

III.K.13.J PROGRESS REPORT

Title 40 CFR §51.308(f)(5) requires states to submit a progress report to EPA every five years that evaluates progress towards the RPGs. The last progress report was submitted in the first implementation period in 2015. The RH SIP due in 2021 will also serve as a progress report addressing the period since submission of the progress report for the first implementation period. At a minimum, the progress reports must contain the elements in 40 CFR 51.308(g)(1) through (5) for each Class I area as summarized below:

- (1) Implementation Status of the Current SIP Measures
- (2) Emissions Reductions Due to Ongoing Air Pollution Programs
- (3) Visibility conditions and changes
- (4) Analysis tracking changes in emissions since the most recent RH SIP revisions
- (5) Assessment of any significant changes in anthropogenic emissions on progress

1. IMPLEMENTATION STATUS OF THE CURRENT SIP MEASURES

40 CFR §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 Class I areas both within and outside the state.” Several existing air pollution programs contribute to visibility improvements in the state’s Class I areas; some are state programs and others are federal requirements. Section III.K.13.H Long-Term Strategy for Regional Haze provides a description of air control measures to reduce emission within the state. Some of these measures are summarized below:

- 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;
- The PSD/NSR rules protect visibility in Class I areas from new industrial sources and major changes to existing sources;
- Implementation of programs to meet PM_{2.5} NAAQS as a part of the “Serious” nonattainment designation for 24-hour PM_{2.5} NAAQS in Fairbanks;
- Alaska open-burning regulations; and
- International Marine Organization low-sulfur marine diesel regulation and the North America Emissions Control Area.

Uncontrollable emissions sources contribute to the atmospheric mix of visibility-impairing pollutants as well as those produced by anthropogenic sources in Alaska; all are detected but not differentiated by the IMPROVE monitoring data. The fact that uncontrollable natural and

anthropogenic sources outside of the United States affect visibility is not neglected in the analysis presented in this RH SIP.

2. EMISSIONS REDUCTIONS DUE TO ONGOING AIR POLLUTION PROGRAMS

40 CFR §51.308(g)(2) requires “a summary of the emissions reductions achieved throughout the state through implementation of the measures described in (g)(1)”. Anthropogenic emissions in Alaska have been decreasing since 2014, but it is not certain if the reductions are due to the RH SIP progress goals. Annual emissions from point sources (2014 and 2017 data include nonpoint data) submitted to EPA in the yearly and triennial NEI demonstrate that the measures are contributing to overall emission reductions (Table III.K.13.J-1). Some of the emission reductions may be due to the economic recession which began in 2016 and population migration loss.¹ However, some reductions are likely due to reduced operations at facilities and use of low sulfur-content fuel. DEC continues to track source or emission unit retirements and changes at point sources through its permit program. Emission reductions from these changes have not been calculated on an annual basis.

Table III.K.13.J-1. Annual Alaska national inventory emissions (2014 to 2019).

Year	CO	NO _x	VOC	SO ₂	PM ₁₀	PM _{2.5}
2014*	30,000	61,272	4,222	5,354	2,966	2,288
2015	27,633	61,489	6,095	4,392	2,907	1,755
2016	7319	38,013	1714	1,565	1,374	292
2017*	12,814	54,135	3,842	3,794	2,494	821
2018	6,543	36,020	1,743	1,642	947	241
2019	6,953	37,122	1,633	1,825	1,003	245

* Triennial Emission Inventory years which tend to be higher than other years due to the reporting of small sources and nonpoint sources.

A. Electrical Grid

Among the largest changes to the anthropogenic emissions footprint within the state includes the refit of George Sullivan Plant 2 in Anchorage, which is one of the largest electrical generators in the state. It has new natural gas-fired generators which generate electricity more efficiently and have up-to-date mechanical emissions controls installed. The Beluga River Power Plant, owned and operated by Chugach Electric, has been maintained in stand-by mode over the last five years to provide additional power generation capacity for the electrical grid in Southcentral Alaska. The Eklutna Generating Station has been brought online to provide power generation capacity for the Matanuska Electric Association. It uses natural gas-fired turbines which have updated mechanical

¹ February 2021 Alaska Economic Trends, Alaska Department of Workforce and Economic Development. <https://labor.alaska.gov/trends/feb21.pdf>

controls installed. Its activation further reduces grid reliance on older power generators to provide excess capacity during periods of increased demand.

