.. (1999 September 20). *Flux estimation of oceanic dimethyl sulfide around North America*. Journal of Geophysical Research. Vol. 104, No. D17, Pages 21,327. https://saga.pmel.noaa.gov/sites/default/files/atoms/files/sharma_etal_1999.pdf

G. Assessment of Current Strategy (51.308(g)(6))[56]

RHR paragraph 51.308(g)(6) requires an assessment of whether current plan elements and strategies are sufficient to enable the state, or states with Class I areas affected by emissions from the state, to meet all established RPGs for the period covered by the most recent plan.

To address the requirements under 40 CFR 51.308(g)(6), ADEC has evaluated the IMPROVE monitoring data and Emission Inventory data from operating sources within the state as described in previous sections of this report to determine if the state's Class I Areas are expected to meet their 2028 reasonable progress goals.

<u>Current Strategy Assessment</u>

- For the purposes of this report, Section C describes the verifiable emissions reductions from implemented measures since the time of the second planning period regional haze SIP. The implementation of some of the measures described in Section B were deemed necessary in Alaska's second regional haze SIP for making reasonable progress were implemented. Some SO_2 controls implemented in the summer of 2021 under Alaska's second planning period regional haze SIP and described in Section B were rescinded in September 2023 as modelling showed that SO_2 from major stationary sources did not meaningfully contribute to $PM_{2.5}$ concentrations in the FNSB NAA. The withdrawal of the regulatory requirements for these controls is not expected to significantly impact visibility in Alaska's Class I Areas.
- Current haze indexes for Denali and Tuxedni Class I areas' 20% MID continue to trend downward and follow closely with the URP. Simeonof shows some minor improvement as compared to the Baseline, but ADEC contends visibility continues to be impacted by uncontrollable sources, most significantly, SO_2 gas released by volcanic activity. All three of Alaska's Class I areas continue to be at or below the Baseline on the 20% Clearest days indicating no degradation in visibility has occurred as described in Section D. ADEC maintains these trends are indicative that all of Alaska's Class I areas are on track to meet the RPGs established in the second planning period regional haze SIPs.
- Based on point source emissions data reported to ADEC, emissions for visibility impairing pollutants have trended downward for Alaska. NEI data shows some variability in emissions between 2017 and 2020, but overall, anthropogenic emissions across the state are improving and expected to continue to improve. Additionally, light extinction, calculated from IMPROVE station data, shows a decrease in visibility degradation on the 20% MID consistent with the URP at both Denali and Tuxedni. Likewise, the 20% Clearest Days continue to remain at or below Baseline for all of Alaska's Class I Areas. Please see Sections D, E, and F.

[56] Sections 51.308(g)(6) and 51.309(d)(10)(i)(F)

2028 Reasonable Progress Goals

EPA used the Community Multiscale Air Quality (CMAQ) modeling platform to project future-year 2028 visibility at each of the Class I Areas and documented the results in the modeling report entitled, "Technical Support Document for EPA's Updated 2028 Regional Haze Modeling for Hawaii, Virgin Islands, and Alaska"[57]. The 2028 projection represents the forecasted visibility at the end of the Second Implementation Period. According to EPA's modeling report, the visibility projections follow the procedures in EPA's Ozone, $PM_{2.5}$, and Regional Haze Modeling Guidance[58]. This modeling effort is

This standard methodology used by EPA and described in the technical document is appropriate for the contiguous 48 states. The pollutants captured by their IMPROVE stations can be reliably categorized as anthropogenic or natural and used to generate a precise glidepath with truer forecasts on future visibility impairment. However, emissions from international pollution impacting Alaska's visibility, including natural occurrences, industrial emissions, and marine vessels cannot be properly accounted for by the model. The CMAQ model used by EPA also does not account for volcanic activity, oceanic DMS, or the unique composition and characteristics of Alaskan wildfires. Additionally, IMPROVE monitors representing Tuxedni and Simeonof aren't placed in or near the Class I Areas due to the lack of accessibility and electricity to power the stations. Instead, the two stations are located near cities and busy roads, locations that do not represent the Class I areas in population nor potential emission sources.

ADEC does not have the funding nor the manpower to develop more accurate modeling platforms. Instead, for the purposes of this report, ADEC relied on data from the IMPROVE monitors and the forecast for Future Year 2028 described in the EPA Technical Support Document to determine if Alaska's Class I Areas will achieve reasonable progress by the end of the Second Implementation Period. Based on this information and the rest of the discussion presented in this progress report, ADEC affirms that Alaska's regional haze State Implementation Plan for the second planning period is adequate for making reasonable progress towards the Regional Haze Rule goal of achieving natural visibility conditions at Class I areas by 2064.

Clearest Days

Based on the IMPROVE data listed in Table 21 below, there has been no degradation in clearest days visibility since the Baseline period and EPA's forecasted 2028 visibility is also below the baseline at every station. The Current Reporting Period data already shows the Class I Areas in Alaska to be within a tenth of a deciview of achieving the 2028 projections for the Clearest Days at Denali and Simeonof. The 2028 projection for Tuxedni is not considered by ADEC to be representative of conditions at either of the TUXE1 or KPBO1 because of the extreme differences in anthropogenic pollution contributions between the two geographical locations. Modeling to forecast the Future Year 2028 KPBO1 visibility was not conducted using the station's data alone.

