

Exceptional Events Waiver Request

For Exceptional PM_{2.5} Events
Between May 26, and July
26, 2019
in the Fairbanks North Star
Borough, Alaska

Air Quality Division

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& Quality Assurance
Program

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Introduction

The Fairbanks North Star Borough (FNSB) covers an area of 7,361 square miles and has a population of approximately 99,849¹. Fairbanks is situated on the banks of the Chena River in

the upper Tanana Valley in the interior region of the state. North of the FNSB are low hills that border the Tanana Valley (Figure 1). Interior Alaska, where FNSB is found, experiences average winter temperatures ranging between -2°F and -19°F and average summer temperatures ranging between 53°F and 72°F. Temperatures have been recorded as low as -78°F in mid-winter, and as high as 93°F in summer. Average annual precipitation is 11.3 inches and ice fog is common during the winter. The extremes in day length in the FNSB range from 21 hours of direct sunlight between May 10 and August 2 to less than four hours of direct sunlight between November 18 and January 24.



Figure 1. Map of Alaska and inset showing Tanana Valley, Fairbanks, and North Pole.

In December of 2009, the Environmental Protection Agency (EPA) designated 244 square miles (3.3%) of the FNSB as a PM_{2.5} non-attainment area (Figure 2). This area encompasses the cities of Fairbanks and North Pole with an estimated population of over 83,000 residents (83.3% of FNSB). During the summer months (May through September), the main source of elevated PM_{2.5} concentrations is smoke from wildland fires. During the winter months (October through March), local home heating emissions are the dominant PM_{2.5}

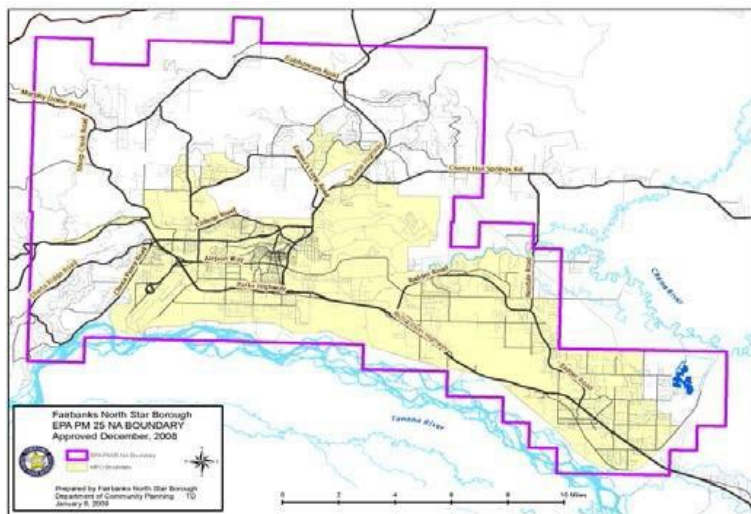


Figure 2. Map of PM_{2.5} non-attainment area in Fairbanks North Star Borough; purple lines indicate boundary.

source², to a much greater extent than industrial or mobile source emissions.

¹ <http://www.census.gov/>

² <http://dec.alaska.gov/air/anpms/communities/fbks-particulate-matter/>

During the summer 2019 wildland fire season, air quality monitors in the FNSB PM_{2.5} nonattainment area recorded elevated concentrations of PM_{2.5} (Table 1.). The Alaska Department of Environmental Conservation (DEC) has prepared this document as part of an Exceptional Event Waiver Request (EEWR) to exclude wildland fire emission caused elevated PM_{2.5} concentrations from federal regulatory decision-making processes under 319(b)(3)(B) of the Clean Air Act.

The DEC Air Quality Monitoring and Quality Assurance Program operated four regulatory monitoring sites during the 2019 wildland fire season using both Federal Reference Method (FRM) PM_{2.5} monitors and Beta Attenuation Monitors (BAM). The filter-based FRM monitors records a 24-hour average PM_{2.5} concentration. The BAM monitors record hourly average PM_{2.5} concentrations.

The DEC does not consider the data quality collected by the BAM monitor sufficient for regulatory purposes and is therefore not operating the continuous monitors as Federal Equivalence Method (FEM) monitors. However, the hourly data from the continuous BAM monitors provides the public with timely information regarding current ambient air quality. DEC only uses the BAM data to issue air quality advisories and as a tool in the winter to call for burn curtailments. Data collected using BAM monitors at the regulatory sites are included in this EEWR solely as supporting information.

This EEWR discusses the data from the following monitors:

- Fairbanks State Office Building (SOB) site, Air Quality System (AQS)
Site ID 02-090-0010 (site shut down on 7/1/19)
 - FRM 02-090-0010-88101-1 (daily)
- Fairbanks National Core Multi-Pollutant Monitoring Station (NCORE)
Site, AQS Site ID 02-090-0034
 - FRM 02-090-0034-88101-1 (daily)
 - FRM 02-090-0034-88101-2 (every third day)
 - BAM 02-090-0034-88501-3 (hourly)
- Fairbanks A-Street Site, AQS Site ID 02-090-0034
 - FRM 02-090-0040-88101-1 (daily) (monitoring began 7/17/19)
 - BAM 02-090-0040-88501-3 (hourly) (monitoring began 6/18/19)
- Hurst Road (HURST) Site, AQS Site ID 02-090-0035
(formerly named North Pole Fire Station (NPFS))
 - FRM 02-090-0035-88101-1 (daily)
 - FRM 02-090-0035-88101-2 (every third day)
 - BAM 02-090-0035-88501-3 (hourly)

These monitors recorded multiple 24-hour average PM_{2.5} concentrations in excess of both the 24-hour National Ambient Air Quality Standard (NAAQS) of 35 µg/m³ and the annual NAAQS of 12 µg/m³ between June 18 and August 9, 2019 (Table 1).

Table 1. 2019 Wildland Fire Season FNSB PM_{2.5} Exceedance Concentrations, µg/m³

June								July							
24-Hour PM _{2.5} Concentrations (µg/m ³)								24-Hour PM _{2.5} Concentrations (µg/m ³)							
Date	NCORE FRM 1°	NCORE FRM 2°	NCORE BAM	HURST FRM	HURST BAM	SOB FRM	A-St BAM	Date	NCORE FRM 1°	NCORE FRM 2°	NCORE BAM	HURST FRM	HURST BAM	A-St FRM	A-St BAM
23	16.2	16.2	16.4	11.9	12.3	16.7	19.3	2	8.8		12.9	20.1	20.8		9.1
25	23.2		24.5	18.3	20.3	23.0	24.6	3	9.4	10.2	11.0	23.8	25.6		11.4
26	20.5	20.2	22.2	16.5	16.7	20.4	17.7	6	25.0		26.7	22.0	23.2		27.1
27	59.1		62.3	64.4	70.3	57.8	58.5	7	102.7		105.0	314.5	306.7		95.5
28	39.5		42.4	38.5	41.7	37.9	42.6	8	112.0		126.4		293.2		137.2
29	52.7	53.4	55.0	94.0	106.2	50.2	56.1	9		130.9	130.7	327.0	306.9		167.3
30	60.0		61.1	53.3	56.0		58.4	10	185.1		160.4	278.4	211.4		162.9
Black Bolded Values indicate an exceedance of the Annual NAAQS (12 µg/m ³) Red Bolded Values indicate an exceedance of the 24-hour NAAQS (35 µg/m ³)								11	211.6	212.4	182.5	210.0	203.7		189.0
								12	65.5		64.5	57.4	59.9		67.9
								13	24.5		27.0	26.2	28.0		27.8
								14	16.7	17.0	17.9	19.1	20.0		18.7
								15	11.0		11.9	15.8	17.0		12.2
								18	15.9		16.2		15.0	15.4	17.0
								20	13.1	13.2	14.0	12.6	14.3	12.4	14.9
								22	10.0			14.8	16.1	9.7	10.5
								23	32.8	32.9	34.8	30.6	35.5	31.7	33.4
								24	18.7		19.9	21.0	23.1	17.9	20.3
								26	16.4	16.6	15.7	16.4	17.2	16.5	17.0

All monitors recorded multiple 24-hour average PM_{2.5} concentrations in excess of both the 24-hour NAAQS of 35 µg/m³ and the annual NAAQS of 12 µg/m³ between May 26 and July 26, 2019 (Table 1). The DEC concurs with EPA in that the only dates that currently have regulatory significance are those that exceeded the 24-hour NAAQS: June 27-30 and July 7-12. However, DEC has identified all days above the annual NAAQS for future consideration. The purpose of this document is to clearly demonstrate that the source of the elevated PM_{2.5} concentrations shown

in Table 1 were the result of wildland fire emissions from fires located in Interior Alaska. Therefore, DEC requests that EPA exclude all wildland fire-influenced 24-hour average PM_{2.5} concentrations occurring during this event that exceed either the 24-hour or annual NAAQS PM_{2.5} exceedance concentrations of regulatory significance from regulatory decisions.

This EEWR includes multiple exceedances due to the nature of the event. It is impossible to attribute individual exceedances to specific fires; instead, the wildland fire season is treated as one event. This EEWR follows the steps outlined in the Exceptional Events Rule, finalized in 2016, and includes the elements required in 40 CFR 50.14(c)(3)(iv):

- A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s).
- A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation.
- Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3) (iv)(B) of this section.
- A demonstration that the event was both not reasonably controllable and not reasonably preventable; and
- A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event.

Conceptual Model

The event began in mid to late June 2019 and lasted through the end of July. Lightning was the cause of all wildland fires depicted in Figure 3, the 2019 Fire Complex Map. Twenty-three of the fires depicted below ignited between June 14 and 29, 2019. During the 2019 fire season, the fire complex to the surrounding FNSB burned at varying intensities. The dry conditions and gradient wind flow patterns played a significant role in the production and transport of smoke throughout Interior Alaska. While most of the 23 fires in the interior were located between 100 and 200 km away from FNSB, seven were within 100 km, see Figure 3 below.

The contributing factor for elevated PM_{2.5} concentrations measured in FNSB was the smoke from those fires. The smoke was transported by low and mid-level wind from all directional quadrants excluding the south. When the winds transitioned out of the south or a frontal system passed over the Interior, FNSB's PM_{2.5} concentrations dropped to more normal summertime readings.

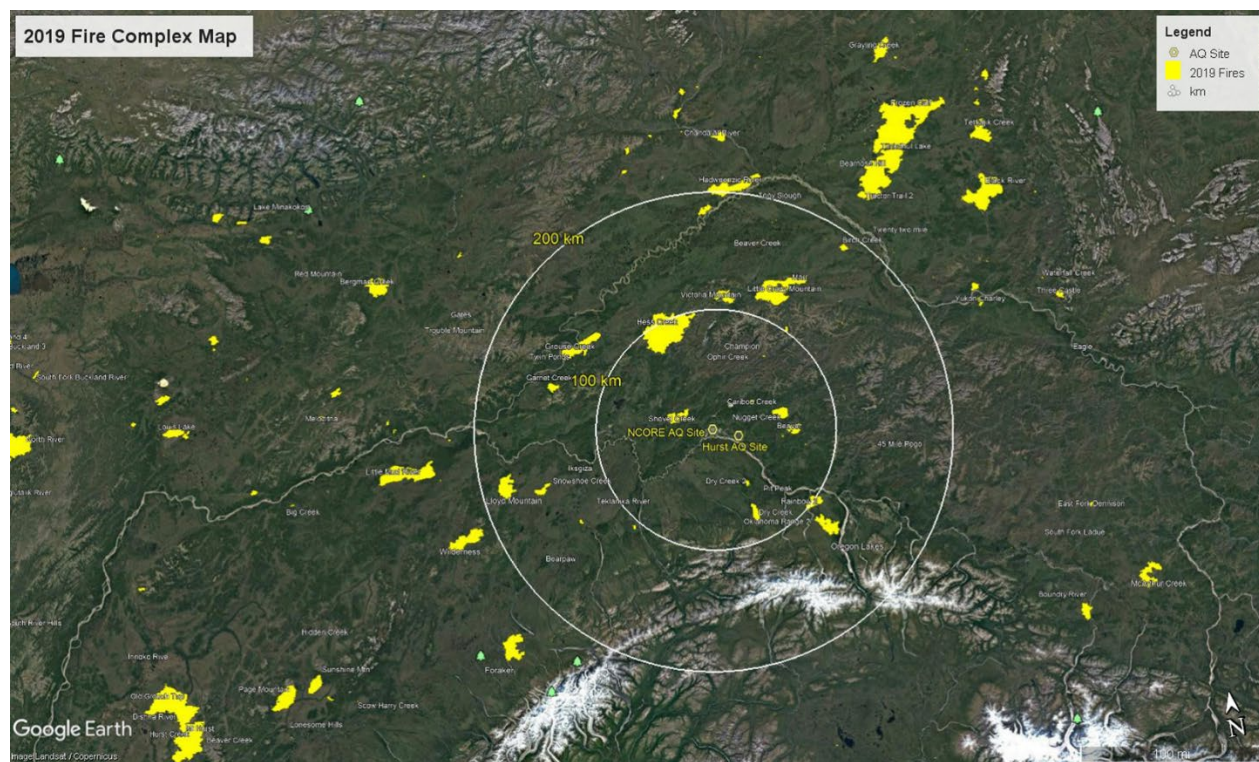


Figure 3. Interior fires during the June/July/August event are in yellow. The shaded fire plots, in Yellow, are estimated from satellite burn scars during the 2019 fire season.

The event's impact on the FNSB area was documented with the collection of primary POC 1 monitor daily $PM_{2.5}$ samples, and secondary POC 2 monitors $PM_{2.5}$ samples collected every third day, in accordance with EPA's national monitoring schedule. Samples collected from the FRM samplers at the Fairbanks SOB, Fairbanks NCORE, Fairbanks A-Street, and HURST all showed elevated $PM_{2.5}$ concentrations for four of the ten days sampled between June 27 and July 12, 2019 (Table 2), on the next page.

While not all ten 24-hour concentrations exceeded the 24-hour NAAQS of $35 \mu g/m^3$, all days had at least one site with elevated concentrations, compared to typical non-wildland fire summertime conditions, which exceeded the annual NAAQS of $12 \mu g/m^3$. During non-wildland fire summer months in the Fairbanks area, the maximum 24-hour average $PM_{2.5}$ average concentrations range between 3 and $6 \mu g/m^3$ (Appendix C). Throughout this period all concentrations at or above the annual NAAQS of $12 \mu g/m^3$ were flagged by DEC.

Table 2. FRM Sampler PM_{2.5} concentrations (µg/m³) at FNSB NCORE, SOB and Hurst sites

May-June								July								August							
24-Hour PM _{2.5} Concentrations (µg/m ³)								24-Hour PM _{2.5} Concentrations (µg/m ³)								24-Hour PM _{2.5} Concentrations (µg/m ³)							
Date	NCORE FRM 1°	NCORE FRM 2°	NCORE BAM	Hurst FRM	Hurst BAM	SOB FRM	A-Street BAM	Date	NCORE FRM 1°	NCORE FRM 2°	NCORE BAM	Hurst FRM	Hurst BAM	A-Street FRM	A-Street BAM	Date	NCORE FRM 1°	NCORE FRM 2	NCORE BAM	Hurst FRM	Hurst BAM	A-Street FRM	A-Street BAM
26-May	17.6	*AF	17.2	33	31.6	17		1	8.3		9.3	9.8	10.4		10.2	1	13.8	14.0	14.0	10.1	10.5	13.8	14.5
31-May	12.5		12.7	12.2	13.2	10		2	8.8	*AF	12.9	20.1	20.8		9.1	2	10.9		10.3	10.6	9.7	10.9	12.7
1	1.5		2.6	1.2	0.0	1.5		3	9.4	10.2	11.0	23.8	25.6		11.4	3	1.4		1.2	1.3	-0.3	1.9	1.6
2	4.4	2.3	3.8	2.6	2.0	2.2		4	1.7		3.0	2.9	1.8		2.9	4	1.7	1.8	2.2	1.3	1.2	2.3	2.2
3	2.5		1.6	2.2	2.0	2.5		5	4.4	4.8	5.0	4.8	4.0		5.5	5	1.7		1.2	1.4	-0.8	2.0	1.6
4	2.9		3.0	3.3	2.0	3.0		6	25.0		26.7	22.0	23.2		27.1	6	1.6		0.9	1.8	-0.2	*AF	1.1
5	3.2	3.4	3.9	3.5	3.2	4.2		7	102.7		105.0	314.5	306.7		95.5	7	3.1	3.4	2.6	3.1	2.1	*AF	2.8
6	3.2		3.2	3.2	2.9	2.8		8	112.0	*AF	126.4	*AF	293.2		137.2	8	4.0		3.9	3.4	3.0	*AF	5.1
7	3.1		2.5	4.7	3.3	2.8		9	*AF	130.9	130.7	327.0	306.9		161.7	9	4.0		4.6	3.8	2.5	*AF	4.6
8	3.5	0.4	2.5	7.4	6.6	2.7		10	185.1		160.4	278.4	211.4		162.9	10	4.8	5.1	5.9	5.2	4.5	5.3	6.0
9	3.2		3.2	4.8	4.1	2.9		11	211.6	212.4	182.5	210.0	203.7		189.0	11	4.5		5.0	4.3	3.5	4.2	4.0
10	2.4		2.6	3.9	2.5	2.2		12	65.5		64.5	57.4	59.9		67.9	12	5.7		5.4	5.7	4.8	5.4	6.2
11	2.0	2.3	2.8	2.8	1.1	3.1		13	24.5		27.0	26.2	28.0		27.7	13	2.2	2.1	1.0	2.2	1.7	2.1	1.8
12	2.8		2.6	3.7	1.6	3.3		14	16.7	17.0	17.9	19.1	20.0		18.7	14	2.8		4.3	2.9	2.4	3.0	2.5
13	3.7		3.3	4.3	3.0	3.9		15	11.0		11.9	15.8	17.0		12.2	15	2.3		2.0	2.7	1.7	2.6	3.0
14	4.8	6.0	4.8	5.4	3.7	4.5		16	6.7		6.6	8.1	8.7		7.4	16	0.8	1.4	1.4	*AF	0.9	*AF	0.7
15	4.3		4.8	5.7	4.2	4.2		17	7.9	7.9	7.7	10.2	10.9	7.8	9.4	17	1.6		2.1	2.1	1.8	*AF	2.5
16	2.9		3.8	3.7	2.0	3.3		18	15.9		16.2	*AF	15.0	15.4	17.0	18	1.6		1.5	2.2	2.3	*AF	1.1
17	3.5	*AF	4.0	3.8		3.3		19	6.4		7.2	6.8	8.0	6.8	7.4	19	2.7	*AF	1.9	*AF	3.2	*AF	3.0
18	*AF	3.0	3.7	5.1	4.1	2.5	3.5	20	13.1	13.2	14.0	12.6	14.3	12.4	14.9	20	4.2	4.3	5.0	4.8	5.0	*AF	4.6
19	3.2		4.0	3.7	2.9	3.3	3.9	21	7.6			8.8	9.2	6.9	8.5	21	3.6		3.3	3.9		*AF	3.9
20	4.0	4.0	4.7	5.5	5.2	4.1	5.9	22	10.0			14.8	16.1	9.7	10.4	22	6.3	6.8	7.0	1.2		*AF	5.8
21	4.5		5.2	6.9	6.3	5.4	6.2	23	32.8	32.9	34.8	30.6	35.5	31.7	33.3	23	7.6		7.8	7.6		7.4	7.8
22	7.5		8.0	9.8	9.2	7.6	9.4	24	18.7		19.9	21.0	23.1	17.9	20.3	24	5.1		4.7	6.2		5.1	4.9
23	16.2	16.2	16.4	11.9	12.3	16.7	19.3	25	9.8		9.7	10.5	11.6	10.2	10.1	25	3.7	4.0	2.5	5.4		3.9	4.0
24	5.7		7.0	6.7	6.0	6.7	3.8	26	16.4	16.6	15.7	16.4	17.2	16.5	16.9	26	3.9		3.5	5.2		4.2	4.8
25	23.2		24.5	18.3	20.3	23.0	24.6	27	6.8		6.8	8.7	8.7	6.7	8.0	27	3.7		3.9	4.4		*AF	3.8
26	20.5	20.2	22.2	16.5	16.7	20.4	17.7	28	4.8		4.7	4.4	4.1	4.7	6.0	28	3.0	2.8	3.0	3.4		3.0	3.0
27	59.1		62.3	64.4	70.3	57.8	58.5	29	4.5	*AF	4.9	4.2		5.0	5.7	29	4.2		4.7	4.4		3.2	3.1
28	39.5		42.4	38.5	41.7	37.9	42.6	30	7.1	7.6	7.9	6.2		7.6	8.3	30	5.5		5.7	10.2		5.8	5.8
29	52.7	53.4	55.0	94.0	106.2	50.2	56.1	31	9.9		8.7	8.6	8.9	9.7	10.3	31	11.8	12.0	11.6	11.7	11.2	11.2	11.8
30	60.0		61.1	53.3	56.0		58.4																

*AF - Flagged data

During the 2019 fire season, some of the fires impacting the interior of Alaska ignited in mid-June and continued to burn throughout the entire period. As shown in Figure 4, spikes in PM_{2.5}

were correlated with the time period when fires in the interior were most active, strongly indicating the western fire complex from late June through early August as the source of the exceedance. Given this clear association, DEC treated all the days listed in Table 1 as a single event and attributed the elevated PM_{2.5} concentration to the numerous fires burning at that time. Daily PM_{2.5} concentrations varied with fire growth/suppression and meteorological conditions, with wind direction being the most important component. Although the PM_{2.5} concentrations varied, the cause of the elevated PM_{2.5} levels throughout the entire period was wildland fire smoke. See the Clear Causal Relationship section for a detailed breakout of fire area and smoke (PM_{2.5}) activity.

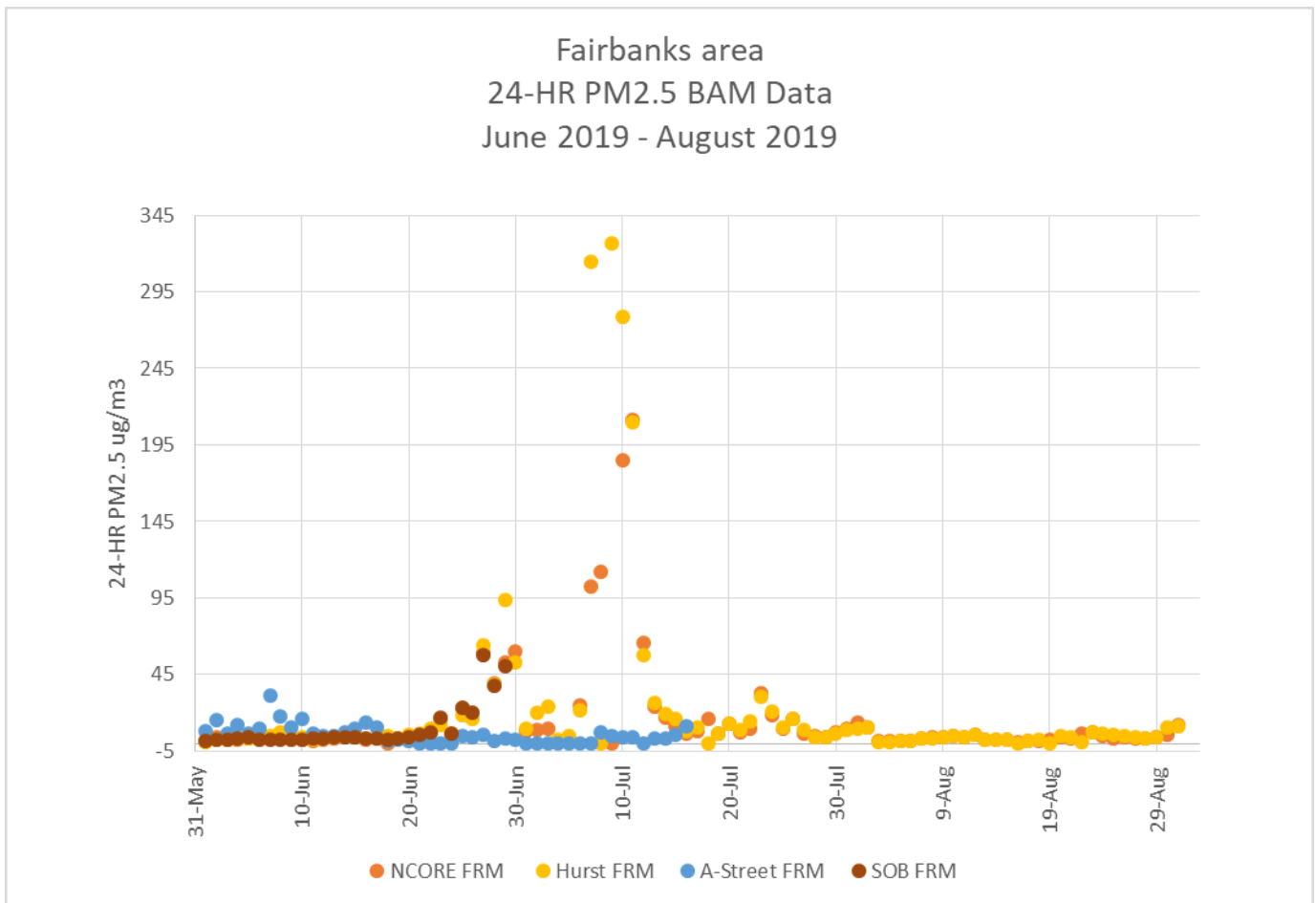


Figure 4. Fairbanks 24-HR PM_{2.5} BAM Data, June-August 2019

Meteorology

The meteorological conditions, listed below, are from the Alaska Center for Climate Assessment and Policy; in partnership with the Alaska Climate Research Center, Arctic Research Consortium of the United States (ARCUS) Sea Ice Outlook, National Center for Environmental Prediction,

and the National Weather Service; are published in the Alaska Climate Dispatch¹.

A new "blob", or large area of warm water observed in the Gulf of Alaska, named the Northeast Pacific Marine Heatwave of 2019, formed in May 2019, and reached its maximum size in August. The "blob" was a result of a high-pressure ridge over Alaska and northwest Alaska that dominated the region as a low-pressure system formed over the Bering Sea producing southwest winds along Alaska's west coast, pushing warm air from southern latitudes into the Arctic. It gradually decreased in size and intensity but is still among the most significant events seen in the past 40 years. NOAA's National Centers for Environmental Information (NCEI) ranked May's temperatures tied for the fifth warmest in the past 95 years.

2019 was the warmest year in Alaska on record with a mean temperature of 37.4 °F, breaking the previous record of 37.2 °F set in 2016 by 0.2 degrees. Alaska Statewide Climate Summary, June 2019² states:

Temperature

"Extreme and persistent warm temperatures persist also during the month of June 2019, following the trend of March, April and May. As shown in Figure 1 and Table 1, all the analyzed stations recorded above normal temperatures. Remarkably, temperature departures are almost everywhere larger than recorded in April and May 2019, placing June as the second month of this year with highest temperature departures, after March. In as much as nine stations, the mean monthly temperature was more than 4 °F warmer than the average value for the 1981-2010 period. In Anchorage, Bethel and McGrath the temperature departure was equal to or larger than 5 °F, with mean monthly values equal to respectively 60.5, 57.8 and 62.4 °F. Also, the Interior saw significantly warmer than normal conditions: Bettles, Fairbanks, Delta Junction, Talkeetna and Gulkana recorded temperature departures equal respectively to 3.1, 3.1, 3.6, 4.5, and 4.2 °F."

Precipitation

"In many locations, precipitation was significantly lower than normal in June 2019. However, precipitation departures are quite variable in space and do not present a clear spatial pattern (Figure 5, Table 3). Several stations, such as Yakutat, King Salmon, Kodiak, St. Paul Island, and Kotzebue recorded roughly half of the normal precipitation. McGrath, Bethel and Talkeetna measured around 80% of normal precipitation. Conversely, some stations, such as Juneau, Fairbanks, Bettles and Gulkana in the Interior, and Nome on the West Coast recorded close to normal precipitation. Anchorage and Homer show the lowest precipitation departures with respectively 6% and 17% of normal precipitation".

July was the warmest month of 2019 with a mean temperature of 60.2, it was also drier than normal Fairbanks recorded less than an inch of precipitation making it the driest July since 2004.

¹ https://uaf-accap.org/wp-content/uploads/2020/02/climate-dispatch-dec-2019_final.pdf

² http://akclimate.org/sites/Default/Files/201906_June_summary.pdf

Alaska Statewide Climate Summary, July 2019³ states:

Temperature

“The highest temperature departures are recorded once again in the Arctic region. The most extreme station is Kotzebue, with an impressive mean monthly temperature of 63.8°F, 9.2°F warmer than the normal for the period 1981-2010. The mean temperatures at Utqiagvik were 48.3°F, which was 7.5°F warmer than normal. Much warmer temperatures are recorded also in Southern Alaska: The observed mean monthly temperatures at Anchorage, Kodiak, King Salmon and Yakutat were 65.3°F, 60.4°F, 61.2°F, and 59.6°F, respectively 6.5°F, 5.9°F, 5.7°F, and 5.2°F warmer than normal. Likewise, St. Paul Island, Cold Bay and Juneau experienced average temperatures respectively 4.4°F, 4.2°F and 3.8°F warmer than normal values. Also, the Interior was extremely warm during July 2019. Talkeetna and Gulkana recorded 5.0 and 4.9°F warmer than normal temperatures, while McGrath and Bettles measured 4°F warmer than normal temperatures. With 66.0, 63.5, and 59.0°F, Fairbanks, Delta Junction and Bethel experienced mean monthly temperatures respectively 3.5, 3.4, and 3°F above average values of the period 1981-2020.”