B. Oil and Gas Industry

Given market factors and field maturation in the Prudhoe Bay region, oil extraction has plateaued below a half-million barrels per day and was significantly curtailed during the first months of 2020 due to market conditions caused in part by COVID-19 pandemic. For more information about this industry and potential future growth, see Section III.K.13.H.

C. Low-Sulfur Fuel Use and Maritime Industry Adoption

In the intervening years since the promulgation of the first RH SIP, regulations concerning the sale and burning of ULSD by stationary and mobile sources have come into effect. Maritime sources have similar regulations as per the ECA. This has resulted in a reduction of sector sulfur dioxide in areas where ECA sulfur requirements apply.

3. ASSESSMENT OF CLASS I AREAS

40 CFR §51.308(g)(3) requires “a summary of for each Class I area within the state, the state must assess the following visibility conditions and changes, with values for most impaired, least impaired and/or clearest days as applicable expressed in terms of five-year averages of these annual values.” This section requires the report to include deciview values for three separate time periods: “current visibility conditions,” “baseline visibility conditions (2000-2004),” and “the past 5 years.” Current visibility conditions” includes the most recent quality assured public data available at the time the state submits its 5-year progress report which is 2014-2018 in this RH SIP. The year associated with the “past 5 years” is the year 5 years previous to the year used for “current visibility conditions.” (i.e., 2009-2013).

Visibility baseline and current conditions are reported in Section III.K.13.D: Assessment of Ambient Data for Class I Areas. The section describes assessment of baseline (2000-2004), past 5 years (2009-2013), and current conditions (2014-2018) for most impaired and clearest days as summarized in Table III.K.13.J-2 and Table III.K.13.J-3 below. Comparison between the current and past 5 years’ visibility conditions demonstrates visibility improvement for most impaired and clearest days at all Alaska IMPROVE sites. Note that the last year of TUXE1 IMPROVE data was 2014; therefore, years 2010-2014 comprise the current period for the TUXE1 site in this RH SIP.

Table III.K.13.J-2. Summary of baseline, past 5 years, and current visibility conditions (dv) on the most impaired days.

Class I Area	IMPROVE ID	Baseline (2000-2004)	Past 5 years (2009-2013)	Current (2014-2018)	Deciview Change between Current and Past 5 years	Improvement: YES/NO?
Denali National Park	TRCR1	9.1	9.3	8.8	-0.5	YES
	DENA1	7.1	7.7	6.6	-1.2	YES
Tuxedni Wilderness Area	TUXE1	10.5	10.6*	10.0*	-0.6	YES
	KPBO1**	n/a	n/a	n/a	n/a	n/a
Simeonof Wilderness Area	SIME1	13.7	14.3	13.9	-0.4	YES

*Since TUXE1 ceased operation after 2014, 3-year average is used instead. Current Period for TUXE1 IMPROVE site is 2012-2014 and Past Period is 2009-2011.

** First full year of KPBO1 IMPROVE site operation was 2016

Table III.K.13.J-3. Summary of baseline, past 5 years, and current visibility conditions (dv) on the clearest days.

Class I Area	IMPROVE ID	Baseline (2000-2004)	Past 5 years (2009-2013)	Current (2014-2018)	Deciview Change between Current and Past 5 years	Improvement: YES/NO?
Denali National Park	TRCR1	3.5	3.8	3.4	-0.5	YES
	DENA1	2.4	2.5	2.2	-0.4	YES
Tuxedni Wilderness Area	TUXE1	4.0	4.2	3.8	-0.4	YES
	KPBO1	n/a	n/a	6.0	n/a	n/a
Simeonof Wilderness Area	SIME1	7.6	7.9	7.7	-0.2	YES

4. ANALYSIS OF CHANGE (2013-2018) - STATE SOURCES AND ACTIVITIES

40 CFR §51.308(g)(4) requires analysis tracking of the change over the period since the 2009 and 2014 RH SIP revisions, emissions of pollutants contributing to visibility impairment from all sources and activities within the state, and emissions changes identified by type of source or activity.

Analysis of changes to state mobile and stationary sources and other activities is based on state triennial NEI reporting. Three complete inventories are used to analyze changes to the state emissions profile during the last decade: 2011, 2014, and 2017. The 2017 inventory is the last complete inventory available for emissions analysis at present². Emissions are broken out by source sector as defined in the NEI.