[57] U.S. Environmental Protection Agency (2021). *Technical Support Document for EPA's Updated 2028 Regional Haze Modeling for Hawaii, Virgin Islands, and Alaska*. Office of Air Quality Planning and Standards Air Quality Assessment Division. https://www.epa.gov/system/files/documents/2021-08/epa-454-r-21-007.pdf

[58] U.S. Environmental Protection Agency (2018). *Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.5, and Regional Haze*. Office of Air Quality Planning and Standards Air Quality Assessment Division. https://www.epa.gov/sites/default/files/2020-10/documents/o3-pm-rh-modeling_guidance-2018.pdf

Table 21: Future Year 2028 Visibility for Clearest Days Compared to Baseline & Current Reporting Period (dv)

Class I Area	Denali National Park	Denali National Park	Tuxedni National Wilderness Refuge	Tuxedni National Wilderness Refuge	Simeonof National Wilderness Refuge
IMPROVE Station	**DENA1**	**TRCR1**	**TUXE1[2]**	**KPBO1[3]**	**SIME1**
Baseline[1]	2.43257	3.46248	3.99058	6.01997	7.60272
Current Reporting Period (2018-2022)	2.27544	3.47616	---	5.90086	7.48286
Future Year (2028)[4]	2.16000	3.32000	4.23000		7.42000

Notes:

1. The Baseline for DENA1 is based on the annual average of the 20% Clearest Days data collected by the IMPROVE monitor between 2000 and 2004 and averaged together. The Baseline for TRCR1, TUXE1, and SIME1 is based on data collected between 2002 and 2004. The Baseline for KPBO1 is an unofficial estimate by ADEC based on the method described in 51.308(f)(1)(i) using data from 2016-2020, an official determination will be provided for the 3rd Implementation Period.
2. The IMPROVE monitor TUXE1 was decommissioned in December 2014 and replaced by KPBO1 that began operating in August 2015. No data was gathered by the TUXE1 station during the Current Reporting Period. The 2028 forecast was estimated based on combined data for TUXE1 and KPBO1 from 2014-2017.
3. The first complete calendar year of data collection for KPBO1 was 2016 and the Most Recent Plan value was estimated based on 2016-2018 data. The 2028 forecast was estimated based on combined data for TUXE1 and KPBO1 from 2014-2017.
4. Future Year (2028) Data from Table 3-2 of the Technical Support Document for EPA's Updated 2028 Regional Haze Modeling for Hawaii, Virgin Islands, and Alaska", dated August 2021.

Forecasting by the EPA CMAQ predicts the average for the 2028 Clearest Days at each Class I Area to be below the Baselines as depicted by the green "X" in Figures 22-25.

Figure 22. Denali Annual Average Clearest Days, Glidepath, and 2028 Forecast (dv) (DENA1 and IMPROVE Station)

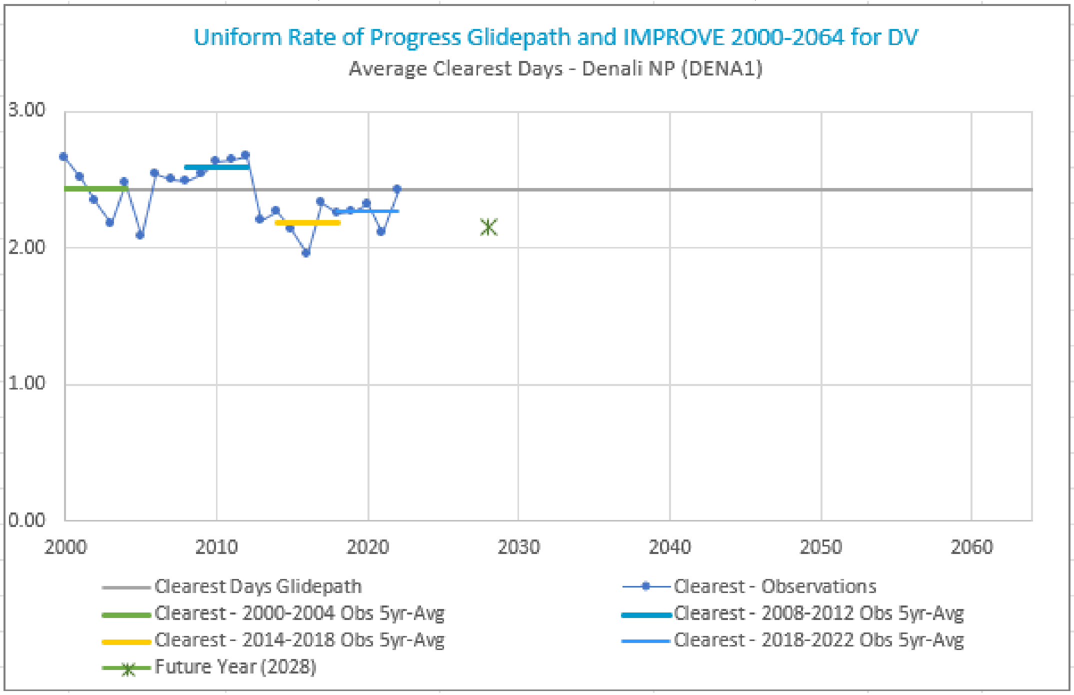


Figure 23. Denali Annual Average Clearest Days, Glidepath, and 2028 Forecast (dv) (TRCR1 IMPROVE Station)