Precipitation

“Following the trend of June 2019, in many locations, precipitation was significantly lower than normal in July 2019. While the western part of Alaska experienced more than normal precipitation, the eastern part saw drier than normal conditions. Many stations in the Interior, such as Bettles, Delta Junction, Fairbanks, Talkeetna recorded less than 50% of the normal precipitation for the month of July.”

Ft Yukon is located 224 km northeast of FNSB and was centered in-between the larger acreage fires to the northeast of FNSB. Table 3 gives a daily break down of Ft Yukon’s meteorology, max temperature and precipitation totals for each day, June through August. Ft Yukon’s are the most representative meteorological conditions in the interior supporting fire ignition and fire growth.

³ http://akclimate.org/sites/Default/Files/201907_July_summary.pdf

Table 3. Daily max temperature and precipitation, Ft Yukon, AK

Date	Temp C	Precip	Date	Temp C	Precip	Date	Temp C	Precip
June			July			Aug		
1	20.0	0.00	1	20.0	0.00	1	**	0.00
2	18.9	0.00	2	22.8	0.00	2	13.9	0.00
3	17.2	0.00	3	22.8	0.00	3	22.8	0.38
4	19.4	0.00	4	23.9	0.00	4	19.4	0.01
5	19.4	0.00	5	26.1	0.00	5	20.6	0.00
6	20.6	0.00	6	27.8	0.01	6	16.1	0.23
7	21.7	0.00	7	28.9	0.01	7	18.3	0.07
8	22.8	0.00	8	27.8	0.03	8	20.6	0.00
9	22.2	0.00	9	29.4	0.00	9	20.0	0.00
10	**	0.00	10	26.1	0.01	10	18.3	0.02
11	22.8	0.14	11	22.2	0.00	11	19.4	0.10
12	23.3	0.00	12	24.4	0.00	12	22.8	0.00
13	23.9	0.00	13	**	T	13	18.9	0.27
14	25.0	0.00	14	26.7	T	14	17.2	0.06
15	17.8	0.04	15	27.2	0.04	15	18.9	0.00
16	22.8	0.06	16	27.2	0.15	16	15.0	0.00
17	20.6	0.00	17	26.1	0.06	17	15.0	0.57
18	22.2	0.00	18	26.7	0.15	18	12.8	0.00
19	25.6	0.00	19	22.8	0.43	19	13.3	0.00
20	29.4	0.00	20	21.7	0.03	20	10.0	0.34
21	30.0	0.00	21	23.3	0.00	21	**	0.01
22	28.3	0.00	22	26.1	0.00	22	14.4	0.00
23	25.0	0.02	23	27.2	0.00	23	13.9	0.00
24	23.3	0.00	24	26.7	0.00	24	15.6	0.00
25	19.4	0.11	25	23.3	0.00	25	17.8	0.00
26	23.3	0.00	26	26.1	0.00	26	17.8	0.00
27	21.1	0.00	27	19.4	0.15	27	16.7	0.00
28	27.8	0.00	28	20.6	0.01	28	13.9	0.14
29	30.6	0.00	29	20.6	0.02	29	15.0	0.00
30	26.1	0.00	30	22.8	0.00	30	13.9	0.00
			31	24.4	0.00	31	24.4	0.00
Avg/Total	23.1 C	0.37		24.7 C	0.59		17.1 C	2.20
Norms	21.6 C	0.73		22.9 C	0.81		19.1 C	1.60
Above Below Avg	1.5 C	40.40%		1.8 C	17.20%		2.0 C	72.80%

The Event was Natural

Wildland fires are a common occurrence in Alaska when meteorological conditions are favorable and dry fuels are available, as they were in 2019. Since 2004, an average of 1,932,823 acres burn annually. Much of the acreage consumed lies in Interior Alaska, where the summers are relatively warm and dry. Most wildland fires are ignited by lightning and periodically burn spruce, birch, and cottonwood dominated forests. The most active lightning day during Alaska's 2019 fire season was July 11 with 25,157 recorded strikes. Overall, the heaviest concentration of strikes were located in the southern interior (Figure 5).

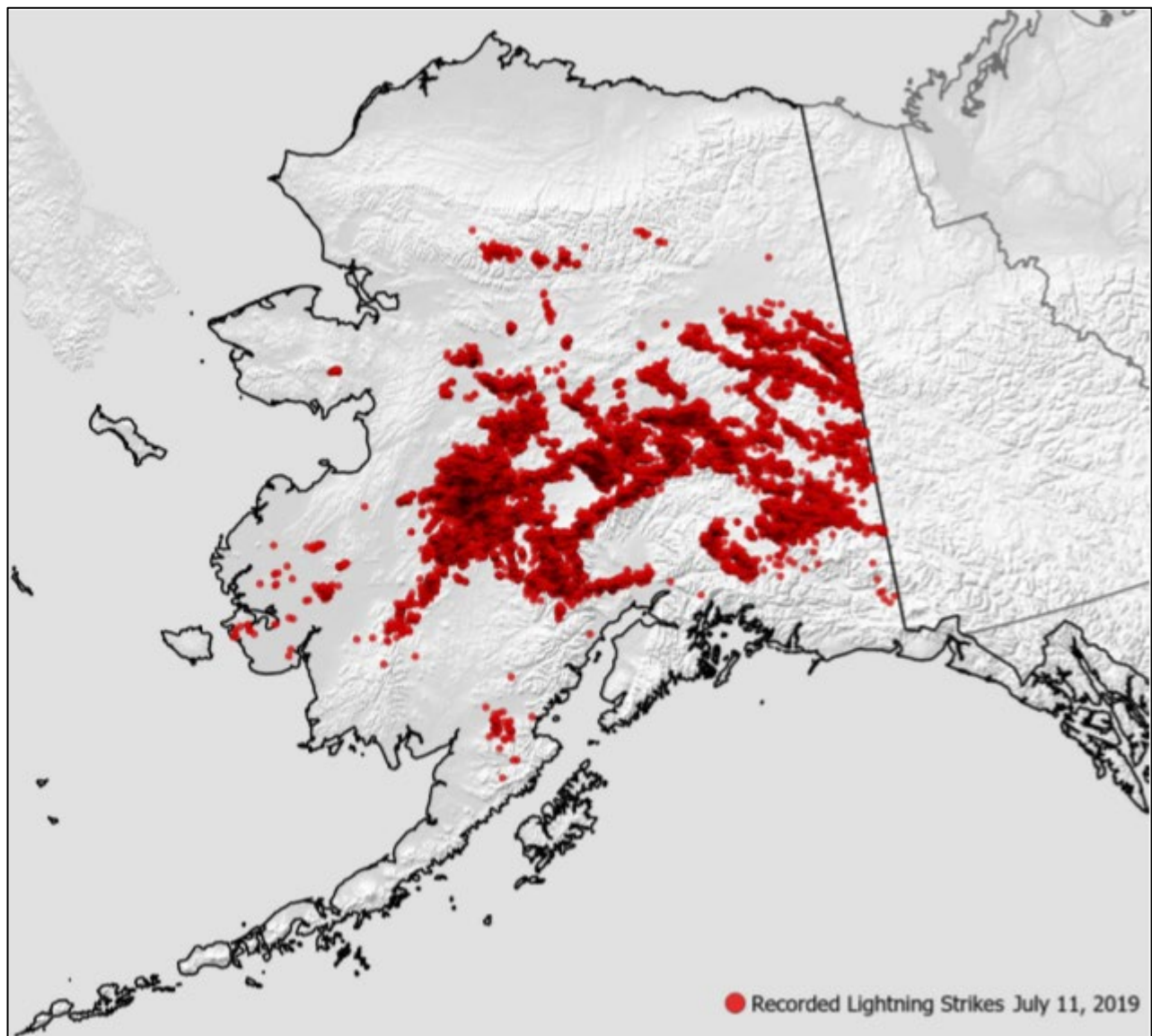


Figure 5. July 11, 2019 Alaska lightning strike map

In 2019, lightning caused fires burned 2,525,356 acres. The AFS 2019 Fire Season report⁴ described the 2019 fires season as follows:

“The 2019 season got off to a fast start as warm temperatures in March initiated an early and gentle melting of the snowpack, which allowed the threat of grass-fueled fires to arise in April. Red flag warnings were issued for the windy areas on the north side of the Alaska Range as early as April 10th and 11th, and the Oregon Lakes fire became an early-season challenge in the breezy Delta Junction area as it burned nearly 35,000 acres. As spring gave way to summer, the occasionally record-setting warmth persisted, and by early and mid-summer an active season was well underway across much of the state, with most of the significant fires, as usual, occurring in Alaska’s Interior. These fires included the 22,000-acre Shovel Creek Fire near Fairbanks, and the Chalkyitsik and Cornucopia Complexes in the Upper Yukon Valley.”

AFS determines the cause of each fire at the time the fire occurs. In 2019, the smoke that caused poor air quality in FNSB was from fires that were caused by lightning. During the June/July period, there were 33 lightning-caused fires in Interior Alaska responsible for the FNSB elevated PM_{2.5} concentrations, see Figure 3 and Figure 5 for reference.

⁴ <https://fire.ak.blm.gov/content/Weather%20Folder/Fire%20Season%20Summaries/2019%20Fire%20Season.pdf>

The Event was not Reasonably Controllable or Preventable

The events described above were not reasonably controllable or preventable by the State for several reasons. First, authority over fire protection areas is split into three major jurisdictions (Figure 6) so that smoke from fires outside of the state's jurisdiction can impact state lands. Second, the events were caused by meteorological conditions (dry weather and high fuel load as described above in the 2019 Fire Season Summary from the Alaska Fire Service) for which the State has no reasonable control. Table 4. Lists the fires and acres burned by Zone and Management Options for 2019. Table 5. shows the breakdown of the number of fires and acreage by Landowners.

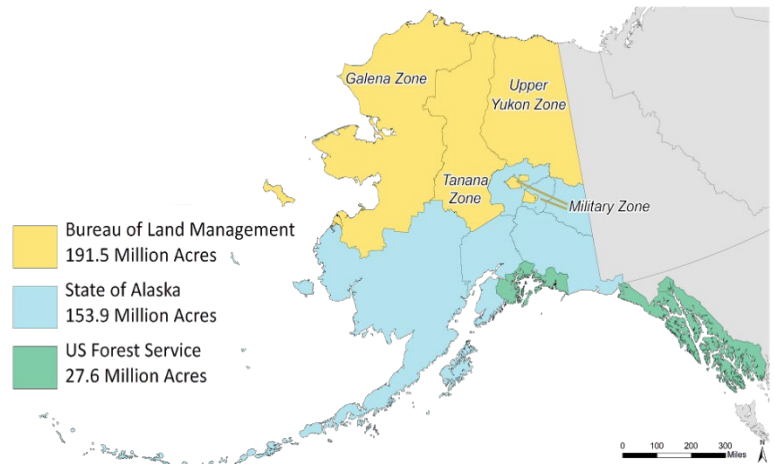


Figure 6. Alaska Wildland Fire Protection Areas

Table 4. Landowner fire activity for 2019

Landowner Agency	Fires	Acres
Bureau of Indian Affairs	10	2,215
Borough	20	3,176
Bureau of Land Management	63	479,317
Department of Defense	46	51,332
Native Claims Act Land	92	299,625
National Park Service	24	76,872
Private	142	2,752
State of Alaska	216	879,287
US Forest Service	15	11,557
US Fish and Wildlife Service	79	793,204

Table 5. Alaska Fire Services Fires and Acres Burned by Zone and Management Option for 2019

BLM Alaska Fire Service Protection Fires and Acres Burned by Zone Management Option										
Zone	Critical		Full		Modified		Limited		Totals	
	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres
Galena	0	0	11	6,000	32	25,119	42	187,656	85	218,775
Military	0	0	22	4	0	0	23	50,221	45	50,225
Tanana	0	0	8	264	5	42,108	27	311,894	40	354,266
Upper Yukon	5	35	13	8,449	10	138,818	51	922,199	79	1,069,501
Totals	5	35	54	14,717	47	206,045	143	1,471,970	249	1,692,767

State of Alaska Fires and Acres Burned by Zone Management Option										
Zone	Critical		Full		Modified		Limited		Totals	
	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres
Anch/Mat-su	106	5,150	15	7	2	51	1	0	124	5,208
Copper River	8	5	7	230	5	102	8	17,245	28	17,582
Delta	6	1	9	18,519	1	8	0	0	16	18,528
Fairbanks	14	8	19	23,668	4	15	12	30,012	49	53,703
Kenai/Kodiak	57	1,069	10	16	0	0	5	167,233	72	168,318
Southwest	1	9,345	39	94,772	18	17,126	55	471,203	113	592,446
Tok	1	2	7	15,093	0	0	5	26,245	13	41,340
Totals	193	15,580	106	152,305	30	17,302	86	711,938	415	897,125

USDA Forest Service Fires and Acres Burned by Zone Management Option										
Zone	Critical		Full		Modified		Limited		Totals	
	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres
Chugach N.F.	6	3	4	1	1	0	1	0	12	4
Tongass N.F.	6	5	21	2	4	3	3	0	34	10
Totals	12	8	25	3	5	3	4	0	46	14

In Alaska, the AFS and military units work together on fire control measures since live fire training can potentially ignite fires. Control measures include prescribed burns in the spring to reduce fuel loads, isolation or “black-lining” all the training areas, and coordination with AFS and military responders on days with live fire training. Black-lining is a procedure where the just the perimeter of an area is burned so if a fire is ignited within that area it will be contained within the perimeter’s “black-line.” Some prevention measures surrounding FNSB were taken prior to the summer fire season but the majority were cancelled due to wildland fire in the military training area. The AFS conducted prescribed burns on the Stuart Creek and Mississippi Military Reservation ranges, in accordance with the Alaska Enhanced Smoke Management Plan (ESMP) and DEC 18 AAC 50, Air Quality Control. Both ranges are burned and/or “black-lined” each spring since they are used for live fire activities throughout the year. Black-lining is a procedure where just the perimeter of an area is burned so if a fire is ignited within that area it will be contained within the perimeter’s “black-line.”

The 2019 prescribed burns played no role in the event described in this document. Figure 7 shows that the estimated amount of PM_{2.5} released during the prescribed burns (left) is much smaller than the amount released during the 2019 wildland fire events (right). The Wildfire Emissions Inventory (DEC, 2019) lists two major Prescribed Fires for the year; April slash pile burns in the Yukon Training Area West (10,488 acres), and the May range burns at Joint Base Elmendorf-Richardson (1,554 acres) (Figure 8). Table 5 shows the prescribed burn and

wildland fire acres and PM_{2.5} tonnage breakdown for the past seven years. Also included is the 2019 fire season with monthly Wildland Fire and Prescribed Burn PM_{2.5} emission totals. The prescribed burns conducted in April 2019 in the Yukon Training Area West did not result in elevated PM_{2.5} concentrations at or above the annual NAAQS of 12 µg/m³.

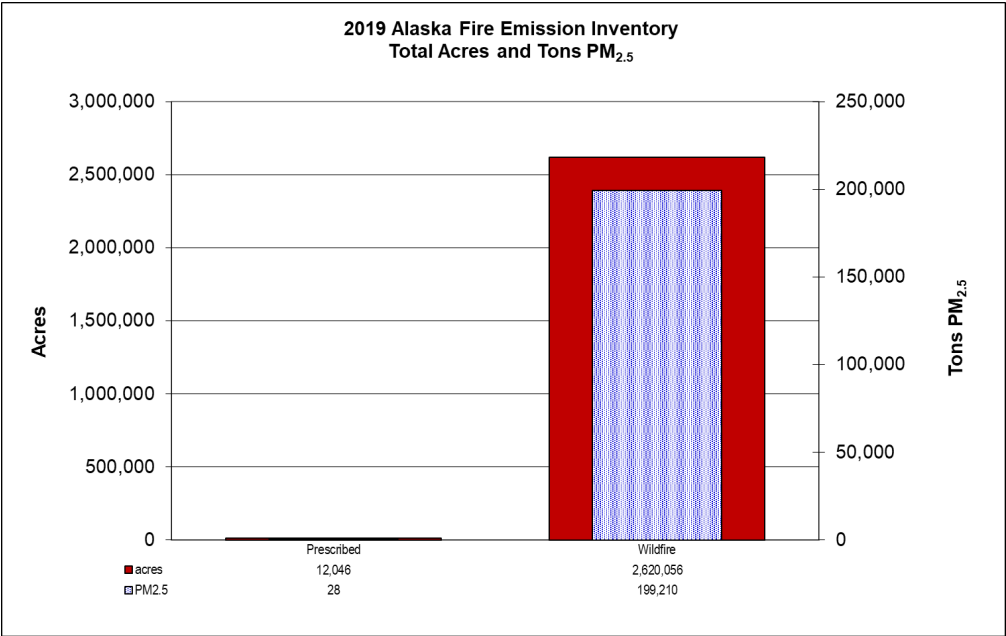


Figure 7. The number of acres burned and the tons of PM_{2.5} produced for both fire types (prescribed and wildland fire) during the 2019 season.

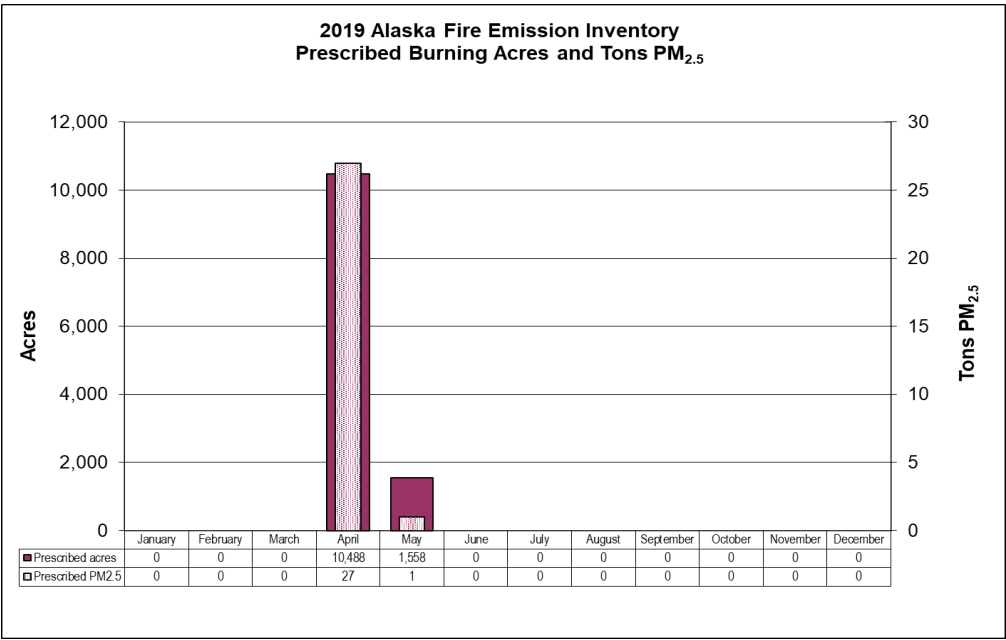


Figure 8. The total prescribed fire emissions in 2019, by month

Table 6. Prescribed Burn and Wildland Fire Acres and PM_{2.5} tonnage breakdown for the past seven years. Data from 2019 Alaska Wildland fire Emissions Inventory (DEC, 2019)

Historical Annual Fire Data							
Year	2013	2014	2015	2016	2017	2018	2019
Wildland Fire							
Acres	1,320,748	233,530	5,146,541	496,602	653,145	411,212	2,620,056
Tons PM _{2.5}	574,496	152,298	3,147,143	238,878	110,890	59,231	199,210
Prescribed Burn							
Acres	6,549	59,672	4,132	24,109	30,355	30,569	67,701
Tons PM _{2.5}	260	7,735	16	128	1,920	244	71
% of Total Emissions	0.05%	4.83%	0.001%	0.000053%	0.017%	0.004%	0.0003%
2019 Monthly Fire Data							
Month	May	June	July	August	September		
Wildland Fire							
Tons PM _{2.5}	6.5	189.1	6,190	115,723	77,099		
Prescribed Burn							
Acres	0	4	0	0	0		
Tons PM _{2.5}	0	0	0	0	0		

Table 7. Multi Year Average Fire Information

	2007-2012		2013-2018		2019	
	# Fires	Acres	# Fires	Acres	# Fires	Acres
6-yr Avg.	504	875,972	505	1,376,709		
Annual					719	2,620,056

The two major precursors to an extensive fire season in Alaska are dry meteorological conditions and ignition sources. The first of these precursors, i.e. dry meteorological conditions, cannot be reasonably controlled or prevented in Alaska. The onset of early warm temperatures in March and April initiated a slow and gradual melting of the region's below average snowpack that allowed for the threat of grass-fueled fires. The winter of 2018-2019 left much of the central interior with less than half of their average snowpack. As early as April 10th there were Red Flag warnings issued for the Tanana Flats area. The windy conditions created a challenge for fire fighters on the Oregon Lakes Fire, burning nearly 35,000 acres. The above normal temperatures continued into the summer months along with below normal precipitation for the interior. Ft Yukon record only a total of 0.96 inches of rain for the months of June and July. Fairbanks recorded 2.16 inches of

precipitation during the month of July, that is 52.80% below normal rain fall (Table 3.) By August the interior experienced enough wetting rains to dampen the fires around the FNSB area. August precipitation totals for Fairbanks were 200% above normal with 5.86 inches of rain and Ft Yukon was 72.8% above normal with 2.20 inches of rain recorded.

The very dry conditions, the large number of ignition sources (lightning), and the remoteness of Alaska make it nearly impossible to control wildfires. The remoteness and inaccessibility of most areas in Alaska make firefighting expensive and time consuming. Moreover, many of these fires cannot be controlled or extinguished by human intervention and are only extinguished by the onset of wet weather. Therefore, fires are often only monitored.

The State of Alaska, the federal land management agencies, and Alaskan Native organizations developed an interagency plan, the Alaska Interagency Wildland Fire Management Plan (AIWFMP), to address controlling wildland fires. The AIWFMP requires an annual, pre-season land manager(s)/owner(s) review of the fire protection needs on lands under their management authority. Once fire protection needs are determined, the lands are placed in the Critical, Full, Modified, or Limited management option. Option selections are based on land manager/owner(s), values to be protected, and land and resource management objectives.

The fire management strategies selected vary from initial attack and sustained suppression efforts in the critical and full management areas to surveillance in the limited management areas. This categorization and ensuing prioritization ensure that (1) human life, private property, and identified resources receive an appropriate level of protection with available firefighting resources, (2) the cost of the suppression effort is commensurate with values identified for protection, and (3) the ability of land manager(s)/owner(s) to achieve their individual management objectives is optimized.

The AIWFMP also stresses that lightning-caused wildland fires are an important component of the boreal forest and arctic tundra ecosystems, and the complete exclusion of these fires is neither ecologically sound nor economically feasible. The natural role of fire in the environment must be tempered by the need to protect human life and health, private property, developments, and certain valued natural and cultural resources.

During the fire season, suppression resources may become limited due to commitments to numerous initial attack assignments and/or large fires. The pre-fire season assignment of management options establishes priorities for allocation of suppression forces and substantially improves the cost-effectiveness of wildland fire management.

A large portion of the state has been declared as Modified or Limited management options. The Modified management option is intended to be the most flexible option available to land managers/owners. The intent of the Modified management option is to provide a higher level of protection when fire danger is high, the probability of significant fire growth is high, and the

probability of containment is low. A lower level of protection is provided when fire danger decreases, potential for fire growth decreases, and the probability of containment increases. This option should reduce commitment of suppression resources when risks are low. This option also provides increased flexibility in the selection of suppression strategies when risks are high. The Modified option provides a management level between Full and Limited. Unlike Full management areas, the intent is not to minimize burned acres, but to balance acres burned with suppression costs and to accomplish land and resource management objectives.

The Limited management option allows for even less active fire intervention. This category recognizes areas where the cost of suppression may exceed the value of the resources to be protected, the environmental impacts of fire suppression activities may have more negative impacts on the resources than the effects of the fire, or the exclusion of fire may be detrimental to the fire-dependent ecosystem. The Limited management option reduces both long-term suppression risks and costs by reducing the frequency of large fires that may burn out of boundaries of Limited management regardless of the suppression effort. It also reduces current suppression costs and makes suppression goals more attainable in years of drought and intense fire activity. The Limited management option may also be chosen for areas where fire occurrence is essential to the biodiversity of the resources protected and the long-term ecological health of the land. Suppression actions may be initiated to keep a fire within the boundary of the management option or to protect identified higher value areas/sites. Site-specific areas that warrant higher levels of protection may occur within Limited management areas. Appropriate suppression actions to protect these sites will be taken when warranted, without compromising the intent of the Limited management area.

The DEC has implemented the following mitigation strategies to prevent fires and protect public health. Prior to the fire season, mitigation is carried out in accordance with the Alaska ESMP and DEC 18 AAC 50, Air Quality Control. DEC provides a clear and equitable regulatory basis for smoke management in Alaska through the ESMP. Additionally, DEC is responsible for reviewing controlled burns for resource management, reviewing and approving land clearing applications, and issuing controlled burn approvals. DEC also ensures that controlled burn applications comply with state air quality regulations (18 AAC 50.065) and ESMP guidelines. While reduction of fuel loads is an important control factor, the ESMP clearly states that, "Evaluating potential dispersion of smoke emissions from a project is the single most important component of an effective ESMP." All resource management or land clearing of controlled burns greater than 40 acres in one year must have an approved burn permit. This permit requires the Responsible Authority to notify DEC at least 24-hours in advance of a controlled burn. Additionally, they must successfully obtain a favorable dispersion forecast from the National Weather Service and receive approval from the DEC meteorologist for their planned date. The DEC meteorologist is responsible for ensuring that air quality standards are not violated during controlled burns. While these controlled burns reduce the fire fuels load, they cannot eliminate the wildland fire risk.

DEC issues Air Quality Advisories in accordance with DEC 18 AAC 50, Air Quality Control guidance to further protect public health during periods of poor air quality. During the period of May 2 to July 28, 2019, the DEC meteorologist issued 40 advisories related to wildland fire smoke 12 of which were for the Central Interior region, which includes Fairbanks. The other 28 advisories were issued for the southwest, southcentral, and southeast areas of Alaska (Appendix B).

The Event Affected Air Quality

The PM_{2.5} 24-hour concentrations measured at the Fairbanks NCORE, SOB, A-Street and HURST monitors reflect the unusual fire conditions during the event (Table 6). The PM_{2.5} concentrations were significantly higher than the normal average (without wildland fire smoke) of 4.5 µg/m³ for summer days, between June 1 and August 31 of each year from 1999 to 2019. The concentrations (as measured by the FRM) exceeded the 24-hour NAAQS ten times during the June-July 2019 period, at the FNSB sites. Twelve days had 24-hour average concentrations above the annual NAAQS but below the 24-hour NAAQS. During the months of June through August, the PM_{2.5} concentration fluctuated from higher than average (12.1 µg/m³) to exceedance (58.0 µg/m³). The highest FRM and BAM values occurred on July 9 with values of 327.0 µg/m³ and 306.9 µg/m³, respectively (Table 7).

Table 8. Fairbanks NCORE (FRM/BAM), Hurst (FRM/BAM), A-Street (FRM/BAM) and Fairbanks State Office Building (FRM) 24-hour PM_{2.5} concentrations in summer 2019. Bold red fonts indicate a 24-hour average concentration above the 24-hour NAAQS of 35 µg/m³ and the bold black fonts indicate a 24-hour average concentration above the annual NAAQS of 12 µg/m³.