A. Analysis of State Emissions Trends: 2011, 2014, 2017

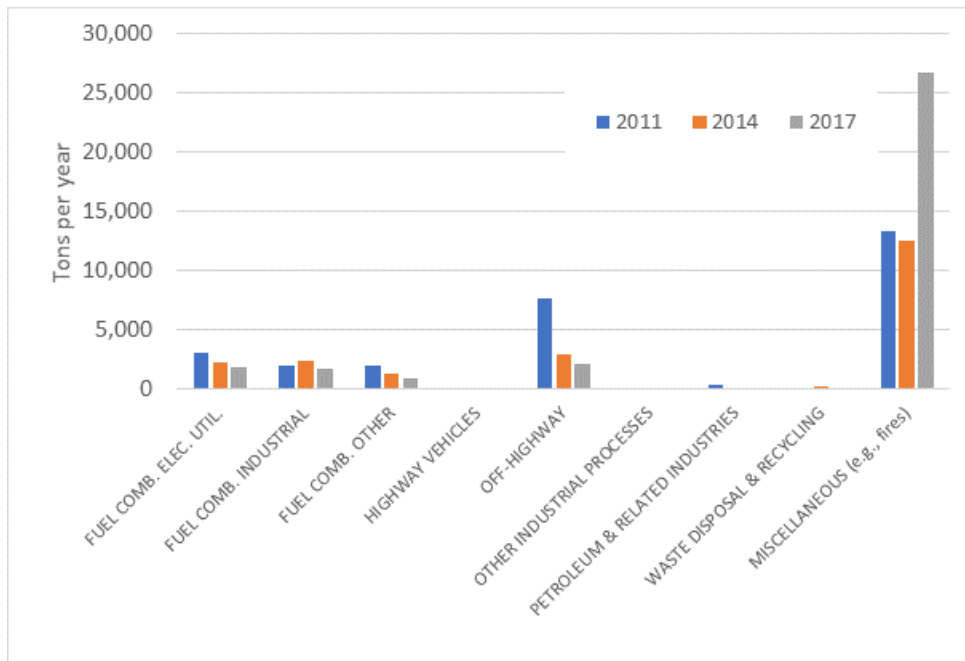
Emission trends are shown for SO₂ and PM_{2.5} since the largest contributors to visibility at Alaska IMPROVE monitors are sulfate and OMC. As evidenced in Figure III.K.13.J-1 and Figure III.K.13.J-2, the largest single category for both pollutants reported to EPA in the state triennial NEI all three years is the miscellaneous category which encompasses both prescribed fires and wildfire activity within the state. All other categories were small by comparison. Off-highway (including commercial marine vessels) contributes to SO₂ emissions as a second largest category, and emissions from this sector have declined significantly in 2017 from 2011. Other sources of visibility impairment include the oil and gas industry, which are categorized as fuel-combustion industrial. Other industrial processes in the NEI also show downward emission trends of SO₂ and PM_{2.5}.

Because the miscellaneous fire category covers both prescribed fires and wildfires, only a limited window of emissions is controllable by any form of state regulations. More information about ongoing prescribed fires and human-caused fire trends are presented below.

² Alaska's residential wood combustion emissions appear to have errors in the 2017 NEI. For the trend analysis purpose, the EPA's 2016 residential wood combustion emissions are used for 2017.

Figure III.K.13.J-1. Emissions trends of SO₂: 2011, 2014, and 2017 NEI.