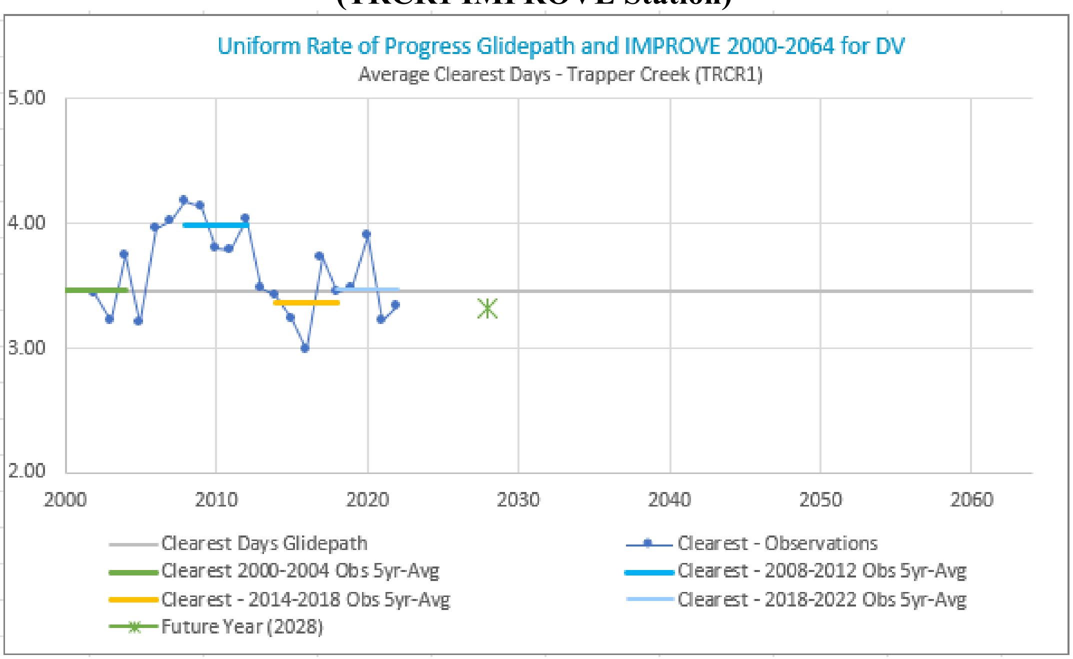
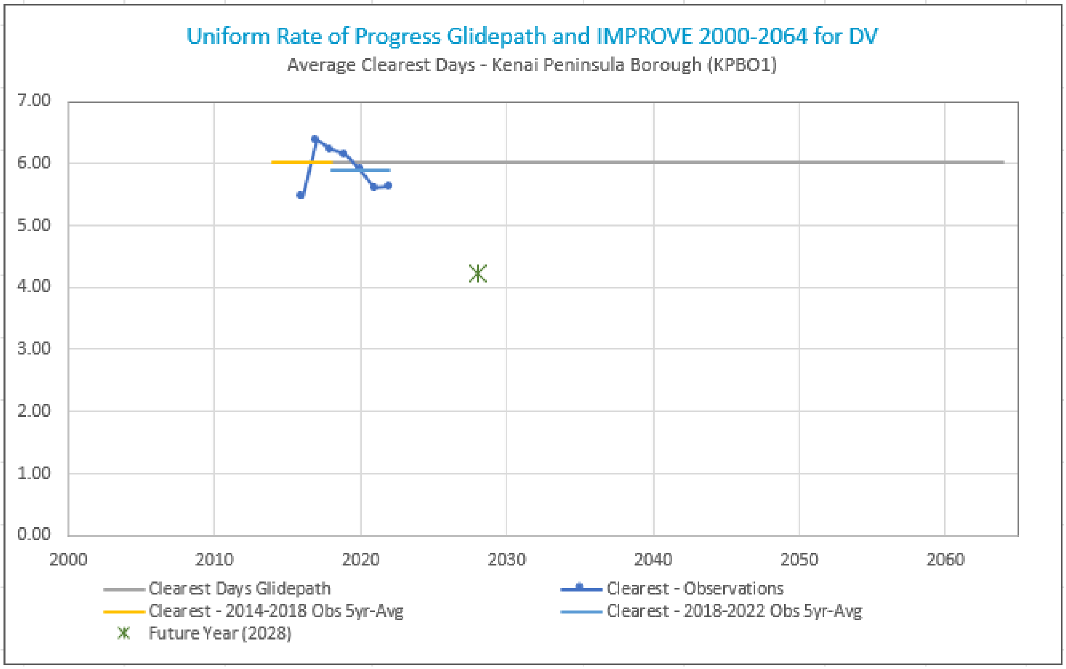
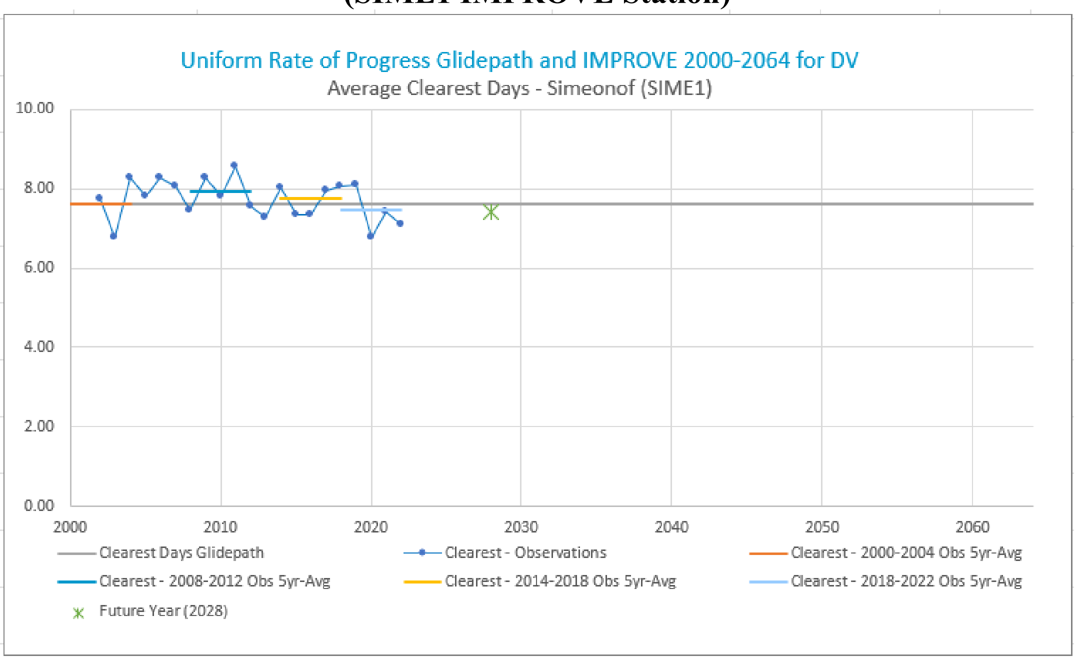


Figure 24. Tuxedni Annual Average Clearest Days, Glidepath, and2028 Forecast (dv) (KPBO1 IMPROVE Station)



Note: The Glidepath for KPBO1 is based on ADEC estimates for the Baseline and the 2064 Endpoint. Additionally, the first calendar year of data collection for KPBO1 was 2016. The 2028 forecast was estimated based on combined data for TUXE1 and KPBO1 from 2014-2017 and deemed invalid by ADEC.