May- June	NCORE FRM	NCORE BAM	Hurst FRM	Hurst BAM	SOB FRM	A-Street BAM	July	NCORE FRM	NCORE BAM	Hurst FRM	Hurst BAM	A-Street FRM	A-Street BAM	August	NCORE FRM	NCORE BAM	Hurst FRM	Hurst BAM	A-Street FRM	A-Street BAM
26 May	17.6	17.2	33	31.6	17		1	8.3	9.3	9.8	10.4		10.2	1	13.8	14	10.1	10.5	13.8	14.5
31 May	12.5	12.7	12.2	13.2	10		2	8.8	10.7	20.1	20.8		9.1	2	10.9	10.3	10.6	9.7	10.9	12.7
1	1.5	2.6	1.2	0	1.5		3	9.4	10.7	23.8	25.6		11.4	3	1.4	1.2	1.3	-0.3	1.9	1.6
2	4.4	3.8	2.6	2	2.2		4	1.7	3	2.9	1.8		2.9	4	1.7	2.2	1.3	1.2	2.3	2.2
3	2.5	1.6	2.2	2	2.5		5	4.4	5	4.8	4		5.5	5	1.7	1.2	1.4	-0.8	2	1.6
4	2.9	3	3.3	2	3		6	25	26.7	22	23.2		27.1	6	1.6	0.9	1.8	-0.2	*AF	1.1
5	3.2	3.9	3.5	3.2	4.2		7	102.7	105	314.5	306.7		95.5	7	3.1	2.6	3.1	2.1	*AF	2.8
6	3.2	3.2	3.2	2.9	2.8		8	112	126.4		293.2		137.2	8	3.9	3.9	3.4	3	*AF	5.1
7	3.1	2.5	4.7	3.3	2.8		9	130.9	130.7	327	306.9		161.7	9	4	4.6	3.8	2.5	*AF	4.6
8	3.5	2.5	7.4	6.6	2.7		10	185.1	160.4	278.4	211.4		162.9	10	4.8	5.9	5.2	4.5	5.3	6
9	3.2	3.2	4.8	4.1	2.9		11	211.6	182.5	210	203.7		189	11	4.5	5	4.3	3.5	4.2	4
10	2.4	2.6	3.9	2.5	2.2		12	65.5	64.5	57.4	59.9		67.9	12	5.7	5.4	5.7	4.8	5.4	6.2
11	2	2.8	2.8	1.1	3.1		13	24.5	27	26.2	28		27.7	13	2.2	1	2.2	1.7	2.1	1.8
12	2.8	2.6	3.7	1.6	3.3		14	16.7	17.9	19.1	20		18.7	14	2.8	4.3	2.9	2.4	3	2.5
13	3.7	3.3	4.3	3	3.9		15	11	11.9	15.8	17		12.2	15	2.3	2	2.7	1.7	2.6	3
14	4.8	4.8	5.4	3.7	4.5		16	6.7	6.6	8.1	8.7		7.4	16	0.8	1.4	*AF	0.9	*AF	0.7
15	4.3	4.8	5.7	4.2	4.2		17	7.9	7.7	10.2	10.9	7.8	9.4	17	1.6	2.1	2.1	1.8	*AF	2.5
16	2.9	3.8	3.7	2	3.3		18	15.9	16.2		15	15.4	17	18	1.6	1.5	2.2	2.3	*AF	1.1
17	3.5	4	3.8		3.3		19	6.4	7.2	6.8	8	6.8	7.4	19	2.7	1.9	*AF	3.2	*AF	3
18	3	3.7	5.1	4.1	2.5	3.5	20	13.1	14	12.6	14.3	12.4	14.9	20	4.2	5	4.8	5	*AF	4.6
19	3.2	4	3.7	2.9	3.3	3.9	21	7.6		8.8	9.2	6.9	8.5	21	3.6	3.3	3.9		*AF	3.9
20	4	4.7	5.5	5.2	4.1	5.9	22	10		14.8	16.1	9.7	10.4	22	6.3	7	1.2		*AF	5.8
21	4.5	5.2	6.9	6.3	5.4	6.2	23	32.8	34.8	30.6	35.5	31.7	33.3	23	7.6	7.8	7.6		7.4	7.8
22	7.5	8	9.8	9.2	7.6	9.4	24	18.7	19.9	21	23.1	17.9	20.3	24	5.1	4.7	6.2		5.1	4.9
23	16.2	16.4	11.9	12.3	16.7	19.3	25	9.8	9.7	10.5	11.6	10.2	10.1	25	3.7	2.5	5.4		3.9	4
24	5.7	7	6.7	6	6.7	3.8	26	16.4	15.7	16.4	17.2	16.5	16.9	26	3.9	3.5	5.2		4.2	4.8
25	23.2	24.5	18.3	20.3	23	24.6	27	6.8	6.8	8.7	8.7	6.7	8	27	3.7	3.9	4.4		*AF	3.8
26	20.5	22.2	16.5	16.7	20.4	17.7	28	4.8	4.7	4.4	4.1	4.7	6	28	3	3	3.4		3	3
27	59.1	62.3	64.4	70.3	57.8	58.5	29	4.5	4.9	4.2		5	5.7	29	4.2	4.7	4.4		3.2	3.1
28	39.5	42.4	38.5	41.7	37.9	42.6	30	7.3	7.8	6.2		7.6	8.3	30	5.4	5.7	10.2		5.8	5.8
29	52.7	55	94	106.2	50.2	56.1	31	9.9	8.7	8.6		9.7	10.3	31	11.8	11.6	11.7	11.2	11.2	11.8
30	60	61.1	53.3	56		58.4														

PM_{2.5} Concentrations Exceeded Historical Fluctuations (HF)

Summertime PM_{2.5} concentrations in the interior of Alaska are directly related to wildland fires. Analysis of the FRM filter data from NCORE, SOB, A-Street, and HURST showed an average summertime 24-hour concentration of 4.5 µg/m³ when wildland fires were excluded. This value was computed by averaging all data for the months of June through August for 1999 through 2019, after removing any data that had been flagged by DEC in EPA's AQS as an exceptional event or influenced by wildfire emissions. Another measure of concentrations to be expected for summers without appreciable wildland fire smoke impacts is using the 95th percentile of low fire summer concentrations. In Table 8 shows the ten previous low fire years' 95th percentile without removing any flagged data. The years included in the analysis are those with annual burned acreage of less than 1 million acres. The average PM_{2.5} 95th percentile concentration of these ten years (2003, 2006-2008, 2011, 2012, 2014, and 2016-2018) at the SOB is 8.2 µg/m³, NCORE is 7.3 µg/m³ and Hurst Road is 12.2 µg/m³.

Table 9. Low fire years, June through August, PM_{2.5} 95th percentile

FRM	%	2003	2006	2007	2008	2011	2012	2014	2016	2017	2018	Avg
SOB	95th	7.0	16.9	7.4	5.7	4.4	5.2	4.2	6.7	12.4	12.2	8.2
NCORE	95th	NA	NA	NA	NA	3.8	6.5	4.6	5.7	10.2	12.9	7.3
NPF	95th	NA	NA	NA	NA	NA	12.6	NA	6.7	13.6	15.7	12.2

Wildland fires occur in Alaska every year, primarily between June and September. In the last 20 years the average annual acreage burned by wildland fire in Alaska is 1,576,818 acres. However, the annual acreage burnt can vary greatly, from as low as 103,299 acres (2008), to as high as 6,523,816 acres (2004) (Table 9). The number of wildland fires and the area burned each year vary with meteorological conditions and locations of fires. Wildland fires are rare during years with predominantly wet meteorological conditions, but they can be widespread in years with dry to exceptionally dry conditions. Long periods of dry conditions in May, June, and July 2019 (Table 3) set the system in motion by allowing extensive areas of wildlands to accumulate fire fuels. The high fuel loads and dry conditions led to wildland fires when an ignition source (lightning) was added.

The fire potential outlook for the 2019 fire season was “above normal” for the southeastern half of the state in May, then “normal” statewide for the rest of the season. A low snowpack and warm, dry spring led to an early melt and concerns for extremely dry fuels to start the fire season. The outlook for the summer was warmer than normal and the Fine Fuel Moisture Codes were at very high values.

The monthly climate summaries below are from the Geophysical Institute in Fairbanks⁵.

The May 2019 Climate Summary from the University of Fairbanks Geophysical Institute states: Fairbanks mean monthly temperature was recorded as 53.8°F, 4.4°F above the normal 49.4°F. The mean maximum temperature for the month was 65.2°F. The highest temperature for the month was 75°F which was recorded on multiple days. The coldest temperature for the month was 29.1°F which occurred on the May 7. The 0.60 inches of precipitation that were measured for the month was just 60% of the expected amount. There was 1.0 in of snowfall, while 0.9 inches is the normal long- term amount. The highest wind speed was 29 mph from an easterly direction on the 15th, while the average wind speed was 6.6 mph.

The June 2019 Climate Summary from the University of Fairbanks Geophysical Institute states: Fairbanks mean monthly temperature was recorded as 63.5°F, 3.1°F above the normal 60.4°F. The coldest temperature for the month was 44°F, which occurred on the 3rd and 4th. The warmest temperature was 89°F on the 29th. The 1.5 inches of precipitation that was measured for the month was just a little over the expected amount.

The first week of June was cooler than normal, but the temperatures crept back to normal quickly with very low relative humidity reported around the Interior and Southcentral Alaska. The fire season ramped up quickly on June 26, an unprecedented lightning event began and lasted through June 26. More than 65,000 lightning strikes were recorded during that period causing 270 ignitions. During the next three weeks, an average of one million acres burned per week.

Table 10. Wildland Fire History of Alaska 2000 – 2019

Year	Acres burned	# Fires
2000	756,296	369
2001	218,113	351
2002	2,186,682	544
2003	602,146	465
2004	6,523,816	696
2005	4,649,597	624
2006	270,539	305
2007	649,411	506
2008	103,299	368
2009	2,951,592	527
2010	1,125,419	688
2011	293,018	515
2012	286,888	418
2013	1,320,752	612
2014	293,202	377
2015	5,150,673	766
2016	500,949	572
2017	652,904	353
2018	411,176	362
2019	2,589,893	719

⁵ http://akclimate.org/sites/Default/Files/2019_AnnualReport.pdf

Historically, all PM_{2.5} exceedances and major fire periods in Alaska have occurred between June 1 and August 31. Therefore, the DEC has identified this time range as Alaska’s annual “fire season.” Occasionally a high number of fires occur during a single year, resulting in higher PM_{2.5} concentrations for that fire season. These “fire years” (2000, 2004, 2005, 2009, 2015, and 2019) show significantly elevated PM_{2.5} concentrations for the FNSB (Figure 10). In particular, 2004 was the worst fire year/season since sampling began in Alaska. The PM_{2.5} concentrations for this year are so much higher than any year on record that the upper bounds could not be displayed in Figure 10 without making the variation among the other 19 years indistinguishable. The 90th percentile for PM_{2.5} (green box) in 2004 was over 280 (µg/m³) and the highest values recorded exceeded 700 (µg/m³).

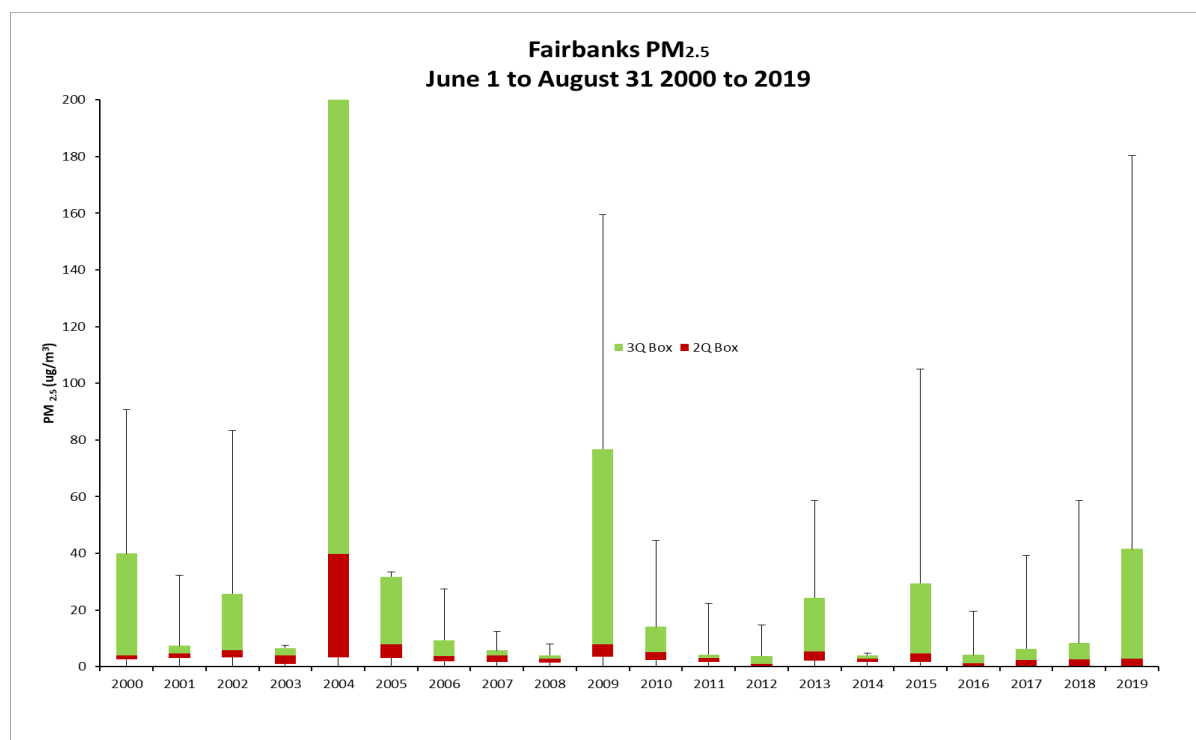


Figure 9. Fairbanks PM_{2.5} concentrations for the 2000-2019 fire seasons. The upper box (green) represents data from the median to the 90th percentile. The lower (red) boxes represent data from the median down to the 10th percentile. The “whiskers” indicate the values between the top (bottom) of the box, 90th (10th) percentile to the highest (lowest) values.

The 2019 fire season included seven fires within close proximity (100 km) of FNSB, resulting in higher PM_{2.5} concentrations than any of the most recent fire years (2004, 2005, 2009, 2015) that burned more acreage.

Clear Causal Relationship

This section establishes the clear causal relationship between the smoke from the wildland fires in the Interior of Alaska during the summer of 2019 and the PM_{2.5} concentrations in Fairbanks measured between May 26 and July 26. The following section describes the major fires impacting air quality in Fairbanks during these periods. This includes a daily description of fire locations, measured PM_{2.5} concentrations, Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) backward trajectory forecasts, meteorological observations, and other pertinent data for each day as needed to show the origin and extent of fire smoke. These products are arranged in chronological order, by day, for each day of the 2019 event. Additionally, a data narrative is included in this section which describes the daily changes that occurred during this event.

Description of Major Fires:

There was a total of 719 wildland fires and a total of 2,589,893 acres burned in Alaska in 2019. Overall, 2019 wildfires burned 1 million acres more than the average acreage burned annually in Alaska over the last 20 years. (Table 9). The elevated PM_{2.5} levels measured in Fairbanks in the summer of 2019 were related to the location of the fires in relation to Fairbanks and the number of fires that occurred.

Figure 11 shows where the fires were in relation to Fairbanks.

Lightning strikes caused a massive ignition of fires surrounding Fairbanks during the third week of June and second week of July. Roughly 25,000 lightning strikes were recorded during the second week of July. The FNSB experienced significantly elevated

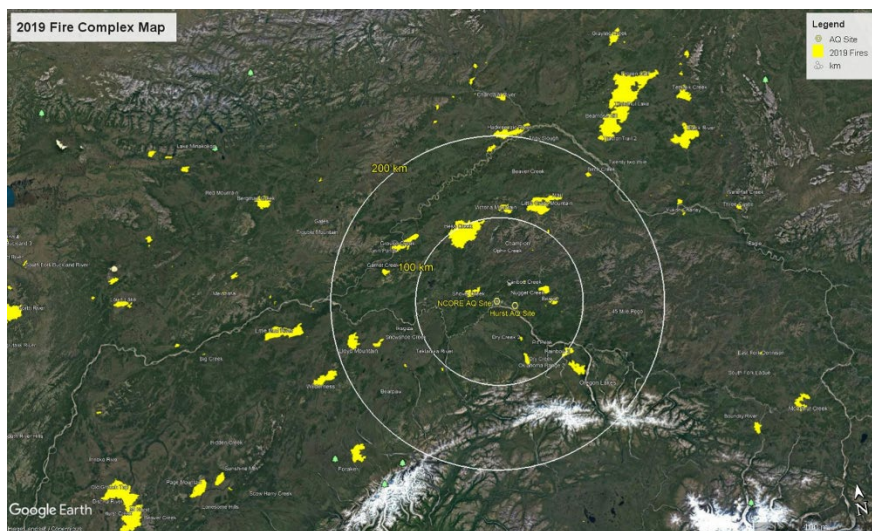


Figure 10. Wildland fires that impacted FNSB in the summer of 2019.
http://afsmaps.blm.gov/imf_firehistory/imf.jsp?site=firehistory

PM_{2.5} concentrations from the fire complex the second week of July for six days. Figure 12 provides a summary of the fires that were burning, and the total acreage burned by the end of the summer.

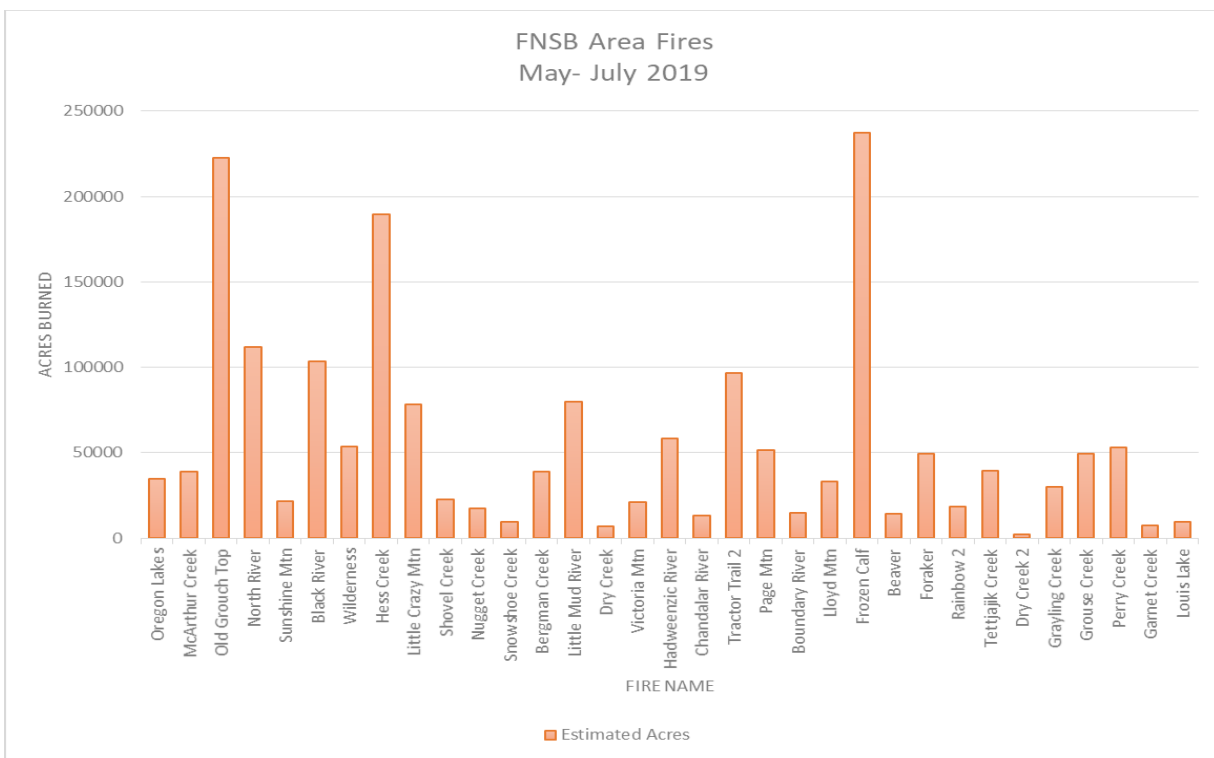


Figure 11. Estimated Acres burned for Interior Alaska fires

June/July Event

The dry and hot conditions as discussed in the meteorology section above set the stage for the rapid spread of fires throughout Alaska. On July 3 the AFS, Predictive Services Branch issued a “Fuels and Fire Behavior Advisory” for the Upper Yukon and Southcentral Alaska. On July 11 the AFS, Predictive Services Branch issued and updated the “Fuels and Fire Behavior Advisory” for the Boreal Interior, Southcentral, and Southwest Alaska. Parts of these advisories are quoted below (Complete advisories are available in Appendix E):

Fuels and Fire Behavior Advisory July 3, 2019

Subject: Exceptional landscape flammability and widespread ongoing large fire growth.

Discussion: The Buildup Index, or BUI, is the best indicator of seasonal severity and overall flammability in the boreal forest here in Alaska. It represents deeper drying in the duff layers and greater fuel availability. Commonly, large fire problems occur from mid-June to mid-July surrounding the summer solstice when long days are accompanied with precipitation deficits that produce elevated BUI levels. And in extreme years, like 2004, they can continue into August under drought conditions.

Difference from normal conditions: The current year is well above the typical pattern and actually trending along the historic maximum values for each day since

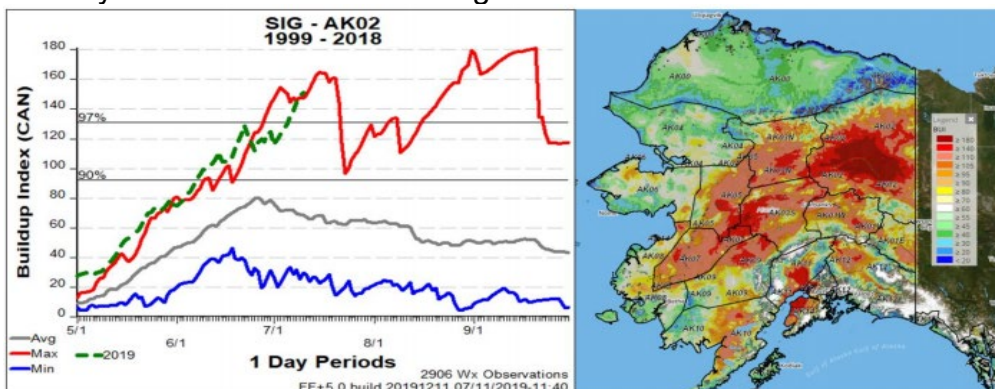
May 1. Multiple wetting rains adding up to more than an inch over several days will be needed for lasting relief.

Fuels and Fire Behavior Advisory July 11, 2019

Subject: Exceptional landscape flammability and widespread ongoing large fire growth.

Discussion: The Buildup Index, or BUI, is the best indicator of seasonal severity and overall flammability in the boreal forest here in Alaska. It represents deeper drying in the duff layers and greater fuel availability. Commonly, large fire problems occur from mid-June to mid-July surrounding the summer solstice when long days are accompanied with precipitation deficits that produce elevated BUI levels. And in extreme years, like 2004, they can continue into August under drought conditions.

Difference from normal conditions: The graph below shows the current 2019 BUI season trend overlaid on the historic climatology for combined stations in the Upper Yukon Predictive Service Area. Current trend is well above the 97th percentile and trending with new daily records. Multiple rain events totaling more than an inch over several days will be needed for lasting relief.



Area of Concern: Large fire growth and new starts that resist control and require life and property protections continue throughout interior and southern Alaska PSAs despite forecasted short-term moderation. BUIs, shown in red colors on the map, are expected to remain above critical thresholds of 100, highlighting control and extinguishment difficulty as fires continue to burn.

During the week when these advisories were issued, there were dramatic increases in fires due to lightning strikes in Interior Alaska. On July 11, the day the Fuels and Fire Behavior Advisory was updated, there were a total of 25,157 lightning strikes in Alaska (Figure 5). Table 10 lists the 2019 Interior Alaska fires, the majority of which make up the complex of fires identified in Figure 11 and show the estimated fire growth over a two-week period. Many of the fires saw rapid growth after ignition, by July 6 approximately 1,312,956 acres had burned in close proximity to FNSB.

Table 11. Rapid growth of fires in Interior Alaska

Fire Name	Discovery Date	Acreage		Growth (Acres)	Estimated Total Acres
	April	Initial	1-Jun-19		
Oregon Lakes	4/30	30	29,296	29,266	34,740
	May	Initial	1-Jun-19		
McArthur Creek	5/21	150	5,000	4,850	38,955
	June	Initial	15-Jul-19		
Old Grouch Top	6/5	20	222,709	222,689	222,709
North River	6/10	60	91,275	91,215	111,898
Sunshine Mtn	6/14	55	16,393	16,338	21,850
Black River	6/18	15	40,948	40,933	103,269
Wilderness	6/20	10	36,510	36,500	53,411
Hess Creek	6/21	52	172,548	172,496	189,369
Little Crazy Mtn	6/21	100	43,181	43,081	78,132
Shovel Creek	6/21	300	23,948	23,648	22,488
Nugget Creek	6/21	150	15,963	15,813	17,499
Snowshoe Creek	6/21	10	1,900	1,890	9,450
Bergman Creek	6/21	1,000	38,760	37,760	38,760
Little Mud River	6/21	10	43,959	43,949	79,674
Dry Creek	6/22	3	7,125	7,122	7,125
Victoria Mtn	6/22	30	7,881	7,851	20,923
Hadweenzic River	6/22	500	46,034	45,534	58,363
Chandalar River	6/22	1	9,108	9,107	12,977
Tractor Trail 2	6/22	1	41,805	41,804	96,784
Page Mtn	6/22	17	33,786	33,769	51,348
Boundary River	6/23	1,689	14,913	13,224	14,913
Lloyd Mtn	6/23	15	29,446	29,431	32,973
Frozen Calf	6/24	3,600	135,085	131,485	237,494
Beaver	6/26	50	13,854	13,804	14,316
Foraker	6/26	136	45,000	44,864	49,477
Rainbow 2	6/29	150	11,919	11,769	18,453
	July	Initial	1-Aug-19		
Tettjajik Creek	7/2	100	16,513	16,413	39,305
Dry Creek 2	7/9	0.1	2,396	2,396	2,396
Grayling Creek	7/10	0.1	30,080	30,080	30,080
Grouse Creek	7/10	150	49,121	48,971	49,320
Perry Creek	7/12	2200	53,107	50,907	53,107
Garnet Creek	7/15	10	7,521	7,511	7,521
Louis Lake	7/16	25	9,489	9,464	9,489
	Total Acres	10,639	1,346,573	1,179,656	1,646,838

Daily Breakdown of the Event:

The following section describes the daily smoke impact to the FNSB sampling sites. The daily changes in PM_{2.5} concentrations in Fairbanks and North Pole for the period May 26 through July 26 are described by terrain maps, satellite imagery, and modeling. The evidence presented for each day includes Moderate Resolution Imaging Spectroradiometer (MODIS) satellite imagery, Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model backwards trajectory forecasts overlaid on terrain maps and MODIS imagery, and hourly PM_{2.5} concentrations. Supporting evidence from observational data, meteorology, and firefighting efforts are used to describe each day in the period.

Primary observational PM_{2.5} concentrations were collected from the Fairbanks NCORE, A-Street, State Office Building SOB, and North Pole HURST FRM monitors. Secondary data were collected from the collocated NCORE FRM monitors. The primary FRM data are PM_{2.5} 24-hour averaged filters run on a daily schedule. The secondary FRM data are PM_{2.5} 24-hour averaged filters run on a 1-in-3-day schedule. The continuous data are from a BAM at the NCORE, A-Street and HURST sites. The BAM data are included for completeness and to fill in for days when FRM data are not available.

The PM_{2.5} data underwent quality assurance and control by DEC staff and meet the requirements as defined in the State Quality Assurance Plan. The PM_{2.5} concentration graphs consist of 24-hour run concentrations for 2019 fire season days from the FRM's at SOB, NCORE, A-Street, and HURST sites, which operated on a daily and 1-in-3 schedule. Also included are the NCORE, A-Street and HURST BAM PM_{2.5} hourly average concentrations of the 27 days identified below. The data capture for individual hours was 97.9% (1904 of 1944 hours). The raw data was compiled from EPA's AQS. The 24-hour NAAQS and Annual NAAQS are identified by black dashed lines in the graph. Also added to each graph is the low year 95th percentile concentration for the corresponding month. This monthly 95th percentile value was calculated by averaging the 24-hour PM_{2.5} concentration by month for low fire years and excluding all data flagged by DEC as caused by an exceptional event during those low fire years so that the remaining data would exclude most fire/smoke impacts. The monthly low year 95th percentile concentration is identified on each graph by a solid green line.

All weather observation data were downloaded from the National Center for Environmental Information (NCEI) and were subject to their quality control process (<http://www7.ncdc.noaa.gov/CDO/dataproduct>). The MODIS imagery was downloaded from <https://worldview.earthdata.nasa.gov/>. The HYSPLIT model information and model runs are available online from http://www.arl.noaa.gov/HYSPLIT_info.php.

The HYSPLIT Model outputs were created via the Air Resources Laboratory HYSPLIT-Web

(Internet-based) program utilizing archived GDAS (0.5 degree, global, 09/2007-present) for back-trajectory calculations at 100m, 500m, and 1000m elevations. The outputs were generated for 0400L, 1000L, 1600L, 2200L (12Z, 18Z, next day 00Z, next day 06Z), which helped identify the wind pattern/air parcel movement throughout the day. Overlaying multiple transport levels onto Google Earth imagery of the western fire complex makes it easier to identify specific wind flow patterns that were the main transport mechanism for smoke into FNSB.

Each Google Earth map was overlaid with a NASA Worldview image compiled from polar orbiting satellites that capture daily images of Alaska during the afternoon hours. Posting the HYSPLIT trajectory levels next to or overlaying them on the satellite imagery, provides a representation of the smoke plumes responsible for the elevated PM_{2.5} concentrations at FNSB. A brief description of the imagery follows each picture.

Twenty four-hour raw observation data from Fairbanks International Airport and Ft. Wainwright was obtained via MesoWest, University of Utah Department of Atmospheric Sciences. Tables of hourly meteorological conditions, on individual days, were created to show specific time of day that smoke impacted Fairbank. The visibility observations from the airports and the PM_{2.5} concentration readings specific times helped determine the Air Quality Index (AQI) category for the surrounding area. The wind data, in conjunction with the HYSPLIT back trajectories, provide the information needed to track air parcel/smoke movement.

May 26, 2019

Alaska Interagency Coordination Center (AICC) Report Fire Information: There were four new fires reported, for a total of 133 active fires burning statewide. At this point in the 2019 fire season 22,083.4 acres have been burned, which was a 24-hour increase of 540 acres from the previous day.