Including Miscellaneous Category



Excluding Miscellaneous Category

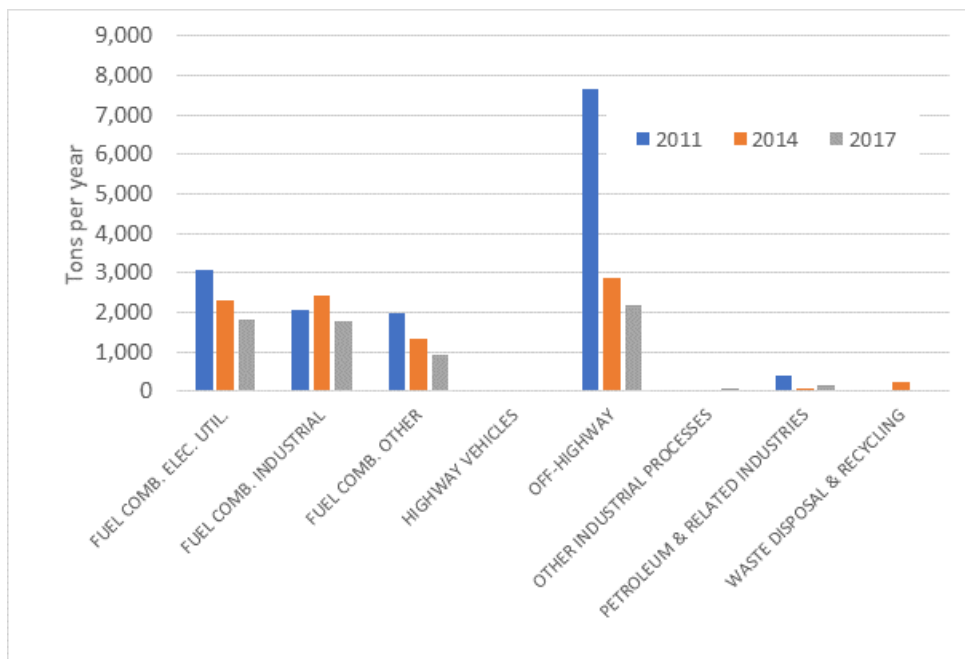
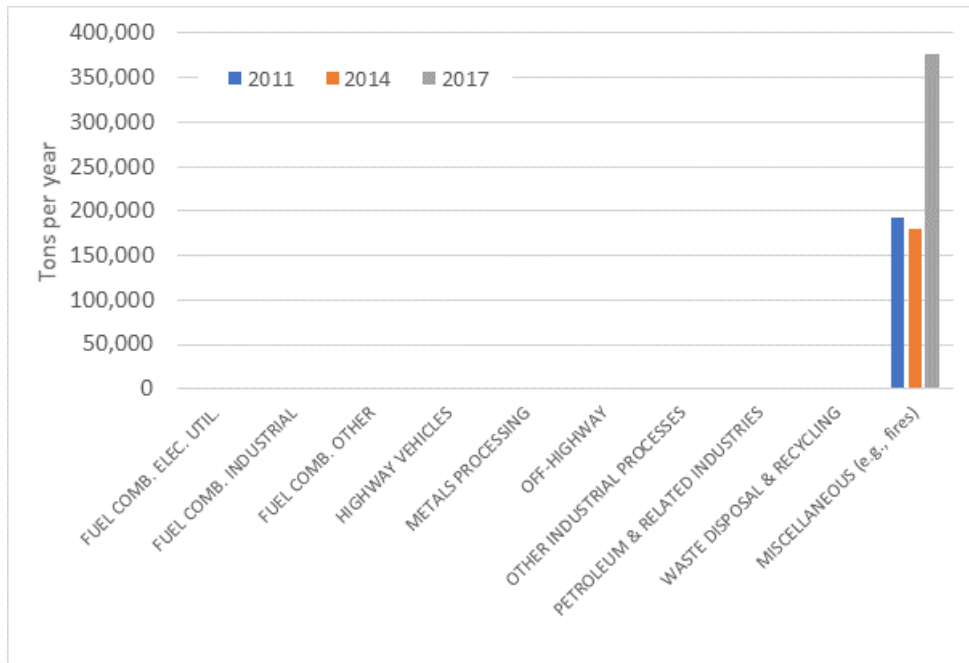
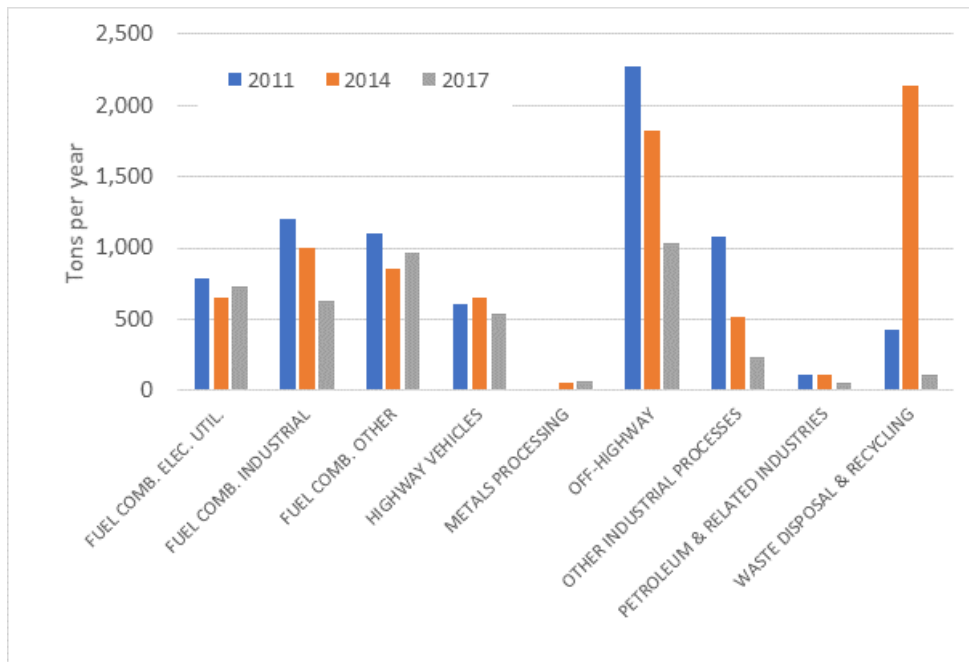