Figure 25. Simeonof Annual Average Clearest Days, Glidepath, and2028 Forecast (dv) (SIME1 IMPROVE Station)



<u>Most Impaired Days</u>

IMPROVE data in Table 22 demonstrates that Alaska's Denali Park stations, DENA1 and TRCR1, show improvement during the Current Reporting Period compared to their Baseline visibility. Tuxedni and Simeonof's IMPROVE stations show some degradation between the two reporting periods. However, as mentioned above, ADEC attributes these increases to uncontrollable and natural pollutants incorrectly categorized as originating from anthropogenic sources. Specifically volcanic gases at SIME1 and wildfire smoke affecting visibility at KPBO1. The values for each station's forecasted Future Year (2028) visibility from the EPA's Technical Support Document are also listed in Table 22 in deciviews.

Table 22: Future Year 2028 Visibility for Most Impaired Days Compared to Baseline & Current Reporting Period (dv)

Class I Area	Denali National Park	Denali National Park	Tuxedni National Wilderness Refuge	Tuxedni National Wilderness Refuge	Simeonof National Wilderness Refuge
IMPROVE Station	**DENA1**	**TRCR1**	**TUXE1[2]**	**KPBO1[3]**	**SIME1**
Baseline[1]	7.08475	9.11354	10.46848	11.46634	13.66871
Current Reporting Period (2018-2022)	6.41822	8.99907	---	11.75865	14.06610
Future Year (2028)[4]	6.84000	8.95000	10.90000		13.43000

Notes:

1. The Baseline for DENA1 is based on the annual average of the 20% Most Impaired Days data collected by the IMPROVE monitor between 2000 and 2004 and averaged together. The Baseline for TRCR1, TUXE1, and SIME1 is based on data collected between 2002 and 2004. The Baseline for KPBO1 is an unofficial estimate by ADEC based on directions in 51.308(f)(1)(i) using data from 2016-2020, an official determination will be provided for the 3rd Implementation Period.
2. The IMPROVE monitor TUXE1 was decommissioned in December 2014 and replaced by KPBO1 that began operating in August 2015. No data was gathered by the TUXE1 station during the Current Reporting Period. The 2028 forecast was estimated based on combined data for TUXE1 and KPBO1 from 2014-2017.
3. The first complete calendar year of data collection for KPBO1 was 2016 and the Most Recent Plan value was estimated based on 2016-2018 data. The 2028 forecast was estimated based on combined data for TUXE1 and KPBO1 from 2014-2017.
4. Future Year (2028) Data from Table 3-2 of the Technical Support Document for EPA's Updated 2028 Regional Haze Modeling for Hawaii, Virgin Islands, and Alaska", dated August 2021.

The table data above is also depicted in Figures 26-29 with a green "X" for the Future Year forecasted visibility assuming the IMPROVE data is accurately categorized. Based on EPA's 2028 forecasted visibility values, both of Denali's IMPROVE stations and Simeonof's station are expected to have annual average MID values slightly higher than their respected Glidepath.

Figure 26. Denali Annual Average Most Impaired Days, Glidepath, and 2028 Forecast (dv) (DENA1 IMPROVE Station)