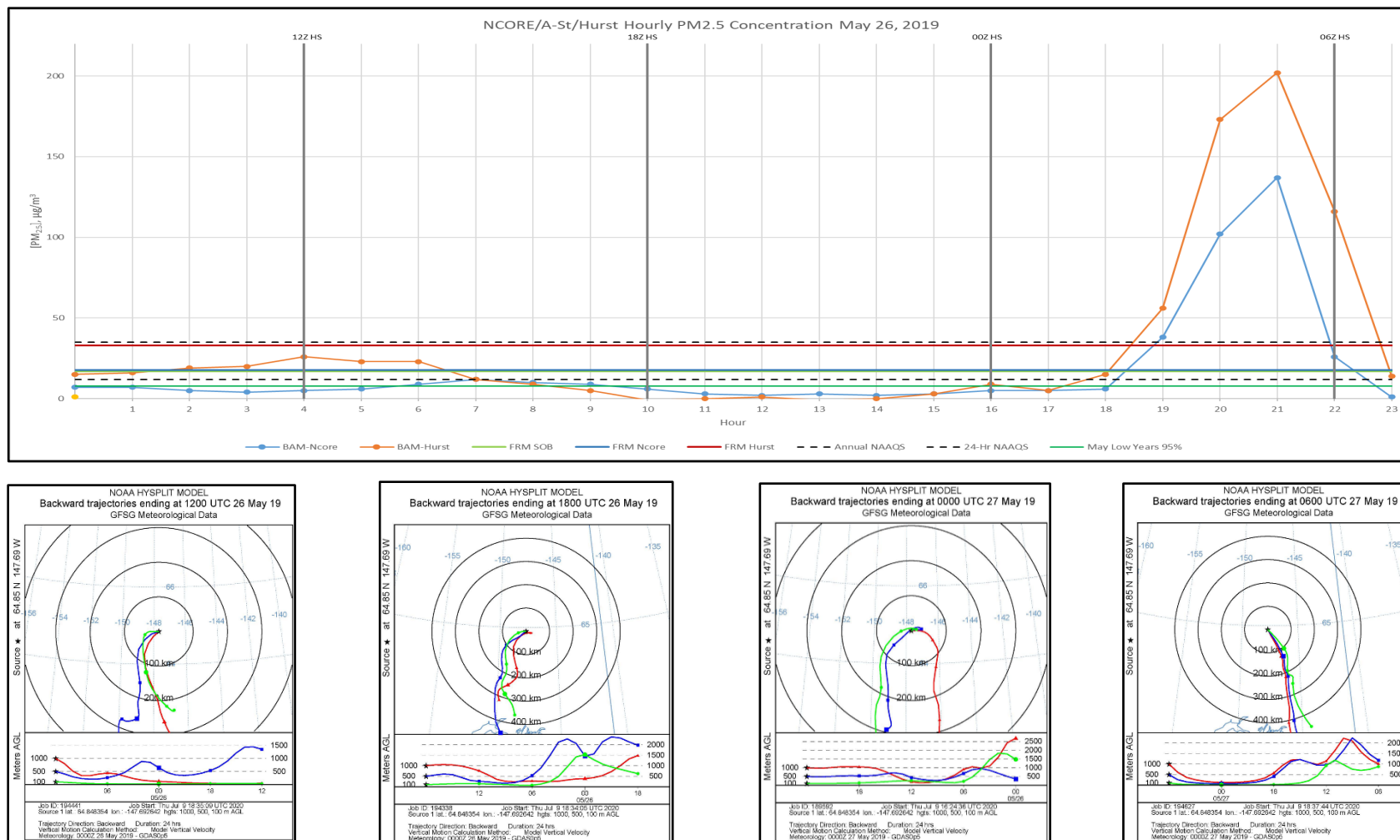


Figure 12. FNSB PM_{2.5} concentrations, NAAQS Annual/24-hour Standard, and 6-hr HYSPLIT runs for May 26, 2019

PM_{2.5} data: Figure 12 depicts the hourly PM_{2.5} concentration increase gradually beginning at 1800L. Concentrations dropped during the late evening, early morning hours as the flow changed to a more southerly component. The maximum hourly concentrations were above 140 µg/m³ in the late evening hours. At NCORE the continuous BAM PM_{2.5} 24-hour average concentration was 17.2 µg/m³ and the FRM PM_{2.5} 24-hour average concentration was 17.6 µg/m³. At HURST the continuous BAM PM_{2.5} 24-hour average concentration was 31.6 µg/m³ and the FRM PM_{2.5} 24-hour average concentration was 33.0 µg/m³. At SOB the FRM PM_{2.5} 24-hour average concentration was 17.0 µg/m³.

HYSPLIT trajectory: The HYSPLIT model indicates flow at the 100m/500m/1000m levels from the south throughout the day. The 00Z HYSPLIT run has been overlaid on the Google Earth image (Figure 13). The Oregon Lakes/Oklahoma Range combined fire to the southeast experienced moderate growth during this period and elevated PM_{2.5} concentrations are a result of the smoke being advected into FNSB.

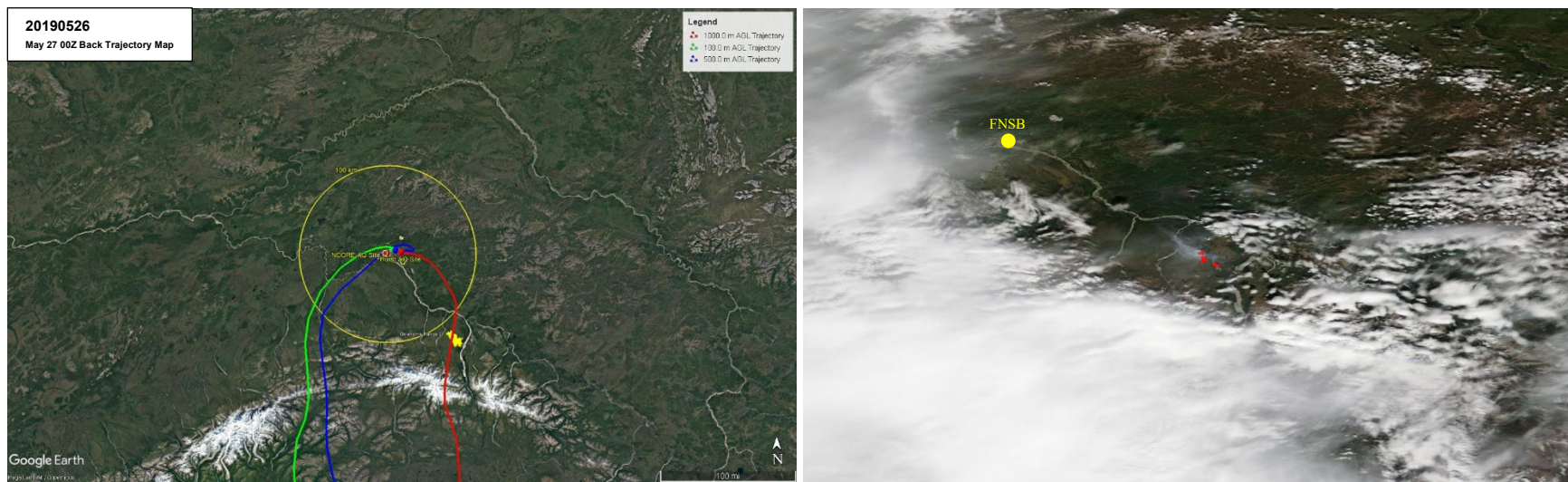


Figure 13. Google Earth image with 2019 Oregon Lakes/Oklahoma Range combined fire Perimeter and 27/00Z (26/1600L) HYSPLIT 100m (Green)/500m (Blue)/1000m (Red) back trajectory. May 26, 2019 MODIS satellite imagery of smoke near FNSB.

MODIS image: The trajectory overlay onto the Google Earth map for May 26, 2019 shows the 100m trajectory passing directly through the Oregon Lakes/Oklahoma Range combined fire (yellow shaded area) to the southeast of Fairbanks. Smoke is visible May 26 on the early afternoon MODIS imagery. Smoke from this fire traveled to the FNSB area around 6pm (AST) that same evening (Figure 14).

Table 12. Hourly observation for Fairbanks International Airport, May 26, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	05/26/2019 00:53 AKDT	0	0	**	**	10	61	44
PAFA	05/26/2019 01:53 AKDT	0	0	**	**	10	60	42
PAFA	05/26/2019 02:53 AKDT	0	0	**	**	10	58	40
PAFA	05/26/2019 03:53 AKDT	5	340	**	**	10	59	37
PAFA	05/26/2019 04:53 AKDT	6	340	**	**	10	58	37
PAFA	05/26/2019 05:53 AKDT	3	230	**	**	10	57	38
PAFA	05/26/2019 06:53 AKDT	0	0	**	**	10	57	41
PAFA	05/26/2019 07:53 AKDT	0	0	**	**	10	58	40
PAFA	05/26/2019 08:53 AKDT	0	0	**	**	10	61	42
PAFA	05/26/2019 09:53 AKDT	0	0	**	**	10	62	42
PAFA	05/26/2019 10:53 AKDT	0	0	**	**	10	64	40
PAFA	05/26/2019 11:53 AKDT	3	100	**	**	10	66	42
PAFA	05/26/2019 12:53 AKDT	0	0	**	**	10	68	39
PAFA	05/26/2019 13:53 AKDT	0	0	**	**	10	69	39
PAFA	05/26/2019 14:53 AKDT	0	0	**	**	10	71	40
PAFA	05/26/2019 15:53 AKDT	5	360	**	**	10	73	41
PAFA	05/26/2019 16:53 AKDT	7	330	**	**	10	72	42
PAFA	05/26/2019 17:53 AKDT	8	330	**	**	10	73	43
PAFA	05/26/2019 18:53 AKDT	14	350	**	**	10	75	45
PAFA	05/26/2019 19:53 AKDT	10	90	17	7 (Smoke)	9	75	45
PAFA	05/26/2019 20:53 AKDT	6	90	**	7 (Smoke)	7	71	47
PAFA	05/26/2019 21:53 AKDT	5	110	**	7 (Smoke)	6	69	48
PAFA	05/26/2019 22:53 AKDT	5	200	**	**	10	64	47
PAFA	05/26/2019 23:53 AKDT	6	200	**	**	10	62	47

Table 13. Hourly observation for Ft. Wainwright, May 26, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	05/26/2019 00:58 AKDT	0	0	**	**	10	60	44
PAFB	05/26/2019 01:58 AKDT	0	0	**	**	10	59	45
PAFB	05/26/2019 02:58 AKDT	7	270	**	**	10	57	44
PAFB	05/26/2019 03:58 AKDT	3	240	**	**	10	61	38
PAFB	05/26/2019 04:58 AKDT	3	50	**	**	9	55	42
PAFB	05/26/2019 05:58 AKDT	0	0	**	**	10	53	43
PAFB	05/26/2019 06:58 AKDT	0	0	**	**	8	53	42
PAFB	05/26/2019 07:58 AKDT	0	0	**	**	10	54	42
PAFB	05/26/2019 08:58 AKDT	0	0	**	**	9	57	42
PAFB	05/26/2019 09:58 AKDT	0	0	**	**	10	61	43
PAFB	05/26/2019 10:58 AKDT	3	260	**	**	10	64	42
PAFB	05/26/2019 11:58 AKDT	0	0	**	**	10	66	40
PAFB	05/26/2019 12:58 AKDT	6	260	**	**	10	69	40
PAFB	05/26/2019 13:58 AKDT	0	0	**	**	10	69	40
PAFB	05/26/2019 14:58 AKDT	0	0	**	**	10	74	41
PAFB	05/26/2019 15:58 AKDT	6	360	**	**	8	74	42
PAFB	05/26/2019 16:58 AKDT	7	320	**	**	7	73	42
PAFB	05/26/2019 17:58 AKDT	0	0	**	**	10	75	43
PAFB	05/26/2019 18:58 AKDT	8	90	**	**	7	77	45
PAFB	05/26/2019 19:58 AKDT	13	110	**	**	10	74	44
PAFB	05/26/2019 20:58 AKDT	8	100	**	**	8	73	46
PAFB	05/26/2019 21:58 AKDT	6	70	**	6 (Haze)	5	70	46
PAFB	05/26/2019 22:58 AKDT	5	80	**	**	9	66	46
PAFB	05/26/2019 23:58 AKDT	0	0	**	**	10	63	48

Surface observations: Tables 12 and 13 show the evening winds with an east to southeast component and a slight visibility drop due to smoke in the area (Figure 14, 1800-2200L). During the late evening the winds shifted to a more southerly component, visibility increased, and the smoke dissipated. The morning observations for the next day do not report any smoke impacting FNSB.

May 31, 2019

AICC Report Fire Information: There was one new fire reported, for a total of 19 active fires burning statewide. For the 2019 fire season 34,772.7 acres have burned, which was a 24-hour increase of 1,525.5 acres from the previous day.

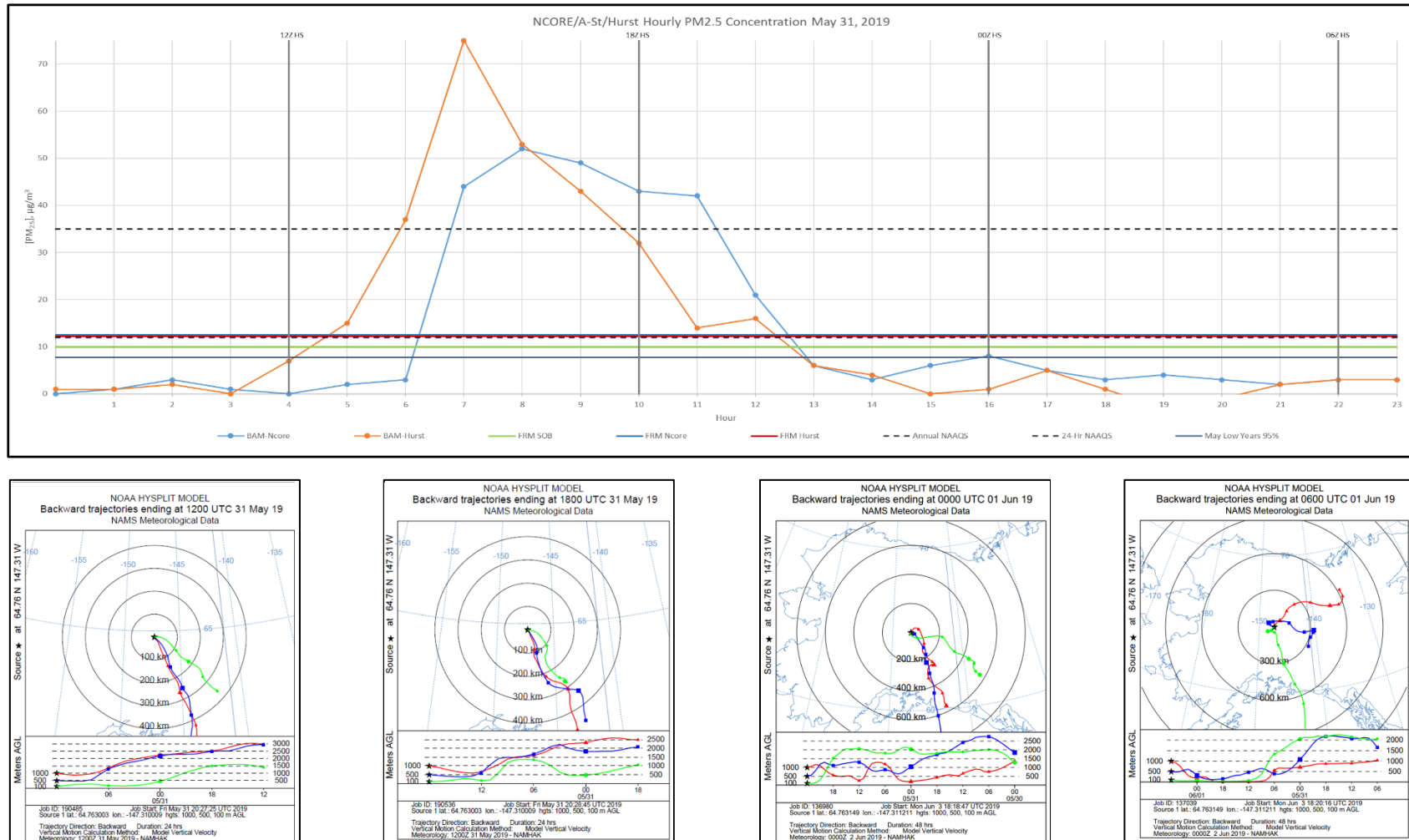


Figure 14. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6-hr HYSPLIT runs for May 31, 2019

PM_{2.5} data: Figure 14 depicts the hourly PM_{2.5} concentration at elevated levels in the morning and their gradual decline throughout the day. The maximum concentrations for the day were above 70 µg/m³ at the 0700L. At NCORE the continuous BAM PM_{2.5} 24-hour average concentration was 12.7 µg/m³ and the FRM PM_{2.5} 24-hour average concentration was 12.5 µg/m³. At HURST the continuous BAM PM_{2.5} 24-hour average concentration was 13.2 µg/m³ and the FRM PM_{2.5} 24-hour average concentration was 12.2 µg/m³. At SOB the FRM PM_{2.5} 24-hour average concentration was 10.0 µg/m³.

HYSPLIT trajectory: The 12Z (0400L) and 18Z (1000L) model runs indicate a flow from the southwest (Figure 14). The 18Z HYSPLIT run has been overlaid on the Google Earth image (Figure 15). The Oregon Lakes/Oklahoma Range combined fires to the southeast experienced low growth during this period, but smoke produced was trapped below the cloud layers. Elevated concentrations of PM_{2.5} concentrations were a result of the smoke being advected into FNSB in the morning hours.



Figure 15. Google Earth image with 2019 Oregon Lakes/Oklahoma Range combined fire Perimeter and 31/12Z HYSPLIT (31/0400L)100m (Green)/500m (Blue)/1000m (Red) back trajectory. May 31, 2019 MODIS satellite imagery and May 31, 0612L (left) and 0725L (Right) Easter Dome (Fairbanks) FAA web camera.

MODIS image: The trajectory overlay onto the Google Earth Map for May 31, 2019, shows the 500m and 1000m trajectories passing directly through the southeast fire perimeter. Due to significant cloud cover the smoke was not visible on MODIS imagery. The Easter Dome FAA web camera has been added to show the smoke visible underneath the cloud layer.

Table 14. Hourly observation for Fairbanks International Airport, May 31, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	05/31/2019 00:53 AKDT	7	40	**	**	10	63	40
PAFA	05/31/2019 01:53 AKDT	8	30	**	**	10	61	40
PAFA	05/31/2019 02:53 AKDT	5	40	**	**	10	62	39
PAFA	05/31/2019 03:53 AKDT	0	0	**	**	10	61	41
PAFA	05/31/2019 04:53 AKDT	0	0	**	**	10	59	44
PAFA	05/31/2019 05:53 AKDT	3	40	**	**	10	58	42
PAFA	05/31/2019 06:53 AKDT	0	0	**	**	10	60	46
PAFA	05/31/2019 07:53 AKDT	3	60	**	**	10	61	43
PAFA	05/31/2019 08:53 AKDT	3	130	**	7 (Smoke)	7	60	41
PAFA	05/31/2019 09:53 AKDT	5	70	**	7 (Smoke)	7	60	44
PAFA	05/31/2019 10:53 AKDT	0	0	**	7 (Smoke)	7	62	45
PAFA	05/31/2019 11:53 AKDT	3	**	**	7 (Smoke)	7	63	44
PAFA	05/31/2019 12:53 AKDT	5	230	**	7 (Smoke)	7	64	44
PAFA	05/31/2019 13:53 AKDT	9	210	**	**	10	65	45
PAFA	05/31/2019 14:53 AKDT	9	210	17	**	10	64	43
PAFA	05/31/2019 15:53 AKDT	13	260	**	Lgt Rain	8	58	47
PAFA	05/31/2019 16:53 AKDT	6	200	**	Lgt Rain	10	56	51
PAFA	05/31/2019 17:53 AKDT	5	230	**	Lgt Rain	10	56	51
PAFA	05/31/2019 18:53 AKDT	5	230	**	Lgt Rain	10	56	51
PAFA	05/31/2019 19:53 AKDT	3	220	**	Lgt Rain	8	55	51
PAFA	05/31/2019 20:53 AKDT	6	210	**	Lgt Rain	6	54	51
PAFA	05/31/2019 21:53 AKDT	5	230	**	Lgt Rain	6	53	51
PAFA	05/31/2019 22:53 AKDT	3	200	**	Lgt Rain	7	53	50
PAFA	05/31/2019 23:53 AKDT	3	200	**	Lgt Rain	4	53	51

Table 15. Hourly observation for Ft. Wainwright, May 31, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	05/31/2019 00:58 AKDT	7	60	**	**	10	63	38
PAFB	05/31/2019 01:58 AKDT	7	60	**	**	10	62	39
PAFB	05/31/2019 02:58 AKDT	6	70	**	**	10	60	40
PAFB	05/31/2019 03:58 AKDT	6	70	**	**	10	59	40
PAFB	05/31/2019 04:58 AKDT	6	60	**	**	10	59	40
PAFB	05/31/2019 05:58 AKDT	0	0	**	**	7	59	42
PAFB	05/31/2019 06:58 AKDT	6	40	**	**	10	59	42
PAFB	05/31/2019 07:58 AKDT	0	0	**	7 (Smoke)	5	60	43
PAFB	05/31/2019 08:58 AKDT	0	0	**	7 (Smoke)	6	61	43
PAFB	05/31/2019 09:58 AKDT	**	**	**	**	**	**	**
PAFB	05/31/2019 10:58 AKDT	0	0	**	7 (Smoke)	6	62	44
PAFB	05/31/2019 11:58 AKDT	3	210	**	7 (Smoke)	6	63	44
PAFB	05/31/2019 12:58 AKDT	5	200	**	**	8	63	45
PAFB	05/31/2019 13:58 AKDT	9	230	**	**	10	65	45
PAFB	05/31/2019 14:58 AKDT	15	230	**	**	10	65	45
PAFB	05/31/2019 15:58 AKDT	12	250	17	**	10	60	46
PAFB	05/31/2019 16:58 AKDT	9	240	**	Lgt Rain	9	58	49
PAFB	05/31/2019 17:58 AKDT	7	250	**	**	10	58	51
PAFB	05/31/2019 18:58 AKDT	8	230	**	Lgt Rain	8	58	53
PAFB	05/31/2019 19:58 AKDT	7	220	**	Lgt Rain	7	55	53
PAFB	05/31/2019 20:58 AKDT	7	220	**	Lgt Rain	9	54	54
PAFB	05/31/2019 21:58 AKDT	**	**	**	**	**	**	**
PAFB	05/31/2019 22:58 AKDT	6	250	**	Lgt Rain	8	54	53
PAFB	05/31/2019 23:58 AKDT	6	250	**	Lgt Rain	7	54	53

Surface observations: Tables 14 and 15 show the morning surface winds were light with an easterly component. Smoke traveled into the area trapped under the low-level clouds. Smoke became thicker in front of the approaching trough from the south. As the winds shifted to a more south/southwest component in early afternoon the rain moved into the area and washed the smoke out of the atmosphere.

June 23, 2019

AICC Report Fire Information: There were 24 new fires reported for a total of 128 fires burning statewide. For the 2019 fire season 166,242.9 acres have been burned, which was a 24-hour increase of 5,721.1 acres from the previous day.

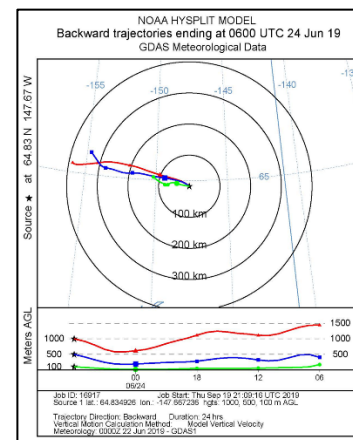
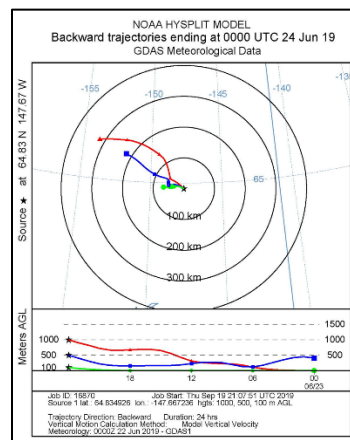
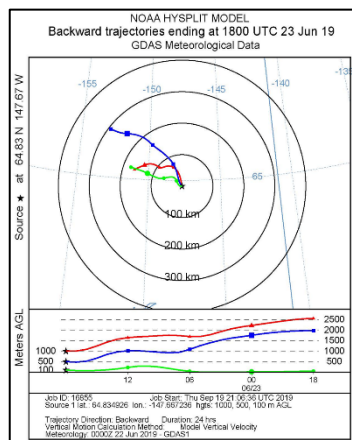
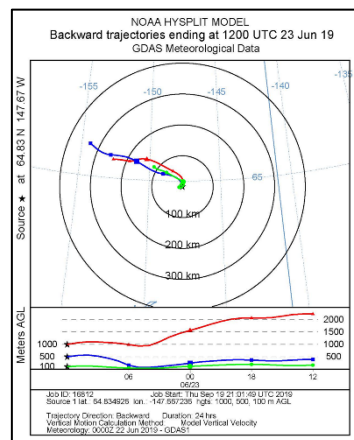
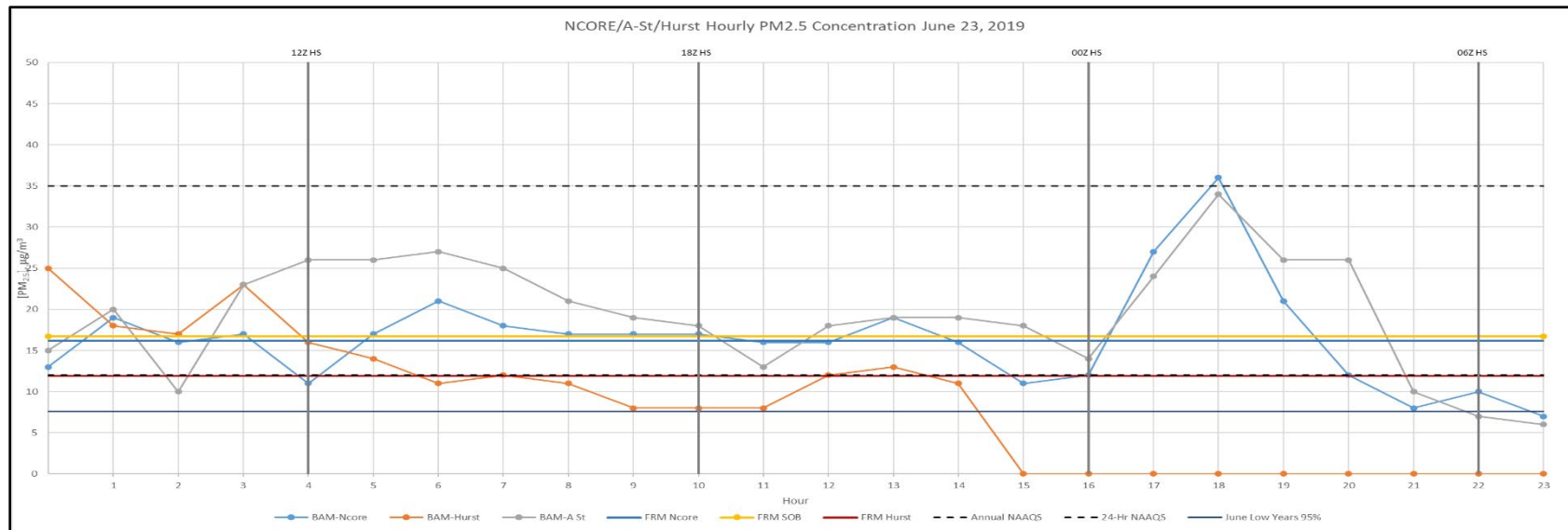


Figure 16. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6-hr HYSPLIT runs for June 23, 2019

PM_{2.5} Data: Hourly PM_{2.5} concentrations were slightly elevated throughout the day on June 23 (Figure 16). At NCORE the continuous BAM PM_{2.5} 24-hour average concentration was 16.4 $\mu\text{g}/\text{m}^3$ and the FRM PM_{2.5} 24-hour average concentration was 16.2 $\mu\text{g}/\text{m}^3$. At HURST the continuous BAM PM_{2.5} 24-hour average concentration was 12.3 $\mu\text{g}/\text{m}^3$ and the FRM PM_{2.5} 24-hour average concentration was 11.9 $\mu\text{g}/\text{m}^3$. The SOB FRM PM_{2.5} 24-hour average concentration was 16.7 $\mu\text{g}/\text{m}^3$ and at A-Street the continuous BAM PM_{2.5} 24-hour average concentration was 19.3 $\mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: The four runs on June 23 indicate a flow from the west-northwest interior. This flow continued for the next few days as the fires in the region intensified and more smoke was be advected into the FNSB area. The 00Z HYSPLIT 100m/500m/1000m run has been overlaid on the Google Earth image (Figure 17).