Figure III.K.13.J-2. Emissions trends of PM_{2.5}: 2011, 2014, and 2017 NEI.

Including Miscellaneous Category



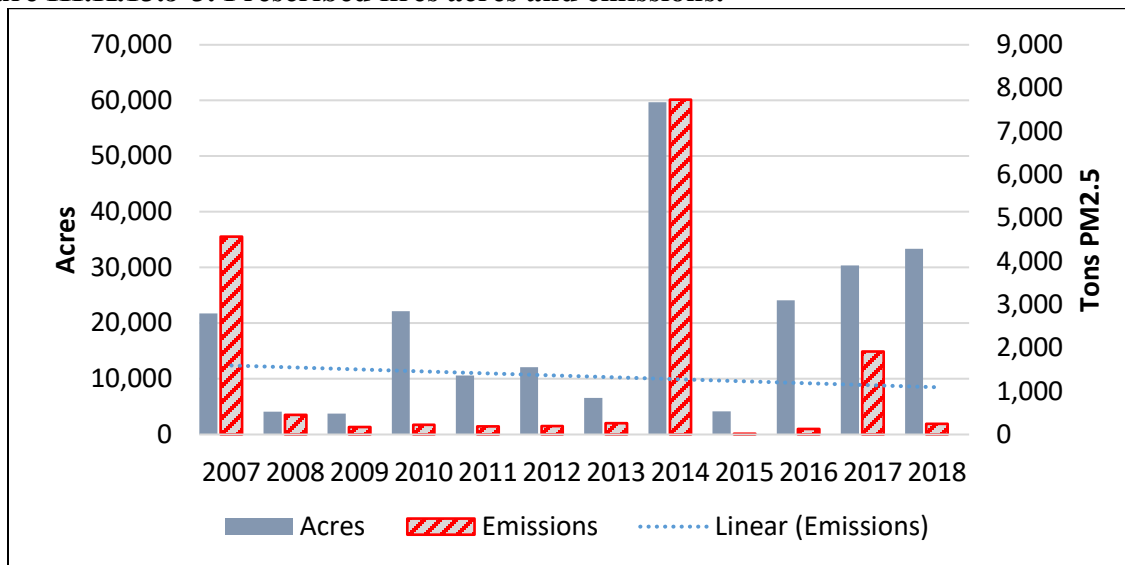
Excluding Miscellaneous Category



B. Prescribed Fires

The number of prescribed fires permitted by DEC with the Open Burn Permit approval is consistent from year to year, and generally they average approximately 20 permits annually. The acreage burned by prescribed fires is steadily growing, and in 2017, one prescribed fire was over 29,000 acres (Figure III.K.13.J-3). There are other categories of fires that are permitted by the Alaska Department of Natural Resources (DNR) under large scale burn permits. These have generally not been tracked over the years but will be included in the 2020 NEI and in the next progress report. DNR issues permits for land clearing, agricultural burning, and other purposes where DEC does not issue permits (fires less than 40 acres in size). Since DEC issues permits for prescribed fires over 40 acres in size within a calendar year, it is not clear how the emissions will change.