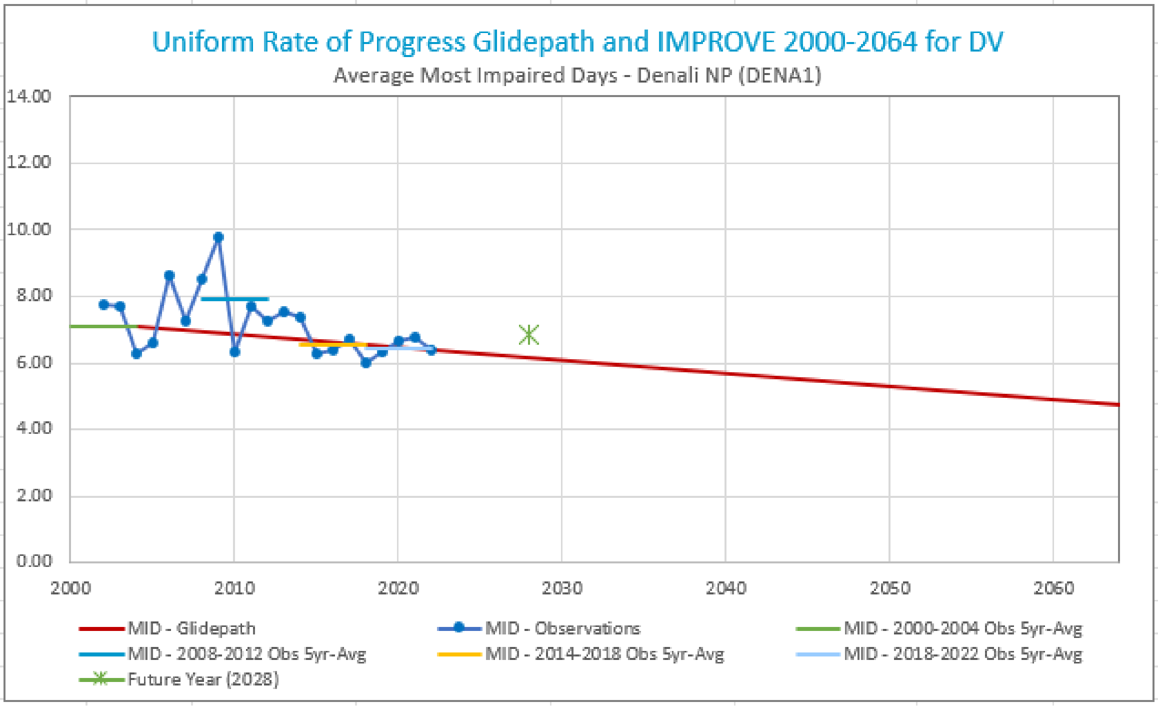
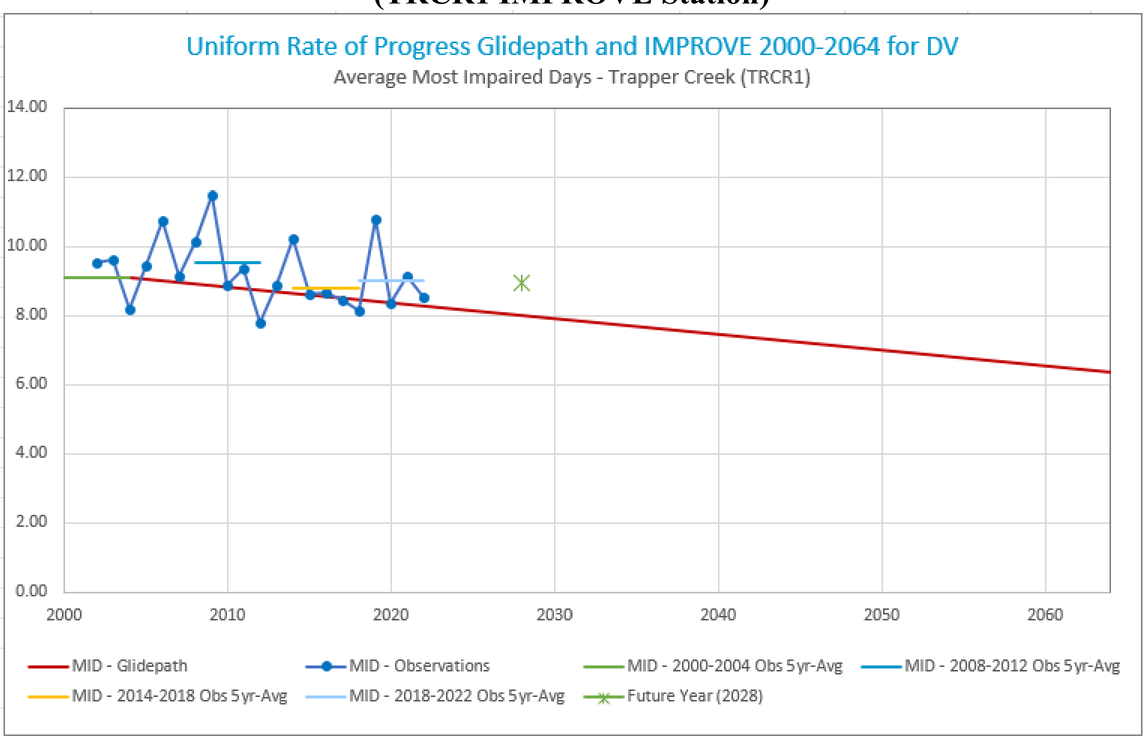
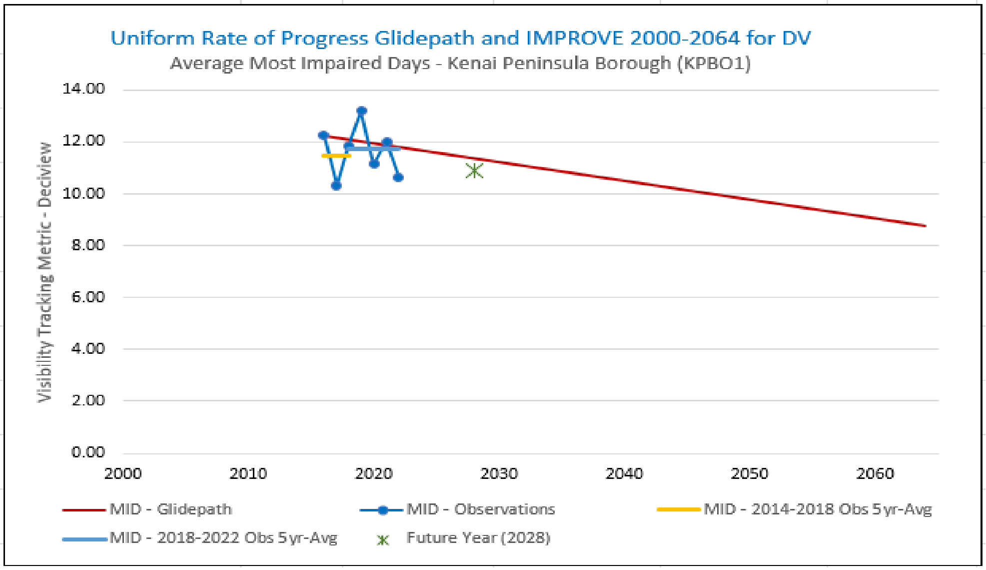


Figure 27. Denali Annual Average Most Impaired Days, Glidepath, and 2028 Forecast (dv) (TRCR1 IMPROVE Station)



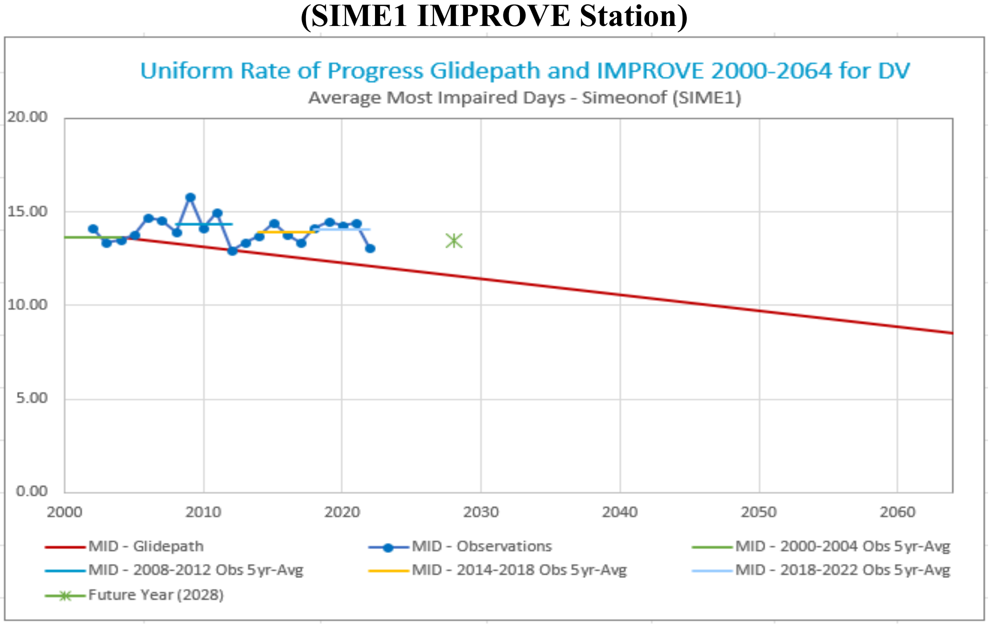
DEC contends that the 2028 projection in Figure 28 for Tuxedni is not representative of conditions at either of the TUXE1 or KPBO1 stations as noted above and is considered invalid. The unofficial Glidepath depicted in Figure 28 was estimated by ADEC as described in further detail in Section A of this report.