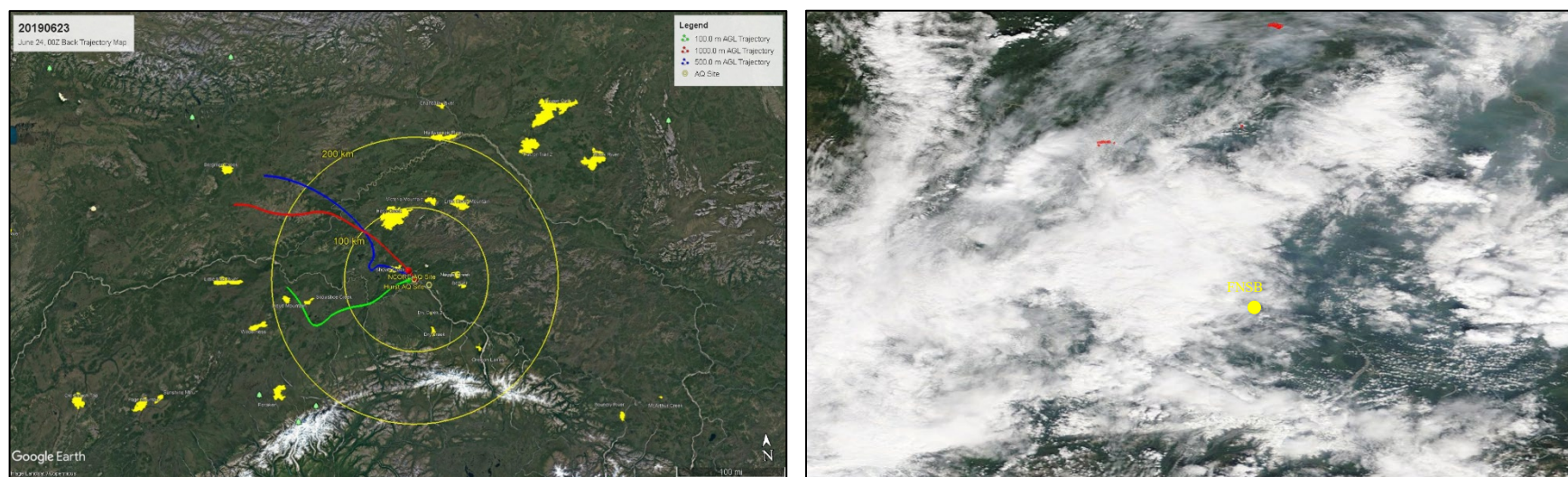


Figure 17. Google Earth image with 2019 fire perimeters and 24/00Z HYSPLIT (23/1600L)100m (Green)/500m (Blue)/1000m (Red) back trajectory. June 23, 2019 MODIS satellite imagery of smoke near FNSB.

MODIS image: Imagery for June 23, 2019, shows significant cloud cover over the fires in the region. Smoke is trapped below the cloud layers. Smoke is visible in the image just east of FNSB outside of the cloud cover. The three trajectories pass directly through the Shovel Creek Fire to the north of Fairbanks.

Table 16. Hourly observation for Fairbanks International Airport, June 23, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	Condi on	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/23/2019 00:53 AKDT	5	100	**	**	10	63	55
PAFA	06/23/2019 01:53 AKDT	0	0	**	**	10	63	55
PAFA	06/23/2019 02:53 AKDT	0	0	**	Lgt Rain	10	61	57
PAFA	06/23/2019 03:53 AKDT	0	0	**	Lgt Rain	10	61	57
PAFA	06/23/2019 04:53 AKDT	3	180	**	Lgt Rain	7	59	56
PAFA	06/23/2019 05:53 AKDT	3	180	**	Lgt Rain	10	60	57
PAFA	06/23/2019 06:53 AKDT	0	0	**	**	9	59	57
PAFA	06/23/2019 07:53 AKDT	0	0	**	**	7	60	57
PAFA	06/23/2019 08:53 AKDT	0	0	**	**	7	60	57
PAFA	06/23/2019 09:53 AKDT	0	0	**	**	8	60	57
PAFA	06/23/2019 10:53 AKDT	0	0	**	**	8	60	57
PAFA	06/23/2019 11:53 AKDT	0	0	**	**	7	61	58
PAFA	06/23/2019 12:53 AKDT	0	0	**	**	7	62	58
PAFA	06/23/2019 13:53 AKDT	3	200	**	**	10	63	58
PAFA	06/23/2019 14:53 AKDT	0	0	**	Lgt Rain	10	63	58
PAFA	06/23/2019 15:53 AKDT	3	210	**	Lgt Rain	10	63	58
PAFA	06/23/2019 16:53 AKDT	0	0	**	**	10	64	59
PAFA	06/23/2019 17:53 AKDT	0	0	**	Lgt Rain	8	67	59
PAFA	06/23/2019 18:53 AKDT	0	0	**	**	7	68	59
PAFA	06/23/2019 19:53 AKDT	0	0	**	**	7	67	60
PAFA	06/23/2019 20:53 AKDT	6	240	**	**	10	66	56
PAFA	06/23/2019 21:53 AKDT	3	220	**	**	10	65	53
PAFA	06/23/2019 22:53 AKDT	0	0	**	**	10	64	52
PAFA	06/23/2019 23:53 AKDT	9	280	**	Lgt Rain	10	62	52

Table 17. Hourly observation for Ft. Wainwright, June 23, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	Condi- tion	VIS (SM)	TEMP (F)	DPt (F)
PAFB	06/23/2019 00:58 AKDT	9	70	**	**	9	61	57
PAFB	06/23/2019 01:58 AKDT	9	40	**	Lgt Rain	2	63	57
PAFB	06/23/2019 02:58 AKDT	5	280	**	Lgt Rain	3	62	57
PAFB	06/23/2019 03:58 AKDT	6	40	**	Lgt Rain	6	60	59
PAFB	06/23/2019 04:58 AKDT	0	0	**	Lgt Rain	6	60	59
PAFB	06/23/2019 05:58 AKDT	0	0	**	Lgt Rain	6	59	58
PAFB	06/23/2019 06:58 AKDT	3	50	**	**	7	59	58
PAFB	06/23/2019 07:58 AKDT	0	0	**	**	9	59	58
PAFB	06/23/2019 08:58 AKDT	0	0	**	**	10	60	58
PAFB	06/23/2019 09:58 AKDT	3	190	**	**	10	60	59
PAFB	06/23/2019 10:58 AKDT	0	0	**	**	7	60	58
PAFB	06/23/2019 11:58 AKDT	0	0	**	**	10	60	58
PAFB	06/23/2019 12:58 AKDT	0	0	**	**	10	62	59
PAFB	06/23/2019 13:58 AKDT	0	0	**	**	9	63	59
PAFB	06/23/2019 14:58 AKDT	0	0	**	**	10	64	59
PAFB	06/23/2019 15:58 AKDT	0	0	**	**	10	64	59
PAFB	06/23/2019 16:58 AKDT	5	220	**	Lgt Rain	7	64	61
PAFB	06/23/2019 17:58 AKDT	3	250	**	**	10	64	60
PAFB	06/23/2019 18:58 AKDT	0	0	**	**	10	65	60
PAFB	06/23/2019 19:58 AKDT	0	0	**	**	10	66	61
PAFB	06/23/2019 20:58 AKDT	0	0	**	**	9	65	61
PAFB	06/23/2019 21:58 AKDT	6	230	**	**	10	66	58
PAFB	06/23/2019 22:58 AKDT	5	250	**	**	10	64	55
PAFB	06/23/2019 23:58 AKDT	6	250	**	**	10	62	55

Surface observations: Tables 16 and 17 show periods of light rain throughout the day until the trough passes in the late evening hours. No reduction in visibility was attributed to smoke even though all FNSB air quality monitors indicated a smoke presence.

June 25, 2019

AICC Report Fire Information: There were seven new fires reported for a total of 141 fires burning statewide. For the 2019 fire season 193,300.2 acres have been burned, which was a 24-hour increase of 13,034.3 acres from the previous day.

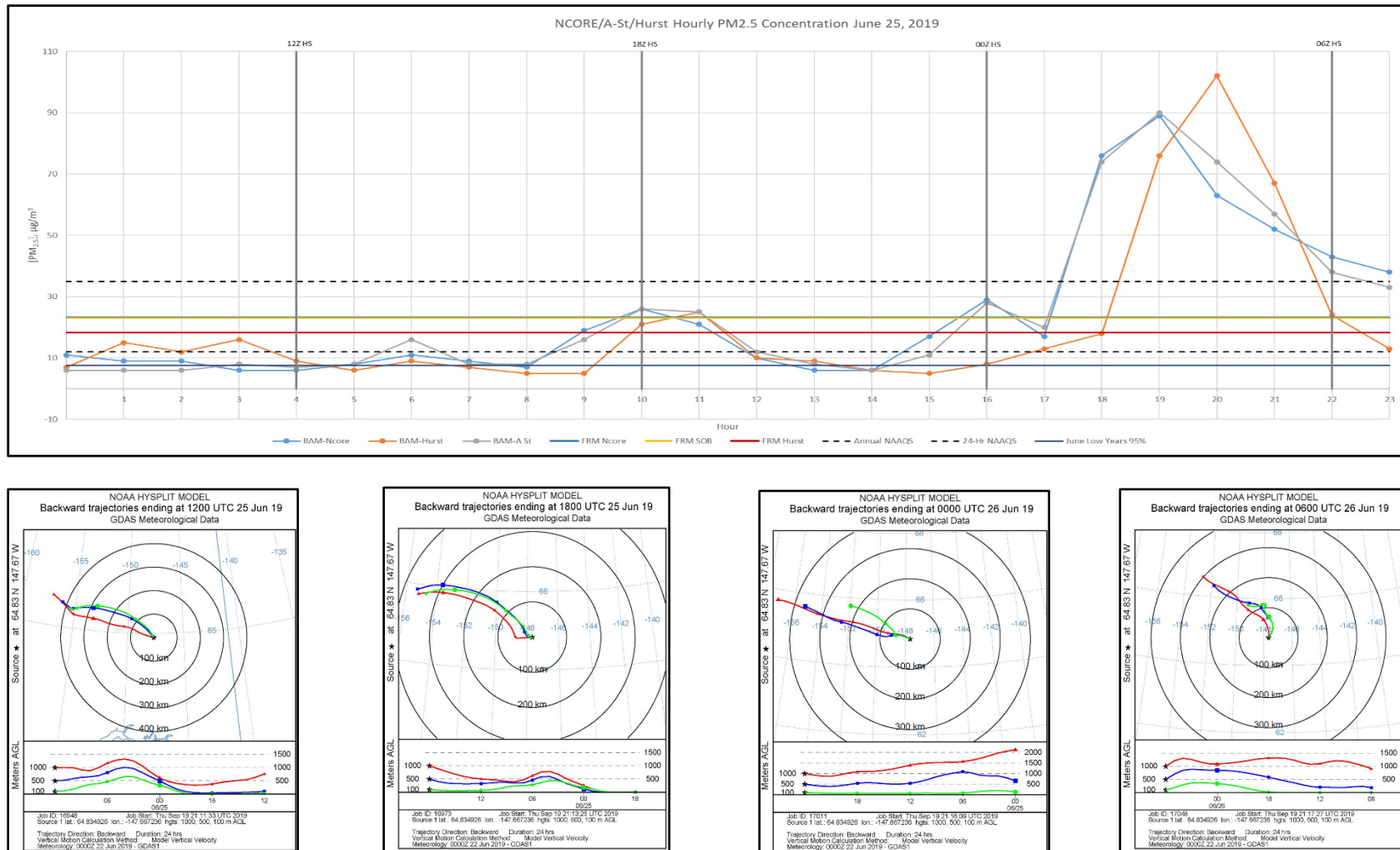


Figure 18. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6-hr HYSPLIT runs for June 25, 2019

PM_{2.5} Data: Hourly PM_{2.5} concentrations were at elevated levels beginning in the late morning with a gradual increase in concentrations throughout the early afternoon (Figure 18). The highest concentrations for the day were above 85 µg/m³ at 1800L. At NCORE the continuous BAM PM_{2.5} 24-hour average concentration was 24.5 µg/m³ and the FRM PM_{2.5} 24-hour average was 23.2 µg/m³. At HURST the continuous BAM PM_{2.5} 24-hour average was 20.3 µg/m³ and the 24-hour FRM PM_{2.5} concentration was 23.2 µg/m³. At SOB the FRM PM_{2.5} 24-hour average was 23.0 µg/m³ and at A-Street the continuous BAM PM_{2.5} 24-hour average concentration was 14.6 µg/m³.

HYSPLIT trajectory: The model indicates a flow from the Shovel Creek fire, advecting in from the NNE to Fairbanks. The 26/06Z HYSPLIT 100m/500m/10000m run has been overlaid on the Google Earth image (Figure 19). All fires experienced moderate growth during this period.

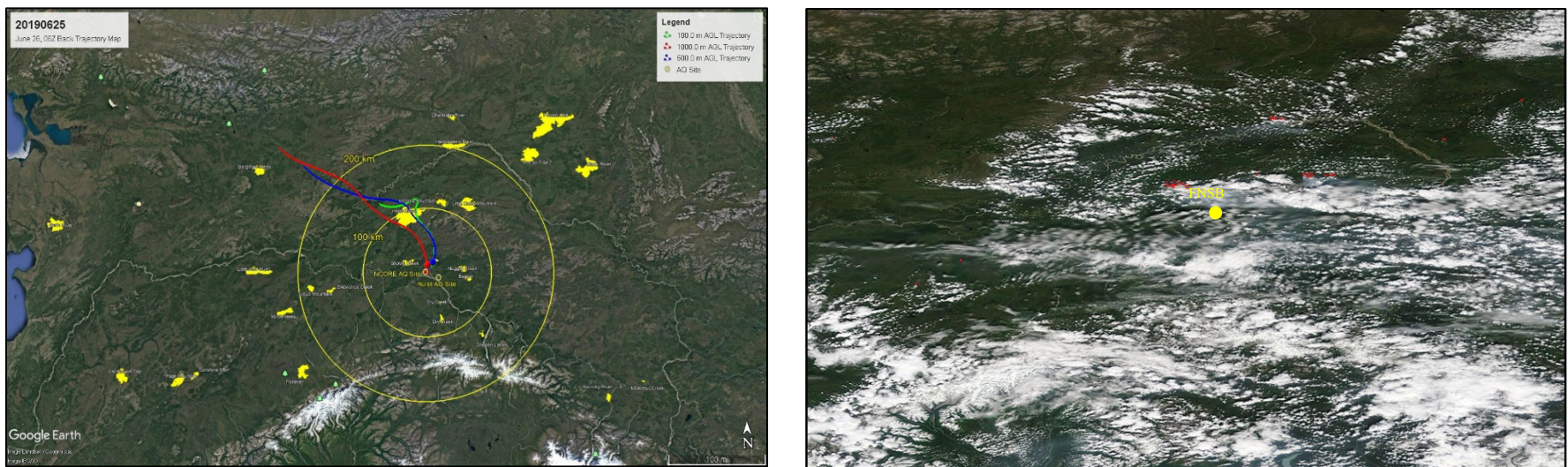


Figure 19. Google Earth with 2019 Fire Perimeters and 26/06Z HYSPLIT (25/2200L) 100m (Green)/500m (Blue)/1000m (Red) back trajectory. June 25, 2019 MODIS satellite imagery.

MODIS image: The trajectory overlay onto the Google Earth map for June 25, 2019, shows the 100m/500m/1000m back trajectory passing directly through the Shovel Creek fire (Figure 19). Smoke is visible on the imagery throughout the Fairbanks area (Figure 19).

Table 18. Hourly observation for Fairbanks International Airport, June 25, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/25/2019 00:53 AKDT	0	0	**	**	10	61	47
PAFA	06/25/2019 01:53 AKDT	0	0	**	**	10	58	48
PAFA	06/25/2019 02:53 AKDT	5	70	**	**	10	55	48
PAFA	06/25/2019 03:53 AKDT	0	0	**	**	10	55	45
PAFA	06/25/2019 04:53 AKDT	3	350	**	**	10	54	44
PAFA	06/25/2019 05:53 AKDT	6	40	**	**	10	53	44
PAFA	06/25/2019 06:53 AKDT	6	50	**	**	10	55	47
PAFA	06/25/2019 07:53 AKDT	3	50	**	**	10	58	46
PAFA	06/25/2019 08:53 AKDT	3	90	**	**	10	60	46
PAFA	06/25/2019 09:53 AKDT	0	0	**	**	10	62	47
PAFA	06/25/2019 10:53 AKDT	5	170	**	**	10	66	46
PAFA	06/25/2019 11:53 AKDT	3	**	**	**	10	70	46
PAFA	06/25/2019 12:53 AKDT	3	240	**	**	10	71	45
PAFA	06/25/2019 13:53 AKDT	9	290	**	**	10	73	41
PAFA	06/25/2019 14:53 AKDT	5	280	**	**	10	73	39
PAFA	06/25/2019 15:53 AKDT	12	340	**	**	10	76	40
PAFA	06/25/2019 16:53 AKDT	13	350	20	**	10	76	41
PAFA	06/25/2019 17:53 AKDT	6	200	**	**	10	75	37
PAFA	06/25/2019 18:53 AKDT	9	320	**	**	10	75	41
PAFA	06/25/2019 19:53 AKDT	6	20	**	7 (Smoke)	4	71	43
PAFA	06/25/2019 20:53 AKDT	7	40	**	7 (Smoke)	3	71	48
PAFA	06/25/2019 21:53 AKDT	8	30	**	7 (Smoke)	5	68	46
PAFA	06/25/2019 22:53 AKDT	7	60	**	7 (Smoke)	5	66	46
PAFA	06/25/2019 23:53 AKDT	6	50	**	7 (Smoke)	6	63	47

Table 19. Hourly observation for Ft. Wainwright, June 25, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	06/25/2019 00:58 AKDT	0	0	**	**	8	57	50
PAFB	06/25/2019 01:58 AKDT	0	0	**	**	10	54	49
PAFB	06/25/2019 02:58 AKDT	0	0	**	**	9	51	47
PAFB	06/25/2019 03:58 AKDT	0	0	**	**	9	51	47
PAFB	06/25/2019 04:58 AKDT	3	60	**	**	10	51	46
PAFB	06/25/2019 05:58 AKDT	3	80	**	**	10	50	45
PAFB	06/25/2019 06:58 AKDT	5	70	**	**	10	52	45
PAFB	06/25/2019 07:58 AKDT	6	80	**	**	10	55	46
PAFB	06/25/2019 08:58 AKDT	3	120	**	**	10	59	46
PAFB	06/25/2019 09:58 AKDT	0	0	**	**	10	62	47
PAFB	06/25/2019 10:58 AKDT	0	0	**	**	10	66	46
PAFB	06/25/2019 11:58 AKDT	0	0	**	**	10	69	42
PAFB	06/25/2019 12:58 AKDT	5	220	**	**	10	71	43
PAFB	06/25/2019 13:58 AKDT	5	260	**	**	10	72	43
PAFB	06/25/2019 14:58 AKDT	8	220	**	**	10	74	38
PAFB	06/25/2019 15:58 AKDT	10	290	**	**	10	75	37
PAFB	06/25/2019 16:58 AKDT	3	290	**	**	10	74	36
PAFB	06/25/2019 17:58 AKDT	5	330	**	**	10	75	36
PAFB	06/25/2019 18:58 AKDT	6	310	**	7 (Smoke)	7	75	37
PAFB	06/25/2019 19:58 AKDT	7	30	**	7 (Smoke)	4	73	42
PAFB	06/25/2019 20:58 AKDT	5	20	**	7 (Smoke)	3	72	43
PAFB	06/25/2019 21:58 AKDT	8	50	**	7 (Smoke)	3	71	45
PAFB	06/25/2019 22:58 AKDT	7	50	**	7 (Smoke)	4	67	45
PAFB	06/25/2019 23:58 AKDT	8	60	**	**	7	64	45

Surface observations: Tables 18 and 19 show the morning winds were light and variable until early afternoon. Winds shifted to a northerly component late afternoon which allowed the smoke from the northwest to advect into Fairbanks. The highest PM_{2.5} concentrations occurred between 1800- 2200L and are reflected by the lower visibility in the surface observations.

June 26, 2019

AICC Report Fire Information: There were six new fires reported for a total of 140 fires burning statewide. For the 2019 fire season 235,978.0 acres have been burned, which was a 24-hour increase of 45,677.8 acres from the previous day.

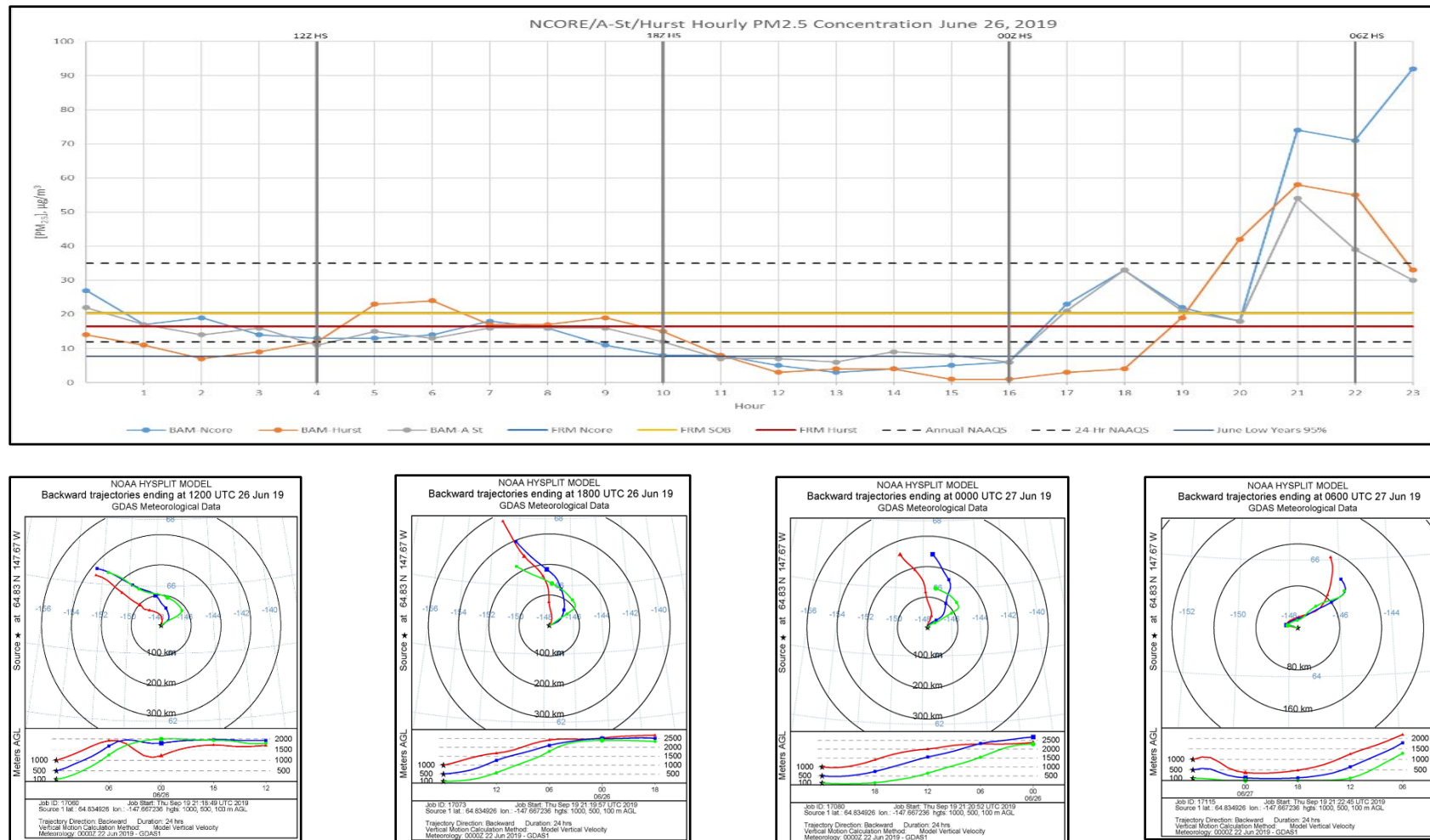


Figure 20. FNSB PM 2.5 concentrations, NAAQS Annual/24hr Standard, and 6-hr HYSPLIT runs for June 26, 2019

PM_{2.5} Data: Hourly PM_{2.5} concentrations were at elevated levels in the early morning with a significant increase in concentrations throughout the day (Figure 20). The highest concentrations for the day were above 90 $\mu\text{g}/\text{m}^3$ at 2300L. At NCORE the continuous BAM PM_{2.5} 24-hour average concentration was 22.2 $\mu\text{g}/\text{m}^3$ and the FRM PM_{2.5} 24-hour average was 20.5 $\mu\text{g}/\text{m}^3$. At HURST the continuous BAM PM_{2.5} 24-hour average was 16.7 $\mu\text{g}/\text{m}^3$ and the 24-hour FRM PM_{2.5} concentration was 16.5 $\mu\text{g}/\text{m}^3$. At SOB the FRM PM_{2.5} 24-hour average was 20.4 $\mu\text{g}/\text{m}^3$ and at A-Street the continuous BAM PM_{2.5} 24-hour average concentration was 17.7 $\mu\text{g}/\text{m}^3$.

HYSPPLIT trajectory: The HYSPLIT model indicates the flow at all levels (100m/500m/1000m) from the western fire complex traveling northeast then into Fairbanks. The 27/06Z HYSPLIT 100m/500m/1000m run has been overlaid on the Google Earth image (Figure 21). All fires experienced explosive growth during this period.

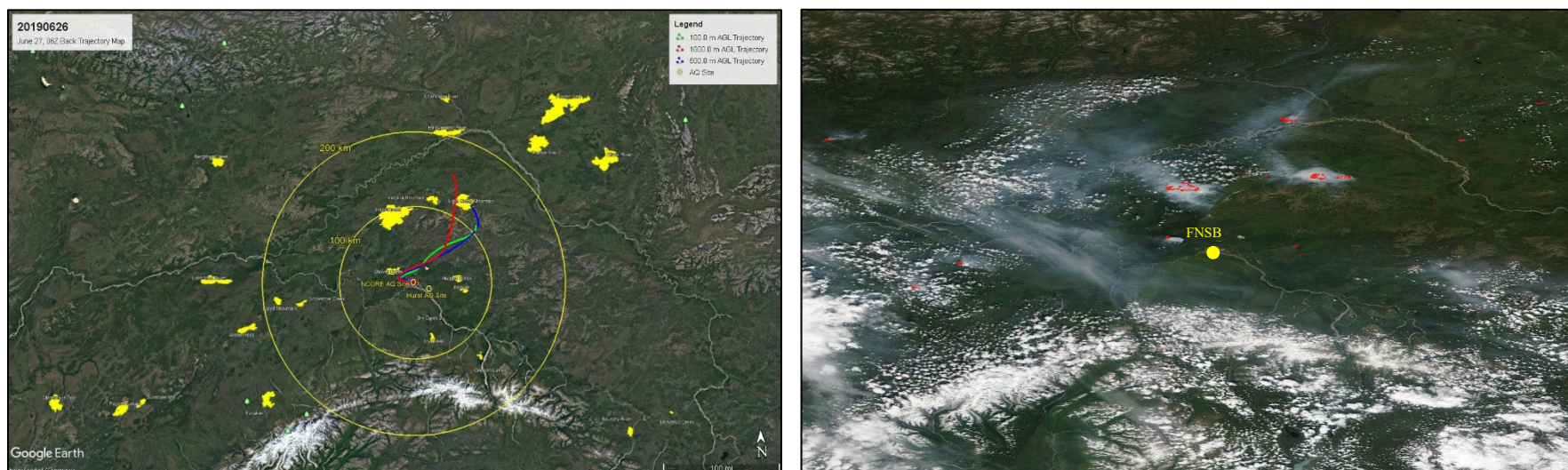


Figure 21. Google Earth with 2019 Fire Perimeters and 27/06Z HYSPLIT (26/2200L)100m (Green)/500m (Blue)/1000m (Red) back trajectory. June 26, 2019 MODIS satellite imagery.

MODIS image: The trajectory overlay onto the Google Earth map for June 26, 2019, shows the 100m/500m/1000m trajectory passing through the northern fires smoke field. Dense smoke is visible on the imagery throughout the interior of Alaska on June.