Figure III.K.13.J-3. Prescribed fires acres and emissions.



i. Human-Caused Fires

The number of human-caused fires has decreased since 2000, and in the last five years, this trend has continued (Figure III.K.13.J-4). The acreage burned resulting from human caused fires has increased slightly (Figure III.K.13.J-5). The acreage increases are likely due to climatic changes where we have warmer summers and less rainfall. This is also mirrored in the wildfire trends.

In reviewing the data provided by AICC, there are some inconsistencies and completeness problems where some fires under investigation are never resolved and data is missing.

Figure III.K.13.J-4.

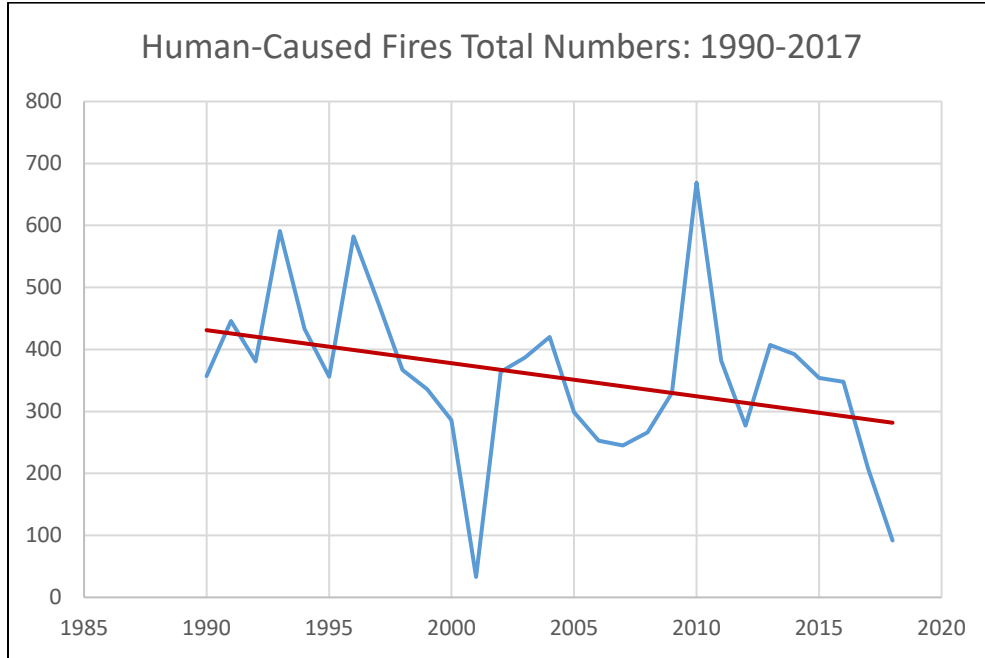
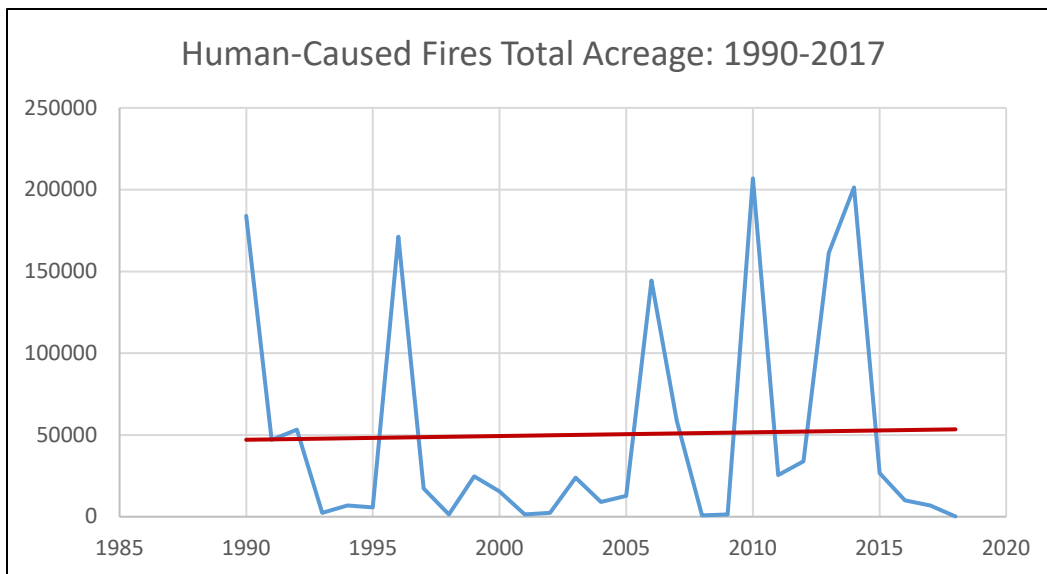


Figure III.K.13.J-5.