Figure 28. Tuxedni Annual Average Most Impaired Days, Glidepath, and2028 Forecast (dv) (KPBO1 IMPROVE Station)



Note: TUXE1 ceased collecting data in December 2014 and a new IMPROVE station representing the Tuxedni National Wildlife Refuge was installed across the inlet and designated KPBO1 in August 2015. No official Baseline nor 2064 Endpoint has been defined by EPA, and therefore, no glidescope has been officially established. Instead, for the purposes of demonstrating changes in visibility for this Progress Report, ADEC estimated the Glidepath. The Baseline was estimated by averaging data from 2016 through 2020 using the method described in 51.308(f)(1)(i). The 2064 Endpoint for the MID at KPBO1 was assumed to be as reported in the file entitled "2064 Endpoint Updated October 2023" on the Colorado State IMPROVE website.

Figure 29. Simeonof Annual Average Most Impaired Days, Glidepath, and2028 Forecast (dv) (SIME1 IMPROVE Station)



This MID 2028 forecast is consistent with ADEC's conclusions that the RH goals cannot be met by improving controllable anthropogenic emissions within their jurisdiction. ADEC's contention is demonstrated by an additional modeling effort EPA conducted to support the state in developing the Second RH Implementation Plan. EPA conducted hemispheric CMAQ modeling for Alaska to estimate sulfate contributions from international anthropogenic emissions and commercial marine vessels. Based on the results, the report proposed an adjusted 2064 Endpoint and Glidepath at each of the Class I areas by adding the uncontrollable international sulfate emissions estimated by the model. The modeling and methodologies used by EPA to calculate the adjusted Endpoints are also included and described in more detail in the report referenced above entitled, "Technical Support Document for EPA's Updated 2028 Regional Haze Modeling for Hawaii, Virgin Islands, and Alaska".[59] As shown in Table 22 below, the difference between each station's Baseline and the adjusted Endpoint is significantly reduced compared to the difference between the Baseline and unadjusted Endpoint. However, although the adjusted Endpoints for international anthropogenic and commercial marine vessels help with the data error, it didn't account for all of it. ADEC contends that the unique natural sources of visibility impairment account for the remaining difference in light extinction between the Baseline and the 2064 Endpoint at each Class I area.

Table 23. Baseline and Adjusted Endpoint Visibility in Deciviews

Class I Area	**Denali National Park**	**Denali National Park**	**Tuxedni National Wildlife Refuge[1]**	**Simeonof National Wildlife Refuge**
IMPROVE Station	**DENA1**	**TRCR1**	**KPBO1**	**SIME1**
Baseline	7.08	9.11	11.47[2]	13.67
Unadjusted 2064 Endpoint[3]	4.72	6.36	8.77	8.51
Difference between Baseline and Unadjusted Endpoint	**2.36**	**2.75**	**2.70**	**5.16**
Adjusted 2064 Endpoint[4]	5.60	7.55	9.92	12.86
Difference between Baseline and Adjusted Endpoint	**1.45**	**1.56**	**1.55**	**0.81**