Table 20. Hourly observation for Fairbanks International Airport, June 26, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/26/2019 00:53 AKDT	3	50	**	7 (Smoke)	6	61	46
PAFA	06/26/2019 01:53 AKDT	3	360	**	7 (Smoke)	6	59	45
PAFA	06/26/2019 02:53 AKDT	6	10	**	**	7	57	45
PAFA	06/26/2019 03:53 AKDT	6	20	**	**	7	55	44
PAFA	06/26/2019 04:53 AKDT	6	60	**	**	7	53	44
PAFA	06/26/2019 05:53 AKDT	7	50	**	**	8	53	44
PAFA	06/26/2019 06:53 AKDT	7	20	**	**	8	56	44
PAFA	06/26/2019 07:53 AKDT	6	50	**	**	8	59	45
PAFA	06/26/2019 08:53 AKDT	5	30	**	**	8	63	44
PAFA	06/26/2019 09:53 AKDT	5	50	**	**	9	67	40
PAFA	06/26/2019 10:53 AKDT	8	70	**	**	9	69	38
PAFA	06/26/2019 11:53 AKDT	6	90	**	**	9	72	36
PAFA	06/26/2019 12:53 AKDT	3	**	**	**	9	74	37
PAFA	06/26/2019 13:53 AKDT	5	200	**	**	10	74	35
PAFA	06/26/2019 14:53 AKDT	7	**	**	**	10	76	36
PAFA	06/26/2019 15:53 AKDT	7	160	**	**	10	76	38
PAFA	06/26/2019 16:53 AKDT	7	160	**	**	10	77	37
PAFA	06/26/2019 17:53 AKDT	6	**	**	**	10	78	39
PAFA	06/26/2019 18:53 AKDT	0	0	**	**	10	77	38
PAFA	06/26/2019 19:53 AKDT	5	200	**	**	10	76	39
PAFA	06/26/2019 20:53 AKDT	3	220	**	**	10	74	41
PAFA	06/26/2019 21:53 AKDT	0	0	**	**	7	70	47
PAFA	06/26/2019 22:53 AKDT	0	0	**	7 (Smoke)	5	67	47
PAFA	06/26/2019 23:53 AKDT	3	50	**	7 (Smoke)	4	60	48

Table 21. Hourly observation for Ft. Wainwright AAF, June 26, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	06/26/2019 00:58 AKDT	8	60	**	**	8	61	45
PAFB	06/26/2019 01:58 AKDT	5	70	**	**	10	60	45
PAFB	06/26/2019 02:58 AKDT	0	0	**	**	10	57	44
PAFB	06/26/2019 03:58 AKDT	0	0	**	**	9	55	44
PAFB	06/26/2019 04:58 AKDT	5	80	**	**	9	52	44
PAFB	06/26/2019 05:58 AKDT	0	0	**	**	7	53	44
PAFB	06/26/2019 06:58 AKDT	5	50	**	**	9	56	41
PAFB	06/26/2019 07:58 AKDT	3	60	**	**	10	58	41
PAFB	06/26/2019 08:58 AKDT	5	40	**	**	10	63	41
PAFB	06/26/2019 09:58 AKDT	9	90	**	**	10	67	36
PAFB	06/26/2019 10:58 AKDT	7	70	**	**	10	70	34
PAFB	06/26/2019 11:58 AKDT	5	170	**	**	10	72	33
PAFB	06/26/2019 12:58 AKDT	0	0	**	**	10	73	30
PAFB	06/26/2019 13:58 AKDT	5	360	**	**	10	76	31
PAFB	06/26/2019 14:58 AKDT	3	280	**	**	10	77	32
PAFB	06/26/2019 15:58 AKDT	6	340	**	**	10	77	30
PAFB	06/26/2019 16:58 AKDT	8	30	**	**	10	78	31
PAFB	06/26/2019 17:58 AKDT	9	230	**	**	10	78	32
PAFB	06/26/2019 18:58 AKDT	8	240	**	**	10	78	32
PAFB	06/26/2019 19:58 AKDT	6	250	**	**	10	77	35
PAFB	06/26/2019 20:58 AKDT	6	240	**	**	8	76	37
PAFB	06/26/2019 21:58 AKDT	5	230	**	7 (Smoke)	6	74	40
PAFB	06/26/2019 22:58 AKDT	0	0	**	7 (Smoke)	5	69	47
PAFB	06/26/2019 23:58 AKDT	0	0	**	**	9	62	48

Surface observations: Tables 20 and 21 show reduced visibility with a north-northeast surface wind component. As the surface winds shifted to a southerly component in the afternoon the visibility increased. The highest PM_{2.5} concentrations occurred between in the late evening and are reflected by the lower visibility in the Fairbanks and Ft Wainwright surface observations for June 26, 2019.

June 27, 2019

AICC Report Fire Information: There were eleven new fires reported, for a total of 130 fires burning statewide. For the 2019 fire season 266,027.8 acres have been burned, which was a 24-hour increase of 30,049.8 acres from the previous day.

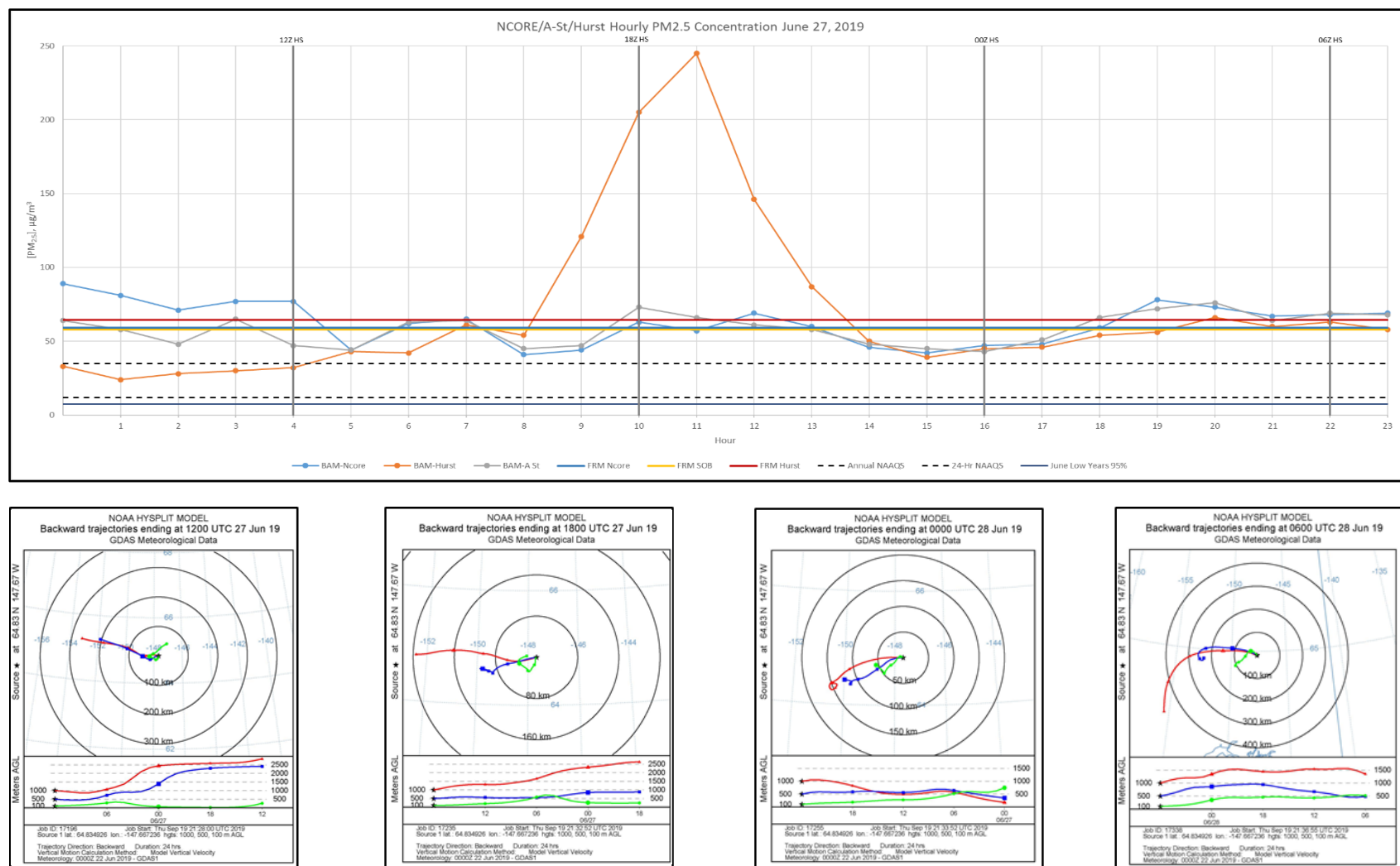


Figure 22. FNSB PM 2.5 concentrations, NAAQS Annual/24hr Standard, and 6-hr HYSPLIT runs for June 27, 2019

PM_{2.5} Data: Figure 22 depicts elevated hourly PM_{2.5} concentration throughout the day, June 27, 2019. The NCORE BAM PM_{2.5} 24-hour concentration was 62.3 µg/m³, NCORE 24-hour FRM PM_{2.5} concentration was 59.1 µg/m³, the HURST continuous BAM PM_{2.5} 24-hour average concentration was 70.3 µg/m³ and the HURST 24-hour FRM PM_{2.5} concentration was 64.4 µg/m³. At SOB the FRM PM_{2.5} 24-hour average was 57.8 µg/m³ and at A-Street the continuous BAM PM_{2.5} 24-hour average concentration was 58.5 µg/m³.

HYSPLIT trajectory: Indicates the flow at all levels, 100m/500m/1000m, transitioning through the western fire complex's smoke field. The 18Z HYSPLIT 100m/500m/1000m run has been overlaid on the Google Earth image, Figure 23. All fires experienced explosive growth during this period.

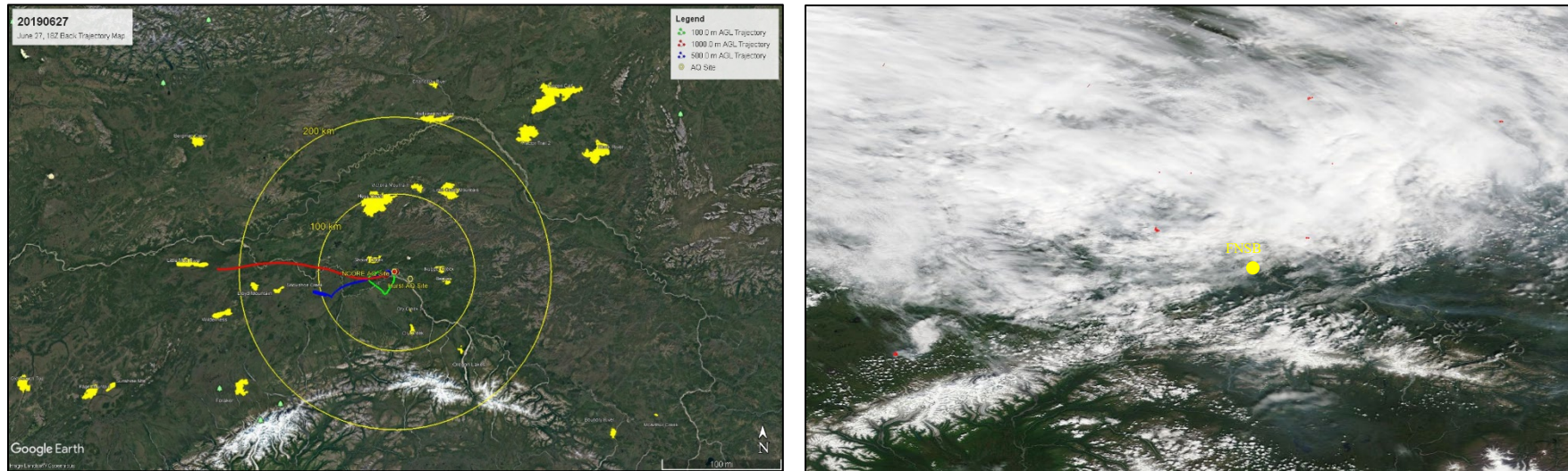


Figure 23. Google Earth with 2019 Fire Perimeters and 27/18Z HYSPLIT (27/1000L) 100m (Green)/500m (Blue)/1000m (Red) back trajectory. June 27, 2019 MODIS satellite imagery.

MODIS image: The 500m/1000m trajectory is advecting smoke under the cloud layers from the western fires into the Fairbanks area. The 100m trajectory is keeping smoke circulating in the flats SW of Fairbanks. Smoke is visible on the imagery outside of clouds in the eastern Tanana Valley.

Table 22. Hourly observation for Fairbanks International Airport, June 27, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/27/2019 00:53 AKDT	0	0	**	7 (Smoke)	3	61	51
PAFA	06/27/2019 01:53 AKDT	0	0	**	7 (Smoke)	3	58	49
PAFA	06/27/2019 02:53 AKDT	5	170	**	7 (Smoke)	3	57	49
PAFA	06/27/2019 03:53 AKDT	5	60	**	7 (Smoke)	4	56	45
PAFA	06/27/2019 04:53 AKDT	3	70	**	7 (Smoke)	4	55	44
PAFA	06/27/2019 05:53 AKDT	5	40	**	7 (Smoke)	4	56	47
PAFA	06/27/2019 06:53 AKDT	3	70	**	7 (Smoke)	4	58	44
PAFA	06/27/2019 07:53 AKDT	3	30	**	7 (Smoke)	4	60	43
PAFA	06/27/2019 08:53 AKDT	5	30	**	7 (Smoke)	5	62	44
PAFA	06/27/2019 09:53 AKDT	3	100	**	7 (Smoke)	5	63	43
PAFA	06/27/2019 10:53 AKDT	0	0	**	7 (Smoke)	6	65	43
PAFA	06/27/2019 11:53 AKDT	0	0	**	7 (Smoke)	6	67	47
PAFA	06/27/2019 12:53 AKDT	0	0	**	7 (Smoke)	5	70	46
PAFA	06/27/2019 13:53 AKDT	0	0	**	7 (Smoke)	5	72	46
PAFA	06/27/2019 14:53 AKDT	0	0	**	7 (Smoke)	5	74	46
PAFA	06/27/2019 15:53 AKDT	0	0	**	**	7	76	45
PAFA	06/27/2019 16:53 AKDT	3	70	**	**	7	75	44
PAFA	06/27/2019 17:53 AKDT	6	20	**	**	7	74	50
PAFA	06/27/2019 18:53 AKDT	5	50	**	57 (Smoke)3	5	72	53
PAFA	06/27/2019 19:53 AKDT	5	50	**	57 (Smoke)3	4	71	54
PAFA	06/27/2019 20:53 AKDT	3	40	**	7 (Smoke)	4	71	52
PAFA	06/27/2019 21:53 AKDT	3	30	**	7 (Smoke)	4	71	54
PAFA	06/27/2019 22:53 AKDT	0	0	**	7 (Smoke)	4	69	55
PAFA	06/27/2019 23:53 AKDT	0	0	**	7 (Smoke)	4	66	55

Table 23. Hourly observation for Ft Wainwright AAF, June 27, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	06/27/2019 00:58 AKDT	0	0	**	**	10	59	49
PAFB	06/27/2019 01:58 AKDT	3	70	**	**	9	56	47
PAFB	06/27/2019 02:58 AKDT	5	80	**	**	8	57	45
PAFB	06/27/2019 03:58 AKDT	5	80	**	**	8	54	43
PAFB	06/27/2019 04:58 AKDT	6	70	**	**	8	53	42
PAFB	06/27/2019 05:58 AKDT	6	80	**	7 (Smoke)	8	54	42
PAFB	06/27/2019 06:58 AKDT	5	70	**	7 (Smoke)	8	56	42
PAFB	06/27/2019 07:58 AKDT	5	50	**	7 (Smoke)	6	59	43
PAFB	06/27/2019 08:58 AKDT	6	80	**	7 (Smoke)	5	61	42
PAFB	06/27/2019 09:58 AKDT	3	100	**	7 (Smoke)	5	62	44
PAFB	06/27/2019 10:58 AKDT	3	100	**	7 (Smoke)	4	64	43
PAFB	06/27/2019 11:58 AKDT	0	0	**	**	6	68	43
PAFB	06/27/2019 12:58 AKDT	0	0	**	6 (Haze)	6	71	44
PAFB	06/27/2019 13:58 AKDT	0	0	**	7 (Smoke)	6	72	45
PAFB	06/27/2019 14:58 AKDT	3	360	**	**	9	75	45
PAFB	06/27/2019 15:58 AKDT	0	0	**	**	8	75	43
PAFB	06/27/2019 16:58 AKDT	3	30	**	**	10	74	47
PAFB	06/27/2019 17:58 AKDT	3	360	**	7 (Smoke)	5	73	50
PAFB	06/27/2019 18:58 AKDT	5	350	**	7 (Smoke)	5	73	50
PAFB	06/27/2019 19:58 AKDT	3	360	**	57 (Smoke)3	4	71	53
PAFB	06/27/2019 20:58 AKDT	5	60	**	7 (Smoke)	4	70	53
PAFB	06/27/2019 21:58 AKDT	3	80	**	7 (Smoke)	5	69	55
PAFB	06/27/2019 22:58 AKDT	0	0	**	7 (Smoke)	5	67	54
PAFB	06/27/2019 23:58 AKDT	0	0	**	**	10	64	56

Surface observations: The Fairbanks Airport and Ft Wainwright observations report smoke as an obstruction to visibility the majority of the day. The lowest visibility report is four miles which equated to the “Unhealthy for Sensitive Groups” category on the AQI chart.

June 28, 2019

AICC Report Fire Information: There were six new fires reported, for a total of 127 fires burning statewide. For the 2019 fire season 324,776.8 acres have been burned, which was a 24-hour increase of 58,749 acres from the previous day.

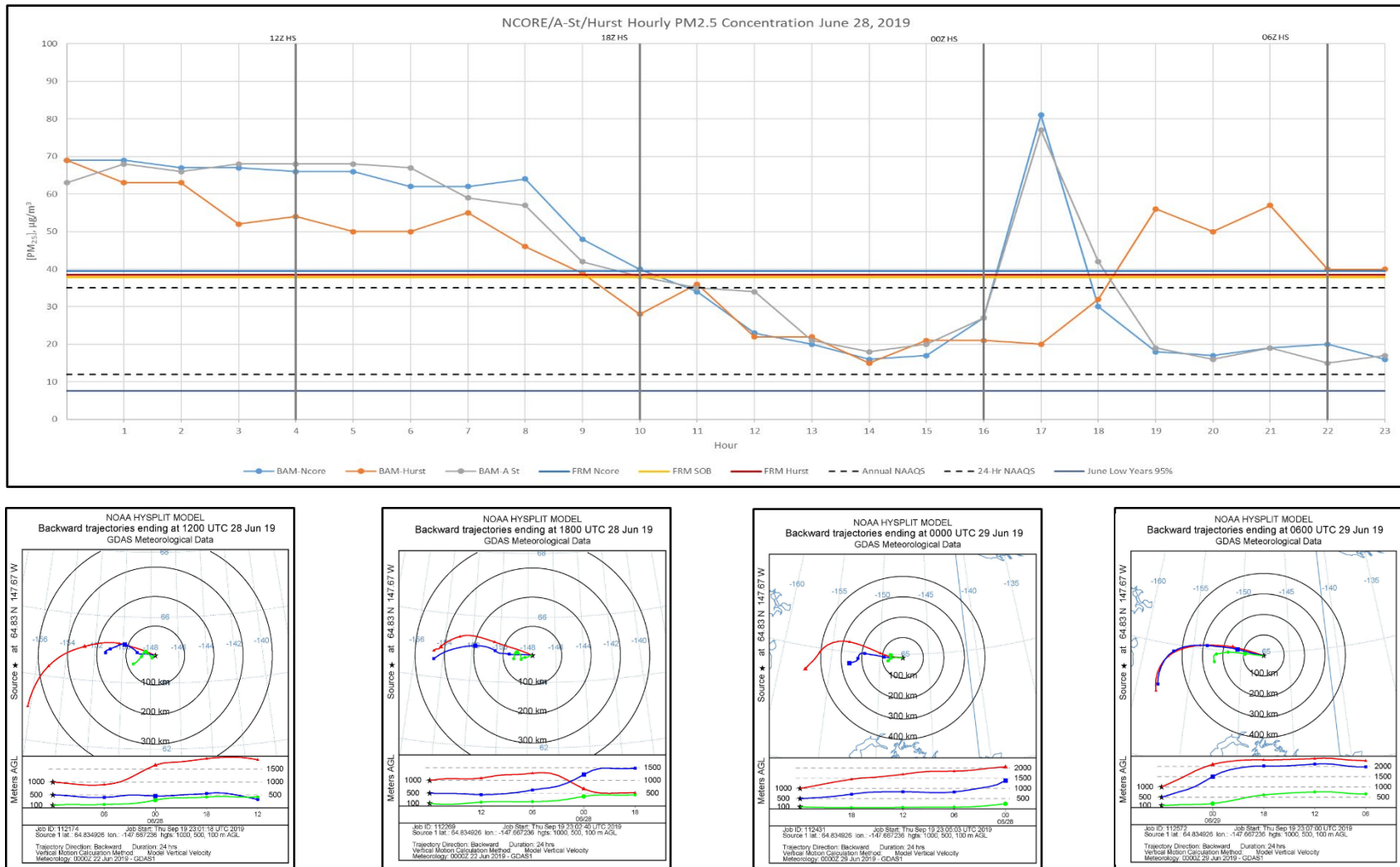


Figure 24. FNSB PM 2.5 concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for June 28, 2019

PM_{2.5} Data: Figure 24 depicts extremely high hourly PM_{2.5} concentration throughout the day, June 28, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 42.4 $\mu\text{g}/\text{m}^3$, NCORE FRM PM_{2.5} 24-hour average was 39.5 $\mu\text{g}/\text{m}^3$, the HURST continuous BAM PM_{2.5} 24-hour average was 41.7 $\mu\text{g}/\text{m}^3$, the HURST 24-hour FRM PM_{2.5} concentration was 38.5 $\mu\text{g}/\text{m}^3$. At SOB the FRM PM_{2.5} 24-hour average was 37.9 $\mu\text{g}/\text{m}^3$ and at A-Street the continuous BAM PM_{2.5} 24-hour average concentration was 42.6 $\mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: Indicates the flow at all levels, 100m/500m/1000m, transitioning through the western fire's smoke field. The 18Z HYSPLIT 100m/500m/1000m run has been overlaid on the Google Earth image, Figure 25. All fires experienced explosive growth during this period.

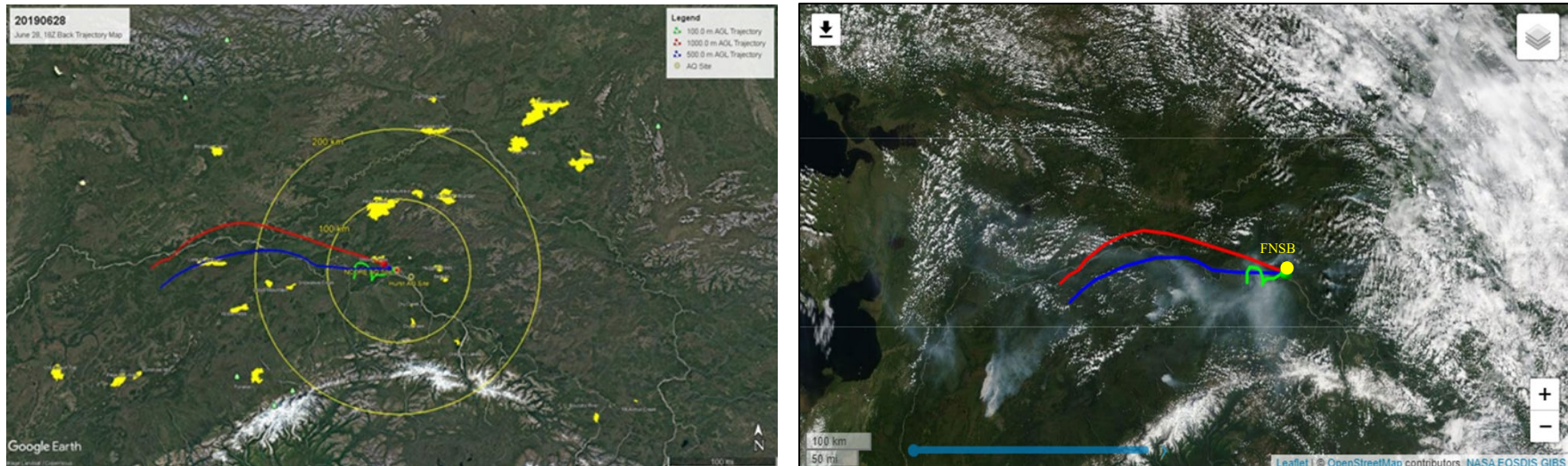


Figure 25. Google Earth with 2019 Fire Perimeters and 28/18Z HYSPLIT (28/1000L) 100m (Green)/500m (Blue)/1000m (Red) back trajectory. June 28, 2019 MODIS satellite imagery overlaid with the 28/18Z HYSPLIT (28/1000L) 100m (Green)/500m (Blue)/1000m (Red) back trajectory.

MODIS image: Imagery for June 28, 2019 shows the 100m/500m/1000m trajectory passing directly through the western smoke field from surrounding fires. Dense smoke is visible on the imagery throughout the Tanana Valley.

Table 24. Hourly observation for Fairbanks International Airport, June 28, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/28/2019 00:53 AKDT	5	40	**	7 (Smoke)	3	62	55
PAFA	06/28/2019 01:53 AKDT	3	330	**	7 (Smoke)	3	62	54
PAFA	06/28/2019 02:53 AKDT	5	30	**	7 (Smoke)	3	59	54
PAFA	06/28/2019 03:53 AKDT	3	50	**	7 (Smoke)	3	58	52
PAFA	06/28/2019 04:53 AKDT	5	40	**	7 (Smoke)	3	57	51
PAFA	06/28/2019 05:53 AKDT	5	60	**	7 (Smoke)	3	59	53
PAFA	06/28/2019 06:53 AKDT	0	0	**	7 (Smoke)	3	61	52
PAFA	06/28/2019 07:53 AKDT	0	0	**	7 (Smoke)	3	64	52
PAFA	06/28/2019 08:53 AKDT	0	0	**	7 (Smoke)	5	66	53
PAFA	06/28/2019 09:53 AKDT	0	0	**	7 (Smoke)	6	69	53
PAFA	06/28/2019 10:53 AKDT	0	0	**	**	7	72	53
PAFA	06/28/2019 11:53 AKDT	0	0	**	**	7	76	55
PAFA	06/28/2019 12:53 AKDT	6	190	**	**	8	79	55
PAFA	06/28/2019 13:53 AKDT	7	**	**	**	10	82	55
PAFA	06/28/2019 14:53 AKDT	8	250	**	**	10	83	52
PAFA	06/28/2019 15:53 AKDT	6	**	**	**	10	82	54
PAFA	06/28/2019 16:53 AKDT	9	300	**	**	10	85	53
PAFA	06/28/2019 17:53 AKDT	12	310	**	**	10	86	51
PAFA	06/28/2019 18:53 AKDT	8	270	**	**	10	86	53
PAFA	06/28/2019 19:53 AKDT	10	260	**	**	10	84	53
PAFA	06/28/2019 20:53 AKDT	7	250	**	**	10	82	52
PAFA	06/28/2019 21:53 AKDT	3	**	**	**	10	81	53
PAFA	06/28/2019 22:53 AKDT	0	0	**	**	10	74	60
PAFA	06/28/2019 23:53 AKDT	0	0	**	**	10	71	58

Table 25. Hourly observation for Ft Wainwright AAF, June 28, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	06/28/2019 00:58 AKDT	0	0	**	**	9	62	55
PAFB	06/28/2019 01:58 AKDT	0	0	**	**	10	59	55
PAFB	06/28/2019 02:58 AKDT	0	0	**	**	10	57	53
PAFB	06/28/2019 03:58 AKDT	0	0	**	**	9	58	52
PAFB	06/28/2019 04:58 AKDT	0	0	**	**	8	54	51
PAFB	06/28/2019 05:58 AKDT	0	0	**	7 (Smoke)	8	57	52
PAFB	06/28/2019 06:58 AKDT	0	0	**	7 (Smoke)	8	59	53
PAFB	06/28/2019 07:58 AKDT	3	10	**	7 (Smoke)	9	62	53
PAFB	06/28/2019 08:58 AKDT	0	0	**	7 (Smoke)	9	66	54
PAFB	06/28/2019 09:58 AKDT	0	0	**	**	10	69	53
PAFB	06/28/2019 10:58 AKDT	0	0	**	**	9	73	53
PAFB	06/28/2019 11:58 AKDT	0	0	**	7 (Smoke)	9	75	54
PAFB	06/28/2019 12:58 AKDT	0	0	**	**	10	78	54
PAFB	06/28/2019 13:58 AKDT	7	200	**	**	10	81	54
PAFB	06/28/2019 14:58 AKDT	8	190	**	**	10	83	53
PAFB	06/28/2019 15:58 AKDT	12	270	**	**	10	84	51
PAFB	06/28/2019 16:58 AKDT	8	250	**	**	10	84	50
PAFB	06/28/2019 17:58 AKDT	8	320	**	**	10	85	50
PAFB	06/28/2019 18:58 AKDT	6	350	**	**	10	83	51
PAFB	06/28/2019 19:58 AKDT	5	280	**	**	10	84	52
PAFB	06/28/2019 20:58 AKDT	7	250	**	**	10	84	52
PAFB	06/28/2019 21:58 AKDT	0	0	**	**	10	82	51
PAFB	06/28/2019 22:58 AKDT	0	0	**	**	10	73	58
PAFB	06/28/2019 23:58 AKDT	3	90	**	**	10	69	58

Surface observations: The Fairbanks Airport observations report smoke as an obstruction to visibility most of the morning hours. The lowest visibility report is three miles which equated to the “Unhealthy” category on the AQI chart. Winds picked up in the late afternoon which helped increase surface visibility at the observation sites. The AQ monitors still recorded elevated PM_{2.5} concentrations thorough the day.

June 29, 2019

AICC Report Fire Information: There were four new fires reported, for a total of 124 fires burning statewide. For the 2019 fire season 362,556.1 acres have been burned, which was a 24-hour increase of 37,779.3 acres from the previous day.