5. ASSESSMENT OF ANY SIGNIFICANT CHANGES IN ANTHROPOGENIC EMISSIONS

40 CFR §51.308(g)(5) requires assessment of any significant changes in anthropogenic emissions within or outside the state that have occurred since the period addressed in the most recent plan required under paragraph (f) of this section, including whether or not these changes in anthropogenic emissions were anticipated in that most recent plan and whether they have limited or impeded progress in reducing pollutant emissions and improving visibility.

In the five years since promulgation of the last progress report in 2015, progress on meeting permitting stipulations and requirements under the BART and Healy Power Plant Consent Decree appear to meet state obligations. At present, there have been no FLM requests to analyze any stationary sources under RAVI stipulations in the 1999 RH Rule. All BART stipulations continue to remain in place on sources subject to BART controls. At present, only the Healy Power Plant has BART stipulations in effect which were brought under the Consent Decree between GVEA and the EPA. Permitting stipulations for emissions controls and best practices appear to be working as intended.

The largest changes that will take place between the writing of this RH SIP and the next progress report will be at the Healy Power Plant and Fort Wainwright CHPP. The Fort Wainwright privatized CHPP is in the process of identifying a suitable replacement for its four coal-fired boilers that have been in use since 1953. The Fort Wainwright EIS identified several alternatives to the current generators, including new coal-fired boilers and distributed natural gas boilers to provide heating and power for the base. Facility managers will have completed the EIS process and either begun construction of replacement CHPP or fully retrofitted the existing CHPP with sulfur controls by the time of the next progress report.

The Healy Power Plant, owned and operated by GVEA, is bound under the terms of the Consent Decree with the EPA regarding emissions controls. GVEA will need to either install SCR controls on Unit 2 or shut it down, with a decision mandated to occur by December 31, 2022. Final shut-down or control installation is scheduled for December 31, 2024. Both deadlines occur prior to the promulgation of the next progress report. Visibility impact of either option will not be readily available, though will be measurable, at the time of the next RH SIP in 2028.

6. ASSESSMENT OF THE CURRENT SIP SUFFICIENCY TO MEET REASONABLE PROGRESS GOALS

The RH SIP in place appears to sufficiently meet the state progress goals at present with ongoing visibility improvement at all IMPROVE monitors. Stationary sources have installed requisite emissions control technology as requested under permitting stipulations and as part of ongoing modernization efforts at stationary sources. The best example of this has been the refit of the George Sullivan Plant, where a formerly BART eligible emissions unit was shut down and a new unit with up-to-date controls were installed. Healy Power Plant has installed SNCR controls onto Unit 1, which meets its obligations under the Consent Decree with the EPA. This does fall

outside of the scope of the Alaska RH SIP, as it is an agreement between GVEA and the EPA and does not involve DEC participation.

At present, though, DEC lacks the modeling tools to quantify how all the control stipulations in the RH SIP are contributing to visibility improvement. In addition, the State of Alaska has been in an ongoing economic recession for much of the last decade due to economic challenges and competitiveness of the state oil and gas industry. This has resulted in a reduction in emissions within the state from several categories of emissions, including transportation and electrical generation. The population of the state has gone down by nearly twenty-thousand people in the last half-decade. While DEC cannot fully identify the reasons for visibility improvement at present, the agency views the measures taken in this plan as adequate to maintain visibility progress moving into the second planning period.

The RH Rule amendments changed the schedule for the five-year reports from states to the EPA. For this second planning period only, the five-year report is required by 40 CFR §51.308(g) to be submitted by July 31, 2025. The five-year report will be examined by the EPA, but the EPA will not formally approve or disapprove it. In the future, the RH SIP process will not be required for the five-year report, but FLM consultation and public comments will still be required.