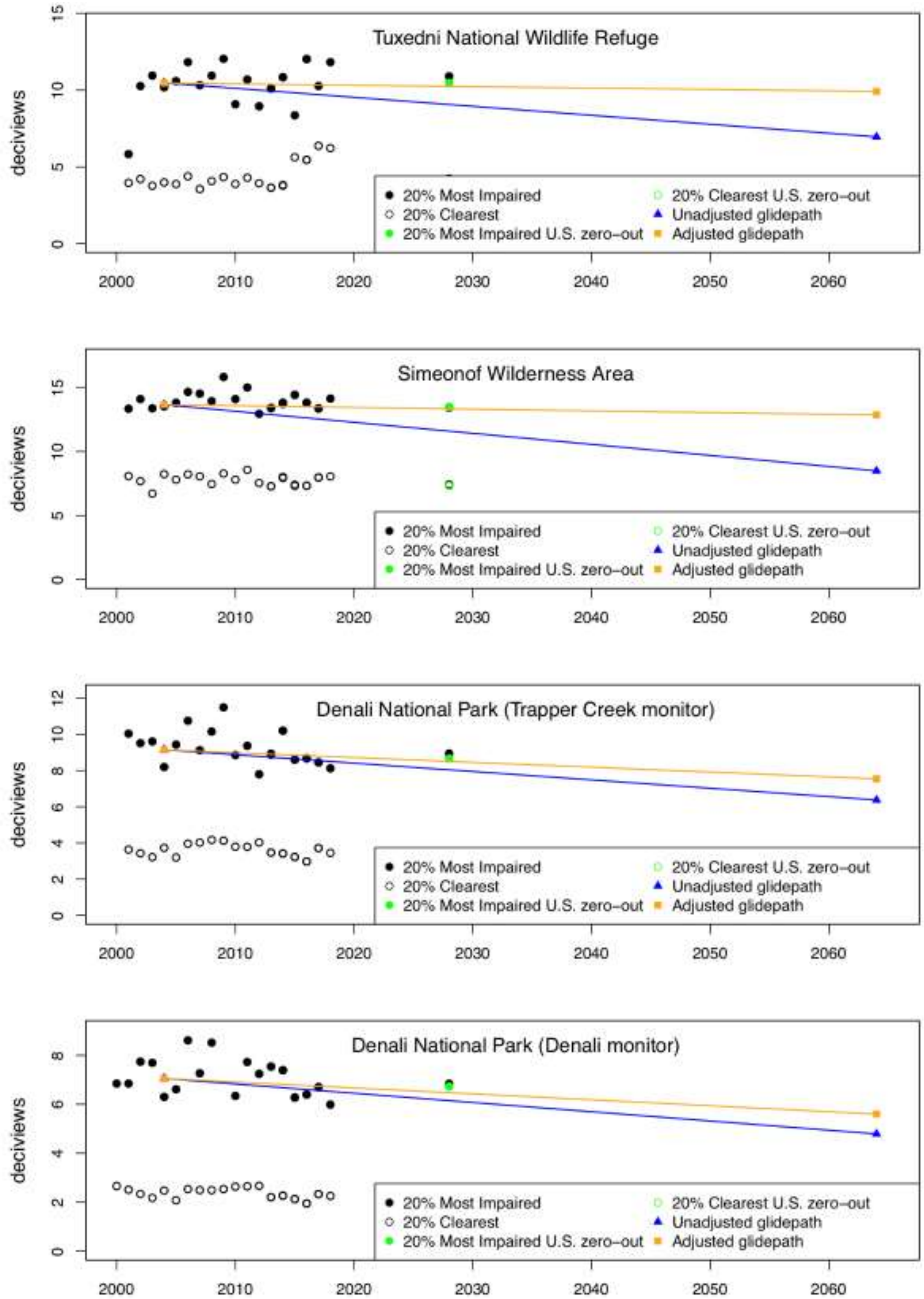
The same support document goes one step further in proving ADEC's contention that Alaska's Class I areas are already achieving natural conditions. The report describes EPA's modeling efforts to project 2028 visibility with and without a zero-out of U.S. anthropogenic emissions at each of the Class I areas examined. The zero-out U.S. anthropogenic emission simulations excluded any anthropogenic emission sources located within the U.S. and the territories. By excluding all anthropogenic sources, all that is left is visibility impairment caused by international anthropogenic emissions and natural sources that are beyond the control of the states.

As shown in Figure 30 below, the results of the effort indicated that even after excluding all anthropogenic emissions, visibility in Alaska's Class I areas remains above both the adjusted and unadjusted Glidepath at all four IMPROVE stations.

[59] U.S. Environmental Protection Agency. (August 2021). *Technical Support Document for EPA's Updated 2028 Regional Haze Modeling for Hawaii, Virgin Islands, and Alaska*. https://www.epa.gov/system/files/documents/2021-08/epa-454-r-21-007.pdf. (Accessed 10/28/2025).

Even more telling, the difference between the 2028 unadjusted forecast and the 2028 zero-out MID is negligible at all four stations. This modeling effort demonstrates that Alaska's Class I areas are already achieving natural visibility conditions and are incapable of improving any further. It also confirms that the methodology used to identify uncontrollable and natural sources of visibility impairment is insufficient to properly categorize sources unique to Alaska.

Figure 30. Visibility Glidepaths and 2028 Forecasts in Deciviews at Each Alaska IMPROVE Station



H. Assessment of Smoke Management Plan (51.308(g)(8))

Under 40 CFR §51.308(f)(2)(iv)(D), states are required to address basic smoke management practices for prescribed fire used for agricultural and wildland vegetation management purposes and smoke management programs. Smoke from wildland fires is a contributor to visibility impairing air pollution in Alaskan communities and mandatory federal Class I areas. Alaska's implementation of smoke management techniques through regulation contributes to minimizing impacts from planned burn activities on visibility in Class I areas. The following table provides a five-year view of the number of prescribed burns and the acres burned across Alaska.

Table 24. Number of Prescribed Burns and Acres Burned in Alaska Annually

Year	# of Prescribed Burns	Prescribed Acres Burned
2018	19	30,569
2019	3	15,204
2020	3	79,965.5
2021	9	50,658.9
2022	18	70,153.9

Alaska has longstanding open burning regulations in 18 AAC 50.065 and included open burning requirements in the SIP (Volume II, Section III.F) to reduce and prevent particulate matter emissions from impacting public health. ADEC requires approvals for open burning or controlled burning to manage forest land, vegetative cover, fisheries, or wildlife habitat if the cumulative area to be burned exceeds 40 acres yearly. ADEC also requires approvals for open burns for firefighter training exercises. In addition to this ongoing regulation, ADEC developed and implemented the Alaska Enhanced Smoke Management Plan (ESMP). Approval to conduct open burning is required to ensure that entities conducting planned burns follow the provisions in the ESMP. The ESMP was included as part of the Long-Term Strategy in the first RH SIP and was updated for the Second Implementation Period.

The ESMP helps fulfill Alaska's responsibilities for protection of air quality and human health under federal and state law and reflects the CAA requirement to improve regional haze in Alaska's Class I areas. The ESMP outlines the processes, practices, and procedures necessary to manage smoke from prescribed and other open burning. It also identifies issues that need to be addressed by ADEC and land management agencies or private landowners/corporations to help ensure that prescribed fire (e.g. controlled burn) activities are conducted in a manner to minimize smoke and impairment to air quality.

Evaluation of the existing ESMP relies on accurate data to determine if improvements are needed. In the review of the ESMP for the Second Implementation Period SIP, ADEC determined that the data quality needs improvement, it was also determined that permits and controlled burning need better coordination. Routine program review needs to be continual as well, and identified improvements need to be made by ADEC to regularly update the ESMP to be able to address EPA exceptional event regulations and guidance. In 2020, ADEC stopped performing a full-scale smoke emission inventory due to lack of resources and aging out of required software. Instead, in 2020, ADEC started to perform a scaled down version of the smoke emission for review internally and with other land managing partners. ADEC will continue to pursue opportunities to improve data quality.