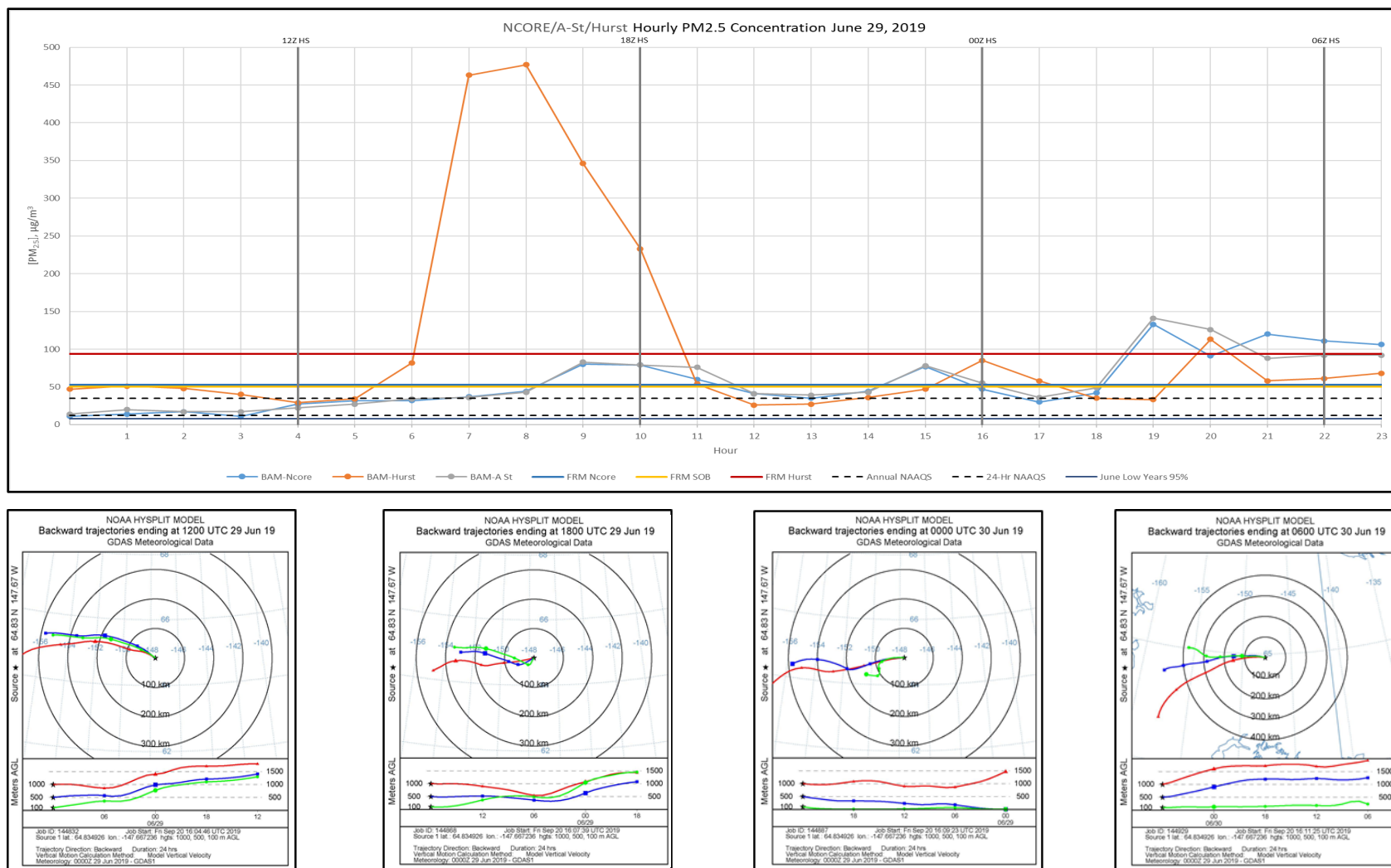


Figure 26. FNSB PM 2.5 concentrations, NAAQS Annual/24hr Standard, and 6 hr. HYSPLIT runs for June 29, 2019

PM_{2.5} Data: Figure 26 depicts extremely high hourly PM_{2.5} concentration throughout the day, June 29, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 55.0 µg/m³, NCORE FRM PM_{2.5} 24-hour average was 52.7 µg/m³, the HURST continuous BAM PM_{2.5} 24-hour average was 106.2 µg/m³, the HURST 24-hour FRM PM_{2.5} concentration was 94.0 µg/m³. At SOB the FRM PM_{2.5} 24-hour average was 50.2 µg/m³ and at A-Street the continuous BAM PM_{2.5} 24-hour average concentration was 56.1 µg/m³.

HYSPLIT trajectory: Indicates the flow at all levels, 100m/500m/1000m, transitioning through the western fire's smoke field. The 18Z HYSPLIT 100m/500m/1000m run has been overlaid on the Google Earth image, Figure 27. All fires experienced moderate growth during this period.

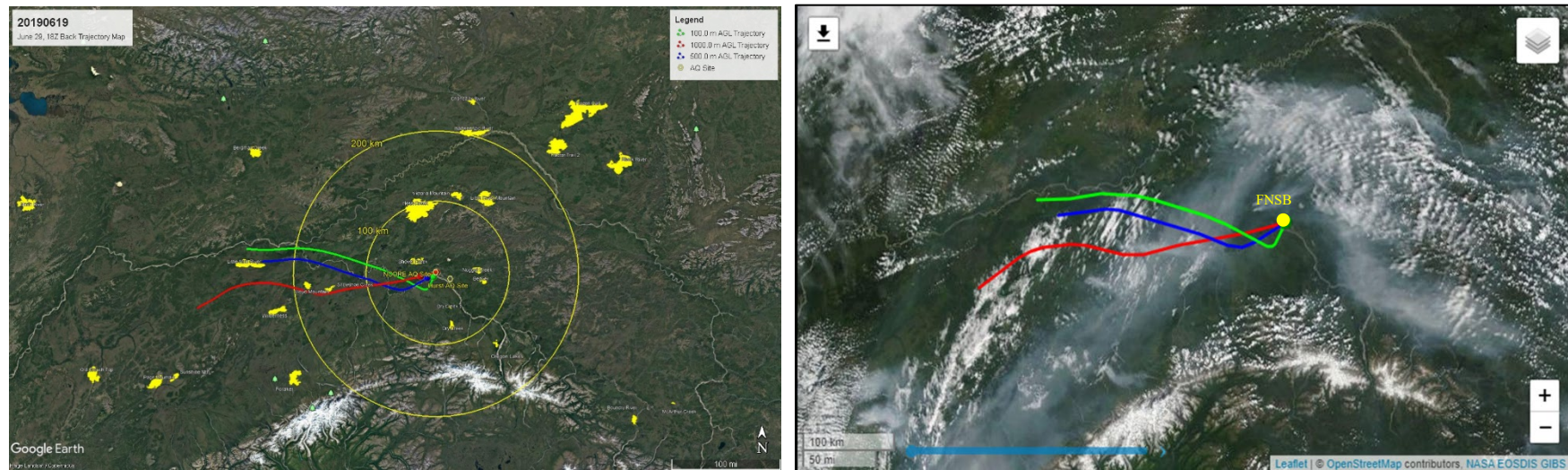


Figure 27. Google Earth with 2019 Fire Perimeters and 29/18Z (29/1000L) HYSPLIT 100m (Green)/500m (Blue)/1000m (Red) back trajectory. June 29, 2019 MODIS satellite imagery overlaid with 29/18Z HYSPLIT (29/1000L) 100m (Green)/500m (Blue)/1000m (Red) back trajectory.

MODIS image: Imagery for June 29, 2019 shows the 100m/500m/1000m back trajectory passing directly through the smoke field. Dense smoke is visible on the imagery throughout the Tanana Valley of Alaska.

Table 26. Hourly observation for Fairbanks International Airport, June 29, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/29/2019 00:53 AKDT	0	0	**	**	7	65	57
PAFA	06/29/2019 01:53 AKDT	0	0	**	**	9	63	56
PAFA	06/29/2019 02:53 AKDT	5	70	**	**	10	60	55
PAFA	06/29/2019 03:53 AKDT	7	40	**	**	9	61	54
PAFA	06/29/2019 04:53 AKDT	3	40	**	**	9	59	53
PAFA	06/29/2019 05:53 AKDT	3	30	**	**	8	62	55
PAFA	06/29/2019 06:53 AKDT	5	40	**	**	8	64	56
PAFA	06/29/2019 07:53 AKDT	0	0	**	**	7	66	55
PAFA	06/29/2019 08:53 AKDT	0	0	**	**	7	67	56
PAFA	06/29/2019 09:53 AKDT	0	0	**	7 (Smoke)	6	70	57
PAFA	06/29/2019 10:53 AKDT	0	0	**	7 (Smoke)	5	73	57
PAFA	06/29/2019 11:53 AKDT	0	0	**	7 (Smoke)	7	76	57
PAFA	06/29/2019 12:53 AKDT	3	240	**	**	7	80	58
PAFA	06/29/2019 13:53 AKDT	6	190	**	**	8	84	59
PAFA	06/29/2019 14:53 AKDT	10	270	**	**	7	88	51
PAFA	06/29/2019 15:53 AKDT	12	290	**	7 (Smoke)	5	88	52
PAFA	06/29/2019 16:53 AKDT	12	280	**	7 (Smoke)	4	88	47
PAFA	06/29/2019 17:53 AKDT	12	260	**	**	8	88	48
PAFA	06/29/2019 18:53 AKDT	8	280	**	**	7	88	50
PAFA	06/29/2019 19:53 AKDT	6	270	**	**	7	87	52
PAFA	06/29/2019 20:53 AKDT	7	290	**	7 (Smoke)	7	86	52
PAFA	06/29/2019 21:53 AKDT	3	310	**	7 (Smoke)	5	84	52
PAFA	06/29/2019 22:53 AKDT	3	240	**	**	8	78	55
PAFA	06/29/2019 23:53 AKDT	0	0	**	**	9	72	56

Table 27. Hourly observation for Ft. Wainwright AAF, June 29, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	06/29/2019 00:58 AKDT	0	0	**	**	10	64	58
PAFB	06/29/2019 01:58 AKDT	0	0	**	**	10	63	57
PAFB	06/29/2019 02:58 AKDT	3	70	**	**	10	60	55
PAFB	06/29/2019 03:58 AKDT	3	70	**	**	9	60	55
PAFB	06/29/2019 04:58 AKDT	7	90	**	**	9	60	55
PAFB	06/29/2019 05:58 AKDT	5	50	**	**	8	60	55
PAFB	06/29/2019 06:58 AKDT	6	70	**	**	10	62	55
PAFB	06/29/2019 07:58 AKDT	3	90	**	**	10	65	56
PAFB	06/29/2019 08:58 AKDT	0	0	**	**	10	67	57
PAFB	06/29/2019 09:58 AKDT	0	0	**	**	8	71	58
PAFB	06/29/2019 10:58 AKDT	0	0	**	**	7	73	57
PAFB	06/29/2019 11:58 AKDT	0	0	**	6 (Haze)	6	76	58
PAFB	06/29/2019 12:58 AKDT	0	0	**	**	9	80	57
PAFB	06/29/2019 13:58 AKDT	7	210	**	**	10	82	57
PAFB	06/29/2019 14:58 AKDT	6	200	**	**	10	85	58
PAFB	06/29/2019 15:58 AKDT	10	240	**	**	10	90	47
PAFB	06/29/2019 16:58 AKDT	13	270	**	**	8	88	47
PAFB	06/29/2019 17:58 AKDT	13	260	**	**	10	88	44
PAFB	06/29/2019 18:58 AKDT	8	320	**	**	9	88	46
PAFB	06/29/2019 19:58 AKDT	6	300	**	6 (Haze)	6	87	49
PAFB	06/29/2019 20:58 AKDT	5	340	**	6 (Haze)	2	85	53
PAFB	06/29/2019 21:58 AKDT	6	330	**	6 (Haze)	3	83	52
PAFB	06/29/2019 22:58 AKDT	3	280	**	6 (Haze)	2	76	55
PAFB	06/29/2019 23:58 AKDT	0	0	**	6 (Haze)	2	70	58

Surface observations: Tables 26 and 27 report smoke and haze with reduced visibility most of the day on the June 29. The lowest visibility reported is two miles late in the evening which equated to the “Very Unhealthy” category on the AQI chart.

June 30, 2019

AICC Report Fire Information: There were five new fires reported, for a total of 119 fires burning statewide. For the 2019 fire season 450,586.0 acres have been burned, which was a 24-hour increase of 69,661.9 acres from the previous day.

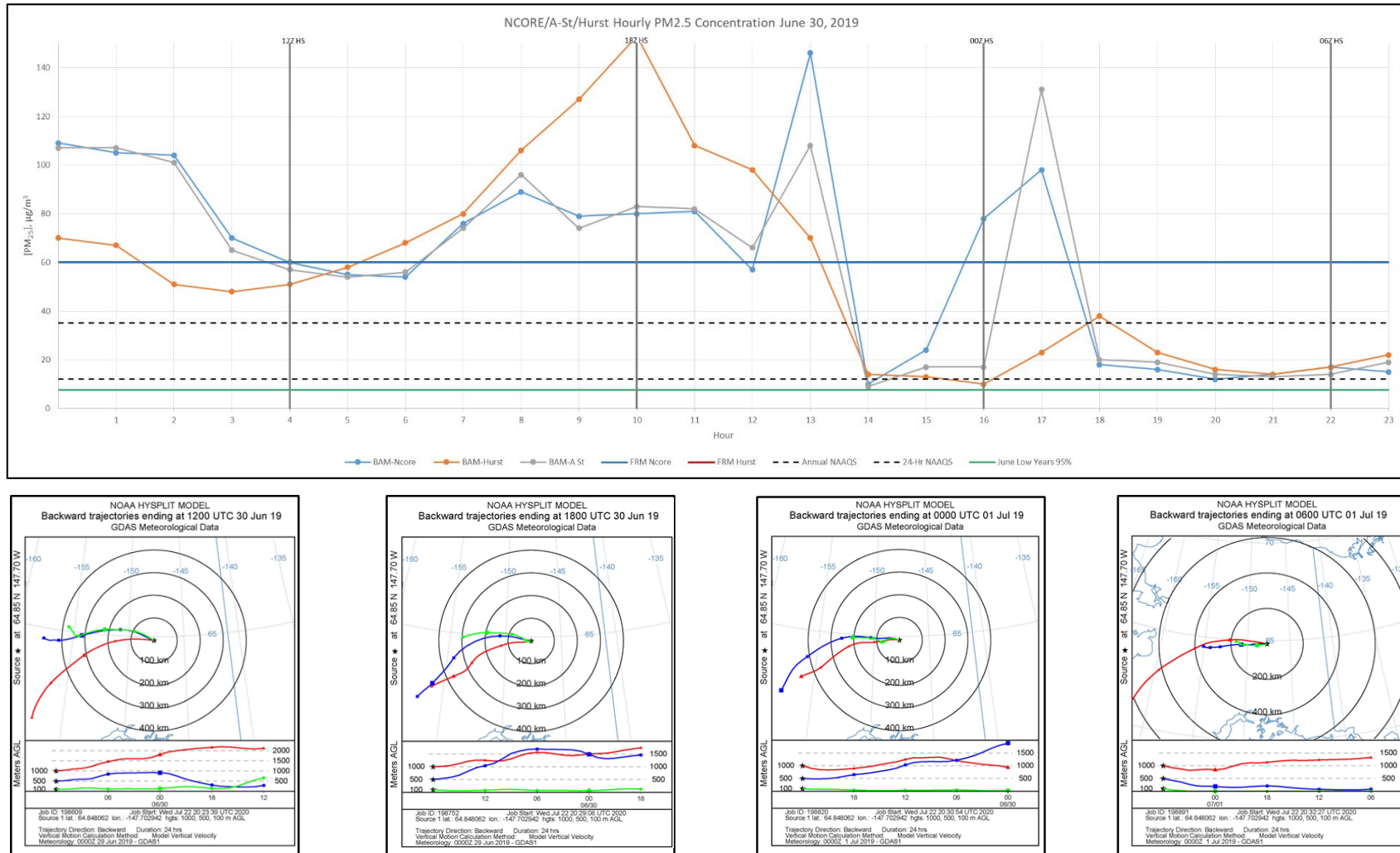


Figure 28. FNSB PM 2.5 concentrations, NAAQS Annual/24hr Standard, and 6-hr HYSPLIT runs for June 30, 2019

PM_{2.5} Data: Figure 28 depicts high hourly PM_{2.5} concentration throughout the day, June 30, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 61.1 $\mu\text{g}/\text{m}^3$, NCORE FRM PM_{2.5} 24-hour average was 56.0 $\mu\text{g}/\text{m}^3$, the HURST 24-hour FRM PM_{2.5} concentration was 53.3 $\mu\text{g}/\text{m}^3$, the HURST continuous BAM and the A-Street the continuous BAM PM_{2.5} 24-hour average concentration was 58.4 $\mu\text{g}/\text{m}^3$.

HYSPLIT trajectory: Indicates that flow is from the west, southwest, the 100m/500m/1000m transition through the western fire complex's smoke field that is trapped below the cloud layers along the Alaska Range's northern slope. The 18Z HYSPLIT 100m/500m/1000m run has been overlaid on the Google Earth image, Figure 29. All fires experienced explosive growth during this period.

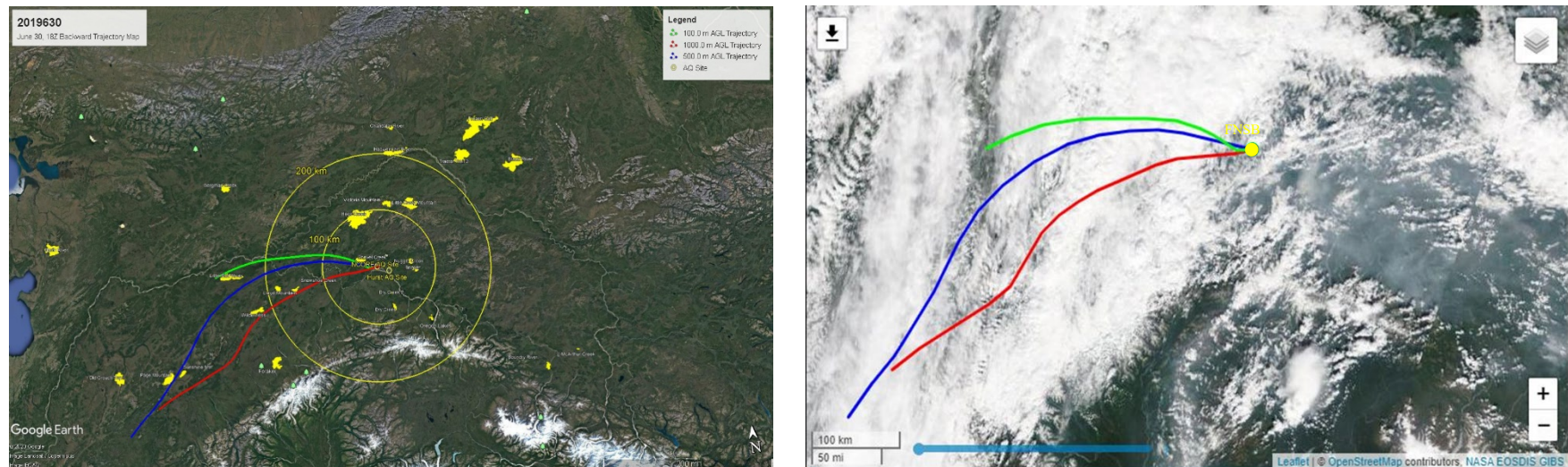


Figure 29. Google Earth with 2019 Fire Perimeters and 30/18Z HYSPLIT (30/1000L) 100m (Red)/500m (Blue)/1000m (Green) back trajectory. June 30, 2019 MODIS satellite imagery overlaid with 30/18Z HYSPLIT (30/1000L) 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for June 30, 2019, shows the 100m/500m/1000m trajectory passing directly through the western fire complex's smoke field that is trapped below the cloud layers along the Alaska Range's northern slope. A mixture of clouds and dense smoke is visible on the imagery throughout the interior of Alaska. The approaching cold front will start moving the dense smoke out of the interior as it passes.

Table 28. Hourly observation for Fairbanks International Airport, June 30, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/30/2019 00:53 AKDT	0	0	**	**	10	71	57
PAFA	06/30/2019 01:53 AKDT	0	0	**	**	9	71	59
PAFA	06/30/2019 02:53 AKDT	3	130	**	**	10	69	58
PAFA	06/30/2019 03:53 AKDT	0	0	**	7 (Smoke)	6	68	59
PAFA	06/30/2019 04:53 AKDT	5	40	**	7 (Smoke)	3	68	57
PAFA	06/30/2019 05:53 AKDT	0	0	**	7 (Smoke)	4	67	58
PAFA	06/30/2019 06:53 AKDT	0	0	**	7 (Smoke)	4	67	58
PAFA	06/30/2019 07:53 AKDT	5	50	**	7 (Smoke)	4	68	59
PAFA	06/30/2019 08:53 AKDT	6	70	**	7 (Smoke)	4	71	58
PAFA	06/30/2019 09:53 AKDT	5	150	**	7 (Smoke)	4	74	58
PAFA	06/30/2019 10:53 AKDT	0	0	**	7 (Smoke)	3	76	58
PAFA	06/30/2019 11:53 AKDT	5	170	**	7 (Smoke)	3	77	58
PAFA	06/30/2019 12:53 AKDT	3	**	**	7 (Smoke)	5	77	59
PAFA	06/30/2019 13:53 AKDT	15	290	**	**	7	79	59
PAFA	06/30/2019 14:53 AKDT	15	350	18.41	7 (Smoke)	1	77	57
PAFA	06/30/2019 15:53 AKDT	9	290	**	Mist	5	73	56
PAFA	06/30/2019 16:53 AKDT	3	220	**	7 (Smoke)	2	65	61
PAFA	06/30/2019 17:53 AKDT	6	190	**	7 (Smoke)	6	65	62
PAFA	06/30/2019 18:53 AKDT	6	260	**	7 (Smoke)	4	65	62
PAFA	06/30/2019 19:53 AKDT	3	210	**	7 (Smoke)	6	65	61
PAFA	06/30/2019 20:53 AKDT	5	230	**	Lgt Rain	7	64	61
PAFA	06/30/2019 21:53 AKDT	6	210	**	Lgt Rain	7	64	61
PAFA	06/30/2019 22:53 AKDT	7	240	**	**	9	63	59
PAFA	06/30/2019 23:53 AKDT	5	240	**	**	9	62	58

Table 29. Hourly observation for Ft Wainwright AAF, June 30, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	06/30/2019 00:58 AKDT	0	0	**	6 (Haze)	2	68	58
PAFB	06/30/2019 01:58 AKDT	0	0	**	6 (Haze)	4	68	56
PAFB	06/30/2019 02:58 AKDT	0	0	**	6 (Haze)	3	67	57
PAFB	06/30/2019 03:58 AKDT	5	70	**	**	10	66	55
PAFB	06/30/2019 04:58 AKDT	3	80	**	**	9	65	55
PAFB	06/30/2019 05:58 AKDT	3	100	**	**	7	66	56
PAFB	06/30/2019 06:58 AKDT	0	0	**	**	10	65	56
PAFB	06/30/2019 07:58 AKDT	3	40	**	**	10	66	56
PAFB	06/30/2019 08:58 AKDT	6	70	**	**	8	71	57
PAFB	06/30/2019 09:58 AKDT	5	120	**	6 (Haze)	6	73	58
PAFB	06/30/2019 10:58 AKDT	0	0	**	**	10	76	58
PAFB	06/30/2019 11:58 AKDT	0	0	**	**	10	77	58
PAFB	06/30/2019 12:58 AKDT	5	250	**	**	10	78	58
PAFB	06/30/2019 13:58 AKDT	8	220	**	**	10	79	59
PAFB	06/30/2019 14:58 AKDT	8	320	**	**	10	76	58
PAFB	06/30/2019 15:58 AKDT	12	300	**	**	10	75	58
PAFB	06/30/2019 16:58 AKDT	12	300	**	Rain	3	67	61
PAFB	06/30/2019 17:58 AKDT	7	240	**	Lgt Rain	6	66	63
PAFB	06/30/2019 18:58 AKDT	7	220	**	Lgt Rain	6	65	63
PAFB	06/30/2019 19:58 AKDT	5	240	**	Lgt Rain	9	65	63
PAFB	06/30/2019 20:58 AKDT	9	230	**	**	10	64	63
PAFB	06/30/2019 21:58 AKDT	12	220	**	Lgt Rain	8	64	63
PAFB	06/30/2019 22:58 AKDT	8	240	**	**	10	64	62
PAFB	06/30/2019 23:58 AKDT	7	220	**	**	10	62	61

Surface observations: Tables 28 and 29 report smoke as an obstruction to visibility 15 of the 24-hourly observations. Light rain moved into the area early evening, washing the smoke out of the lower atmosphere. The lowest visibility report is one mile which equated to the “Very Unhealthy” category on the AQI chart.

July 2, 2019

AICC Report Fire Information: There were two new fires reported, for a total of 123 fires burning statewide. For the 2019 fire season 600,280.8 acres have been burned, which was a 24-hour increase of 69,661.9 acres from the previous day.

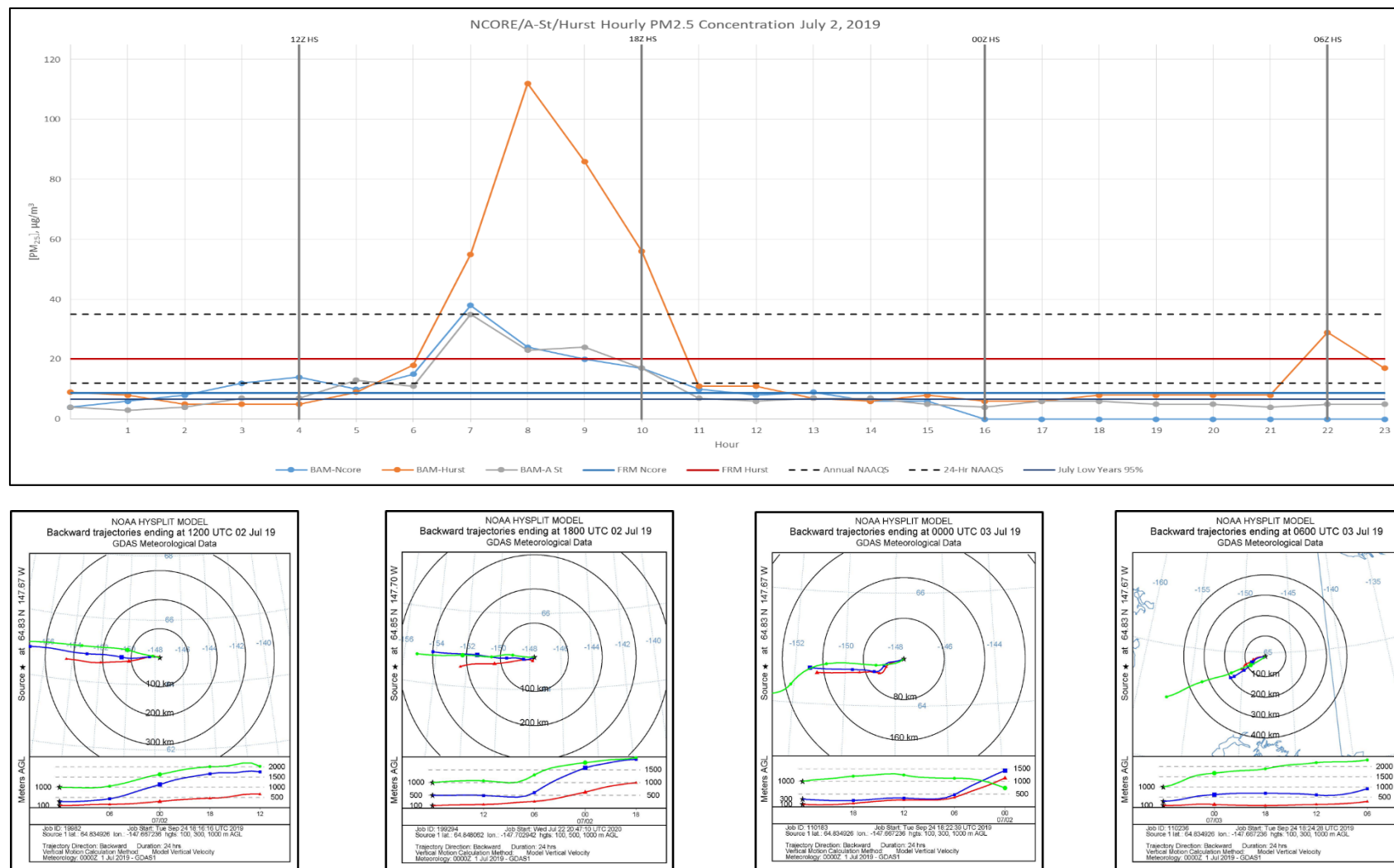


Figure 30. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6-hr HYSPLIT runs for July 2, 2019

PM_{2.5} Data: Figure 30 depicts extremely high hourly PM_{2.5} concentration throughout the day, July 2, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 12.9 µg/m³, NCORE continuous FRM PM_{2.5} 24-hour average was 8.8 µg/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 20.8 µg/m³, HURST 24-hour FRM PM_{2.5} concentration was 20.1 µg/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 9.1 µg/m³.

HYSPLIT trajectory: Indicates that flow is from the west, the 100m/500m/1000m transition through the western fires smoke field. The 18Z HYSPLIT 100m/500m/1000m run has been overlaid on the Google Earth image, Figure 31. The fires in the area experienced moderate growth during the period with the smoke field trapped in the lower levels below the cloud layers.