I. Determination of Adequacy (51.308(h))[60]

RHR Paragraph 51.308(h) requires the state to take one of the following actions:

- The state may declare that no further revision of the existing plan is needed at this time. This is commonly referred to as a "negative declaration".
- If the plan is or may be inadequate to ensure reasonable progress due to emissions from another state, or states, which participated in a regional planning process, the state must notify EPA and the applicable state(s). The state must collaborate with the state(s) through the regional planning process to develop additional strategies for addressing the plan's deficiencies.
- If the plan is or may be inadequate to ensure reasonable progress due to emissions from another country, the state must notify the EPA and provide any available relevant information.
- If the plan is or may be inadequate to ensure reasonable progress due to emissions from within the state, then that state must revise its plan within one year to address the deficiencies.

Based on the information and data presented in this progress report, ADEC 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.

J. Consultation with Federal Land Managers (51.308(i))[61]

Per RHR paragraph 51.308(i), opportunity for FLM consultation on a progress report must be provided no less than 60 days prior to the public hearing or public comment opportunity on the progress report. The consultation must include the opportunity for the FLM to discuss their:

1. Assessment of visibility impairment in the Class I area
2. Recommendations on the development and implementation of strategies to address visibility impairment

DEC provided a draft of this progress report for review to the FLMs, including the National Park Service, U.S. Fish and Wildlife Services, and the Forest Service, on February 4, 2026. Comments from the National Park Service were received on April 2, 2026. No other comments were received. FLM comments are available as Appendix A to this report.

Public Commenting Period

Upon the approval of the Air Quality Board on [DATE], this progress report and all relating documents were made available for public comment from [DATE] to [DATE]. Public notices for the commenting period were issued on the ADEC webpage, via electronic mail, as well as in the local newspapers of the [AREA], [AREA], and [AREA] areas. Commenters included:

This section will be updated to address any comments made during the comment period prior to official submittal to EPA.

[60] Sections 51.308(h) and 51.309(d)(10)(ii)
[61] Sections 51.308(i)(2) and (3)

Information Dissemination

All materials related to this SIP Progress Report will be posted on ADEC’s public platforms as the division has received and processed them. ADEC uses all resources at its disposal to disseminate information to its stakeholders.

APPENDIX A:
FLM Consultation Comments

National Park Service (NPS) Feedback on

Alaska's Draft 2026 Regional Haze Progress Report

Thank you for the opportunity to consult with the Alaska Department of Environmental Conservation (ADEC) on the updated Alaska draft *2026 Regional Haze Progress Report*. We appreciate your willingness to hold a virtual meeting. The National Park Service (NPS) acknowledges that we did not request a meeting for this consultation opportunity. This email provides our formal regional haze consultation response on the draft 2026 progress report, as required by 40 CFR 51.308(i)(2).

Consistent with our June 2025 feedback on an earlier draft of the progress report, the NPS commends ADEC for developing a comprehensive progress report. Overall, the 2026 draft report fulfills the basic requirements of a progress report and documents ongoing implementation of ADEC's second round State Implementation Plan (SIP).

In the intervening time between the 2025 and 2026 draft progress reports, the Environmental Protection Agency (EPA) proposed approval of Alaska's Regional Haze (RH) SIP on October 30, 2025. The proposed EPA approval included an October 6, 2025 clarification memo from ADEC, which documented substantive revisions to the state's long-term strategy (LTS) that the federal land managers (FLMs) did not have a consultation opportunity to discuss with the state.

As described in the *2026 draft Progress Report*:

The 2nd Implementation of the Alaska Regional Haze State Implementation Plan was adopted by Alaska on July 5, 2022 and a clarification memo was submitted to EPA on October 6, 2025. EPA proposed to approve Alaska's RH plan for the second implementation period on October 30, 2025 (EPA-R10-OAR-2023-0348).

EPA recently finalized approval of Alaska's RH SIP on March 3, 2026, including the substantive changes to the LTS that were introduced in the October 6, 2025 clarification memo. This memo reversed ADEC's reasonable progress determination for the Golden Valley Electric Association (GVEA) Healy Power Plant Emission Unit 1. Departing from previous conclusions, ADEC now finds that no additional SO_2 reductions are necessary from Healy Unit 1 to make reasonable progress. The commitments removed from the LTS would have ensured emission reductions at the Healy facility and continued visibility improvement at Denali National Park and Preserve. It is important to note again that these ADEC revisions were not a part of FLM consultation.

The NPS is committed to meeting its congressionally designated *"affirmative responsibility"* to protect air quality related values in Class I areas and to working with federal and state air agencies to ensure clean air and clear views in national parks. The Clean Air Act's (CAA) visibility protection provisions[1] are key to achieving the NPS mission[2] to conserve park resources, including scenery, *"unimpaired for the enjoyment of future generations."* The CAA requires states to consult with FLMs on proposed plan revisions and to include a summary of FLM conclusions and recommendations in the notice to the public.[3] The NPS respectfully requests an opportunity for the required consultation on all substantive SIP revisions.

According to ADEC's 2022 SIP submitted for EPA review, Emission Unit 1 at Healy *"has the highest SO_2 emissions per MMBtu of energy consumed in all GVEA's emissions unit inventory."* As previously shared,[4] NPS study-level analyses suggest that Dry Sorbent Injection system upgrades/replacement at Healy Unit 1 could cost-effectively reduce SO_2 emission rates to 0.20 lb/MMBtu or lower. This facility is located approximately six km from the boundary of Denali National Park & Preserve. The NPS maintains that SO_2 emission reductions from Healy Unit 1 represent Alaska's best opportunity to reasonably address haze affecting this Class I area.

Thank you again for the opportunity to consult on this revised 2026 draft progress report. We look forward to continuing to work with ADEC to protect and improve visibility and air quality in Denali National Park and Preserve's Class I area.

APPENDIX B:
Public Comments