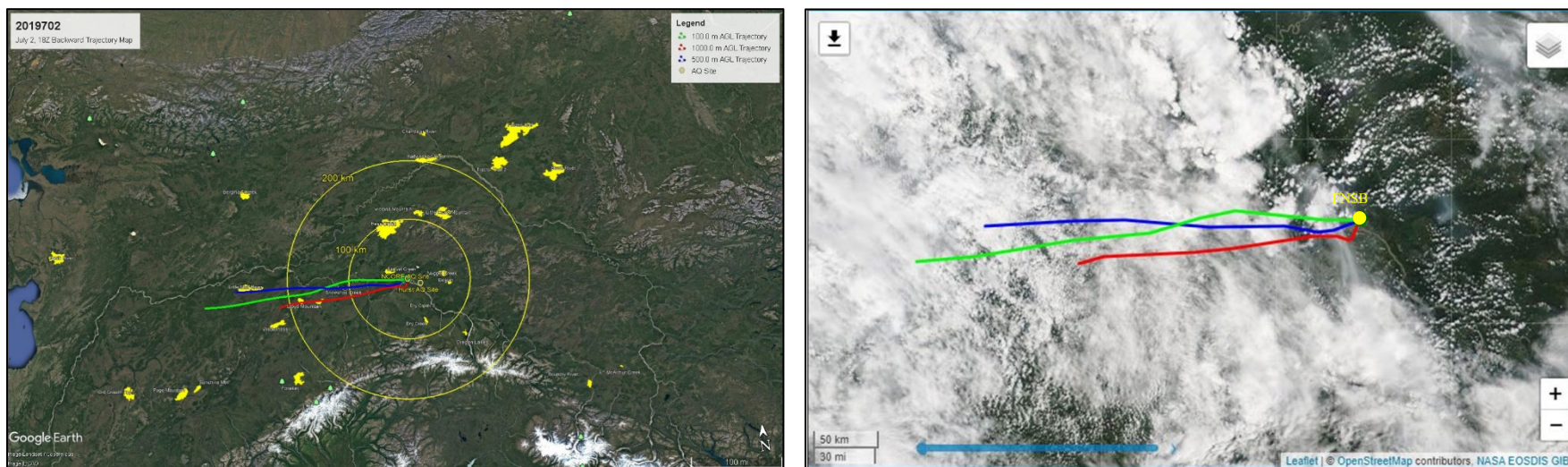


Figure 31. Google Earth with 2019 Fire Perimeters and 02/18Z HYSPLIT (02/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 2, 2019 MODIS satellite imagery overlaid with 02/18Z HYSPLIT (02/1000L) 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 2, 2019, shows a mixture of clouds and minimal smoke, smoke from the Shovel Creek fire just north of FNSB is slightly visible in the satellite imagery.

Table 30. Hourly observation for Fairbanks International Airport, July 2, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/02/2019 00:53 AKDT	0	0	**	**	10	55	50
PAFA	07/02/2019 01:53 AKDT	0	0	**	**	10	54	48
PAFA	07/02/2019 02:53 AKDT	3	50	**	**	10	52	47
PAFA	07/02/2019 03:53 AKDT	0	0	**	**	10	52	46
PAFA	07/02/2019 04:53 AKDT	3	50	**	**	10	51	46
PAFA	07/02/2019 05:53 AKDT	3	90	**	**	10	52	47
PAFA	07/02/2019 06:53 AKDT	3	40	**	**	10	53	47
PAFA	07/02/2019 07:53 AKDT	5	50	**	**	10	54	46
PAFA	07/02/2019 08:53 AKDT	0	0	**	**	10	57	48
PAFA	07/02/2019 09:53 AKDT	3	90	**	**	10	59	49
PAFA	07/02/2019 10:53 AKDT	3	120	**	**	10	62	49
PAFA	07/02/2019 11:53 AKDT	3	220	**	**	10	64	49
PAFA	07/02/2019 12:53 AKDT	3	130	**	**	10	68	46
PAFA	07/02/2019 13:53 AKDT	0	0	**	**	10	69	46
PAFA	07/02/2019 14:53 AKDT	5	**	**	**	10	71	45
PAFA	07/02/2019 15:53 AKDT	8	280	**	**	10	68	47
PAFA	07/02/2019 16:53 AKDT	6	270	**	**	10	70	46
PAFA	07/02/2019 17:53 AKDT	9	290	**	**	10	70	47
PAFA	07/02/2019 18:53 AKDT	7	270	**	**	10	69	48
PAFA	07/02/2019 19:53 AKDT	5	240	**	**	10	69	48
PAFA	07/02/2019 20:53 AKDT	6	210	**	**	10	67	47
PAFA	07/02/2019 21:53 AKDT	3	200	**	**	10	66	49
PAFA	07/02/2019 22:53 AKDT	0	0	**	**	10	65	51
PAFA	07/02/2019 23:53 AKDT	0	0	**	**	10	62	53

Table 31. Hourly observation for Ft. Wainwright AAF, July 2, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/02/2019 00:58 AKDT	3	70	**	**	9	53	49
PAFB	07/02/2019 01:58 AKDT	0	0	**	**	10	52	48
PAFB	07/02/2019 02:58 AKDT	0	0	**	**	10	51	47
PAFB	07/02/2019 03:58 AKDT	0	0	**	**	10	50	47
PAFB	07/02/2019 04:58 AKDT	3	60	**	**	10	49	46
PAFB	07/02/2019 05:58 AKDT	6	60	**	**	10	49	46
PAFB	07/02/2019 06:58 AKDT	5	50	**	**	10	50	46
PAFB	07/02/2019 07:58 AKDT	3	80	**	**	10	52	47
PAFB	07/02/2019 08:58 AKDT	3	40	**	**	7	56	49
PAFB	07/02/2019 09:58 AKDT	0	0	**	**	9	59	49
PAFB	07/02/2019 10:58 AKDT	0	0	**	**	9	62	49
PAFB	07/02/2019 11:58 AKDT	0	0	**	**	10	65	47
PAFB	07/02/2019 12:58 AKDT	0	0	**	**	10	67	44
PAFB	07/02/2019 13:58 AKDT	0	0	**	**	10	69	44
PAFB	07/02/2019 14:58 AKDT	6	260	**	**	10	72	44
PAFB	07/02/2019 15:58 AKDT	9	210	**	**	10	71	44
PAFB	07/02/2019 16:58 AKDT	8	290	**	**	10	70	46
PAFB	07/02/2019 17:58 AKDT	6	270	**	**	10	70	45
PAFB	07/02/2019 18:58 AKDT	9	260	**	**	10	70	46
PAFB	07/02/2019 19:58 AKDT	7	260	**	**	10	69	48
PAFB	07/02/2019 20:58 AKDT	6	210	**	**	10	69	47
PAFB	07/02/2019 21:58 AKDT	8	230	**	**	10	67	47
PAFB	07/02/2019 22:58 AKDT	5	210	**	**	10	66	49
PAFB	07/02/2019 23:58 AKDT	0	0	**	**	7	62	52

Surface observations: Tables 30 and 31 did not report smoke as an obstruction to visibility during the 24-hourly observations but Ft Wainwright did see reduction of visibility during light/calm winds.

July 3, 2019

AICC Report Fire Information: There were six new fires reported, for a total of 122 active fires burning statewide. For the 2019 fire season 655,516.2 acres have been burned, which was a 24-hour increase of 55,235.4 acres from the previous day.

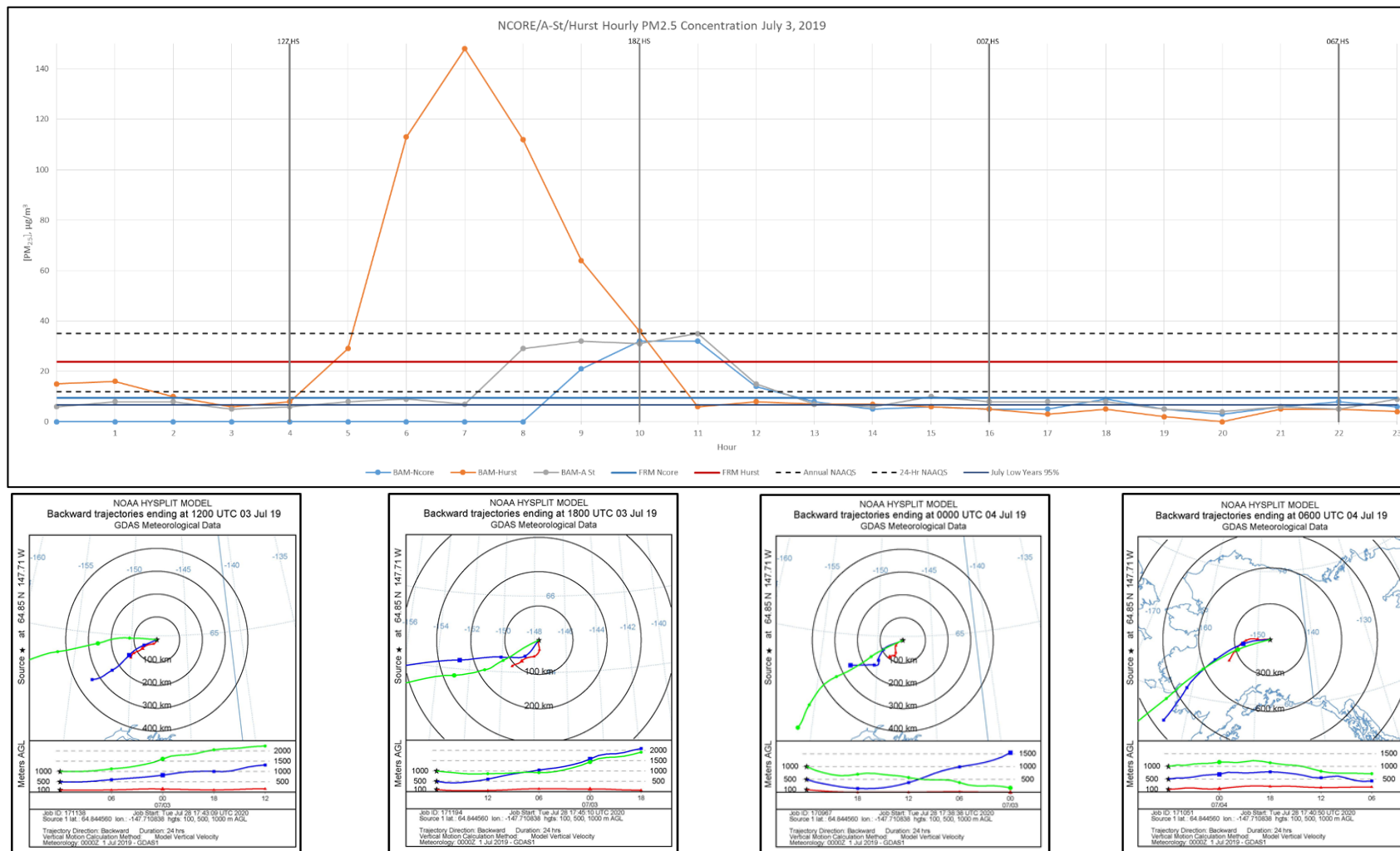


Figure 32. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6-hr HYSPLIT runs for July 3, 2019

PM_{2.5} Data: Figure 32 depicts a spike in hourly PM_{2.5} concentration in the morning hours then tapering off later in the day, July 3, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 11.0 µg/m³, NCORE FRM PM_{2.5} 24-hour average was 9.4 ug/m³, the HURST continuous BAM PM_{2.5} 24-hour average concentration was 25.6 µg/m³, the HURST 24-hour FRM PM_{2.5} concentration was 23.8 µg/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 11.4 µg/m³.

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels from the west southwest for the majority of the day. The 18Z HYSPLIT 100m/500m/1000m run has been overlaid on the Google Earth image, Figure 33. The fires to the west northwest have experienced moderate growth during this period and elevated PM_{2.5} concentrations are a result of the smoke being advected into FNSB.

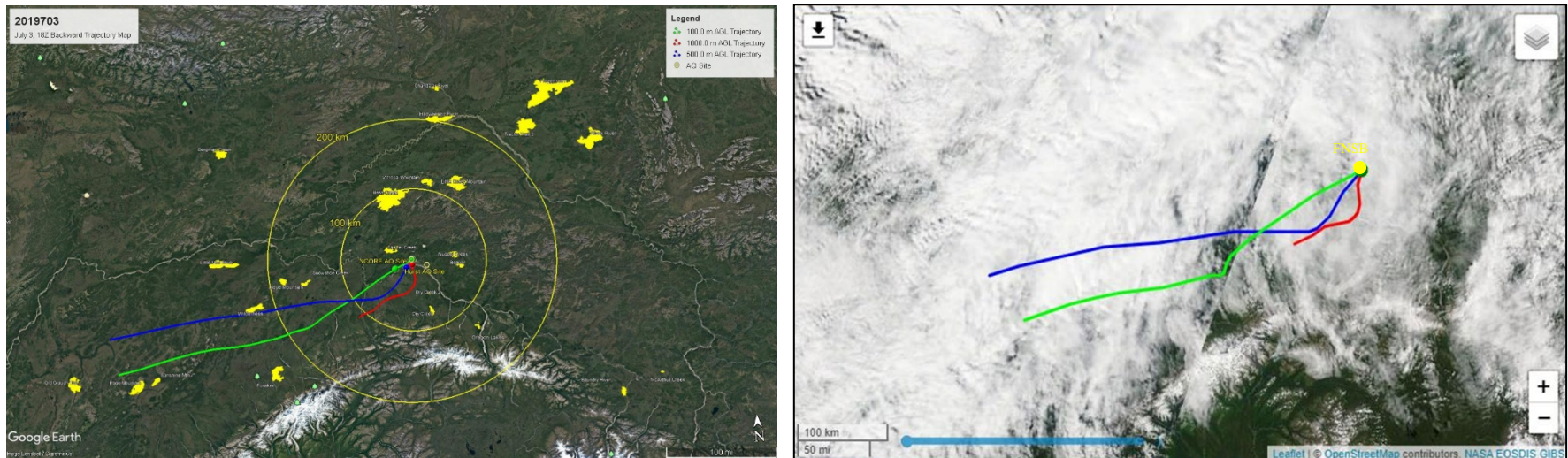


Figure 33. Google Earth with 2019 Fire Perimeters and 03/18Z HYSPLIT (03/1000L) 100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 3, 2019 MODIS satellite imagery overlaid with 03/18Z HYSPLIT (03/1000L) 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 3, 2019, shows the 500m trajectory passing near the Wilderness fire west of FNSB. Significant cloud cover in the current imagery impeding smoke field identification. Surface monitors indicate smoke field trapped below the cloud layers.

Table 32. Hourly observation for Fairbanks International Airport, July 3, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/03/2019 00:53 AKDT	0	0	**	**	10	60	51
PAFA	07/03/2019 01:53 AKDT	3	50	**	**	10	59	52
PAFA	07/03/2019 02:53 AKDT	5	50	**	**	10	57	51
PAFA	07/03/2019 03:53 AKDT	5	60	**	**	10	57	51
PAFA	07/03/2019 04:53 AKDT	0	0	**	**	10	59	50
PAFA	07/03/2019 05:53 AKDT	0	0	**	**	10	59	52
PAFA	07/03/2019 06:53 AKDT	3	40	**	**	10	59	51
PAFA	07/03/2019 07:53 AKDT	5	60	**	**	10	60	50
PAFA	07/03/2019 08:53 AKDT	6	40	**	**	10	63	51
PAFA	07/03/2019 09:53 AKDT	3	**	**	**	8	66	51
PAFA	07/03/2019 10:53 AKDT	3	110	**	**	8	66	51
PAFA	07/03/2019 11:53 AKDT	0	0	**	**	7	68	52
PAFA	07/03/2019 12:53 AKDT	0	0	**	**	9	70	54
PAFA	07/03/2019 13:53 AKDT	9	240	**	**	10	73	51
PAFA	07/03/2019 14:53 AKDT	6	**	**	**	10	75	52
PAFA	07/03/2019 15:53 AKDT	9	220	**	**	10	76	52
PAFA	07/03/2019 16:53 AKDT	7	**	**	**	10	76	51
PAFA	07/03/2019 17:53 AKDT	13	250	19.57	**	10	77	52
PAFA	07/03/2019 18:53 AKDT	16	270	20.71	**	10	75	53
PAFA	07/03/2019 19:53 AKDT	16	280	23.02	**	10	72	56
PAFA	07/03/2019 20:53 AKDT	7	260	**	**	10	68	56
PAFA	07/03/2019 21:53 AKDT	9	260	**	**	10	68	57
PAFA	07/03/2019 22:53 AKDT	5	240	**	**	10	67	56
PAFA	07/03/2019 23:53 AKDT	9	280	**	**	10	64	55

Table 33. Hourly observation for Ft. Wainwright AAF, July 3, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/03/2019 00:58 AKDT	0	0	**	**	9	57	52
PAFB	07/03/2019 01:58 AKDT	0	0	**	**	10	57	51
PAFB	07/03/2019 02:58 AKDT	3	50	**	**	10	56	51
PAFB	07/03/2019 03:58 AKDT	5	80	**	**	10	56	51
PAFB	07/03/2019 04:58 AKDT	5	70	**	**	10	56	50
PAFB	07/03/2019 05:58 AKDT	3	70	**	**	10	56	50
PAFB	07/03/2019 06:58 AKDT	5	60	**	**	9	57	51
PAFB	07/03/2019 07:58 AKDT	5	70	**	**	9	59	51
PAFB	07/03/2019 08:58 AKDT	3	90	**	**	8	60	52
PAFB	07/03/2019 09:58 AKDT	5	90	**	7 (Smoke)	7	65	52
PAFB	07/03/2019 10:58 AKDT	5	90	**	7 (Smoke)	7	67	51
PAFB	07/03/2019 11:58 AKDT	3	170	**	7 (Smoke)	7	68	52
PAFB	07/03/2019 12:58 AKDT	5	130	**	**	8	70	54
PAFB	07/03/2019 13:58 AKDT	12	230	**	**	10	73	51
PAFB	07/03/2019 14:58 AKDT	**	**	**	**	**	**	**
PAFB	07/03/2019 15:58 AKDT	10	220	**	**	10	75	51
PAFB	07/03/2019 16:58 AKDT	**	**	**	**	**	**	**
PAFB	07/03/2019 17:58 AKDT	14	220	**	**	10	77	50
PAFB	07/03/2019 18:58 AKDT	17	270	**	**	10	76	51
PAFB	07/03/2019 19:58 AKDT	15	270	**	**	10	73	55
PAFB	07/03/2019 20:58 AKDT	12	260	**	**	10	69	57
PAFB	07/03/2019 21:58 AKDT	9	250	**	**	10	68	57
PAFB	07/03/2019 22:58 AKDT	9	280	**	**	10	67	56
PAFB	07/03/2019 23:58 AKDT	9	280	**	**	10	66	56

Surface observations: Tables 32 and 33 show slight reduction in visibility in the late morning observations. However, Ft Wainwright AAF is the only location to report smoke in present weather. Minimum visibility for the day at both locations was only seven statute miles.

July 6, 2019

AICC Report Fire Information: There were 5 new fires reported, for a total of 122 active fires burning statewide. For the 2019 fire season 688,687.5 acres have been burned, which was a 24-hour increase of 43,114.7 acres from the previous day.

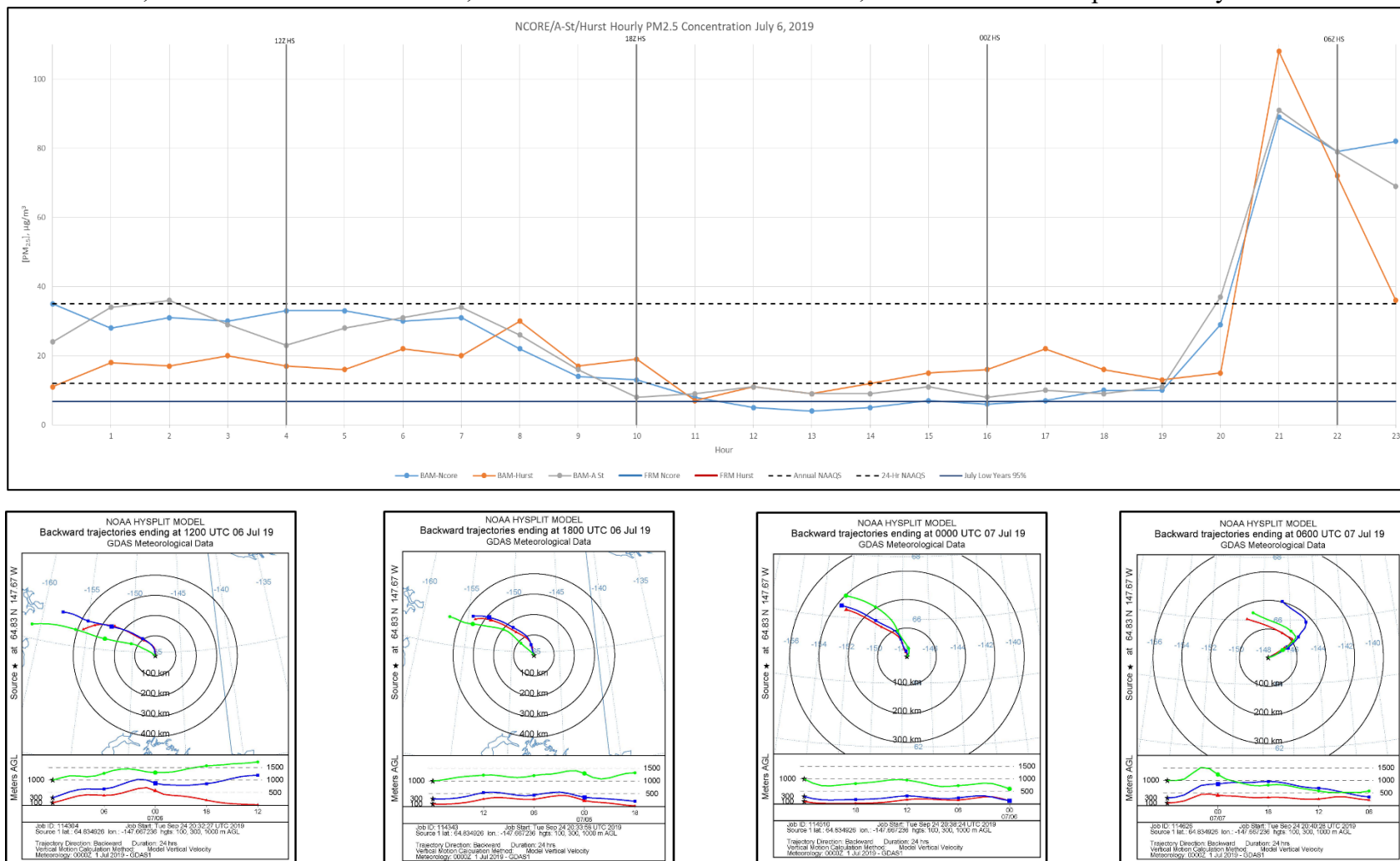


Figure 34. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 6, 2019

PM_{2.5} Data: Figure 34 depicts relatively moderate hourly PM_{2.5} concentrations throughout the day and dramatically increasing in the late evening, July 6, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 26.7 ug/m³, NCORE continuous FRM PM 2.5 24-hour average was 25 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 23.2 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 22.0 ug/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 27.1 ug/m³.

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels from the north west throughout the day and transitioning to a more northeast flow late in the evening during the time which the nearby Nugget Creek and Beaver fires saw significant growth. The 07/06Z (06/2300L) HYSPLIT run has been overlaid on the Google Earth image, Figure 35. The fires in close proximity to FNSB experienced significant growth during this period and late evening elevated PM_{2.5} concentrations are a result of the FNSB being engulfed in smoke.

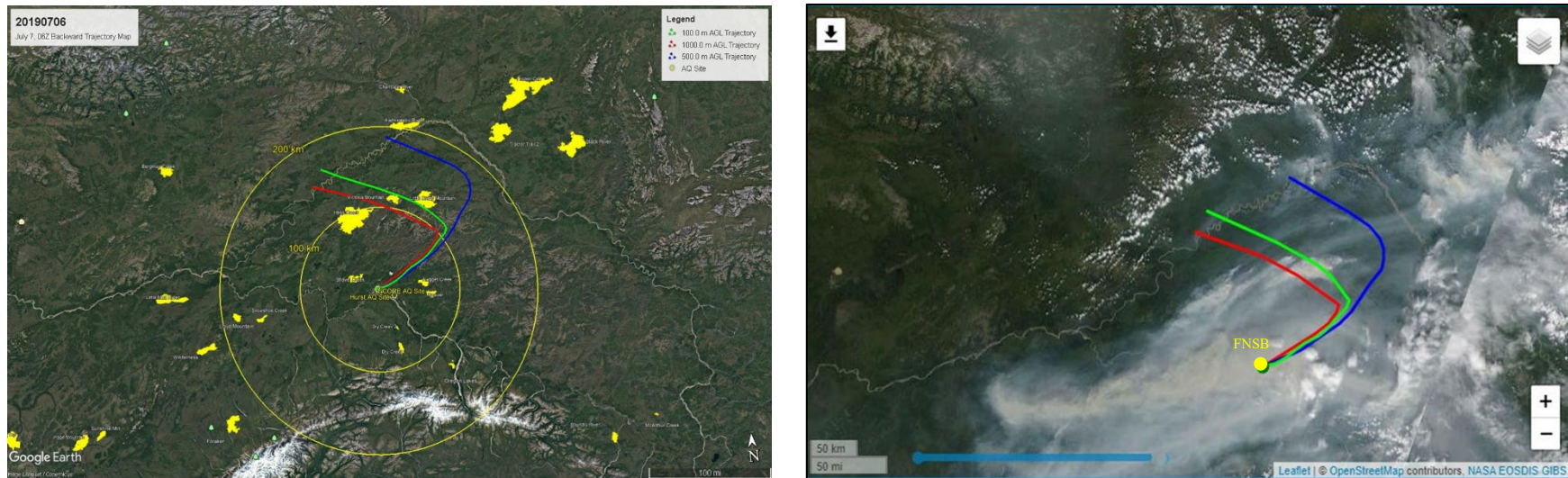


Figure 35. Google Earth with 2019 Fire Perimeters and 07/06Z HYSPLIT (06/2200L)100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 6, 2019 MODIS satellite imagery overlaid with 07/06Z HYSPLIT (06/2200L)100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 06, 2019 shows the 100m/500m/1000m back trajectory passing directly through the smoke field from the fires surrounding FNSB.

Table 34. Hourly observation for Fairbanks International Airport, July 6, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/06/2019 00:53 AKDT	6	**	**	**	8	67	51
PAFA	07/06/2019 01:53 AKDT	7	40	**	**	7	65	52
PAFA	07/06/2019 02:53 AKDT	6	50	**	7 (Smoke)	6	62	51
PAFA	07/06/2019 03:53 AKDT	7	40	**	**	7	59	51
PAFA	07/06/2019 04:53 AKDT	0	0	**	**	7	60	54
PAFA	07/06/2019 05:53 AKDT	3	40	**	**	8	62	53
PAFA	07/06/2019 06:53 AKDT	0	0	**	**	8	63	55
PAFA	07/06/2019 07:53 AKDT	0	0	**	**	10	68	53
PAFA	07/06/2019 08:53 AKDT	0	0	**	**	10	72	55
PAFA	07/06/2019 09:53 AKDT	0	0	**	**	10	75	54
PAFA	07/06/2019 10:53 AKDT	3	**	**	**	10	76	53
PAFA	07/06/2019 11:53 AKDT	5	**	**	**	10	77	53
PAFA	07/06/2019 12:53 AKDT	0	0	**	**	7	79	52
PAFA	07/06/2019 13:53 AKDT	3	260	**	**	8	81	53
PAFA	07/06/2019 14:53 AKDT	6	260	**	**	9	82	52
PAFA	07/06/2019 15:53 AKDT	3	**	**	**	10	82	50
PAFA	07/06/2019 16:53 AKDT	3	**	**	**	10	82	51
PAFA	07/06/2019 17:53 AKDT	5	**	**	**	10	83	52
PAFA	07/06/2019 18:53 AKDT	3	230	**	**	10	82	52
PAFA	07/06/2019 19:53 AKDT	0	0	**	**	10	81	53
PAFA	07/06/2019 20:53 AKDT	3	240	**	**	10	82	53
PAFA	07/06/2019 21:53 AKDT	5	300	**	**	7	80	54
PAFA	07/06/2019 22:53 AKDT	6	50	**	7 (Smoke)	5	73	51
PAFA	07/06/2019 23:53 AKDT	8	360	**	7 (Smoke)	3	71	51

Table 35. Hourly observation for Ft. Wainwright AAF, July 6, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/06/2019 00:58 AKDT	0	0	**	6 (Haze)	1	65	56
PAFB	07/06/2019 01:58 AKDT	0	0	**	6 (Haze)	1	62	54
PAFB	07/06/2019 02:58 AKDT	3	70	**	6 (Haze)	1	59	54
PAFB	07/06/2019 03:58 AKDT	0	0	**	6 (Haze)	1	57	53
PAFB	07/06/2019 04:58 AKDT	0	0	**	6 (Haze)	1	57	52
PAFB	07/06/2019 05:58 AKDT	0	0	**	6 (Haze)	1	59	53
PAFB	07/06/2019 06:58 AKDT	5	60	**	**	10	60	52
PAFB	07/06/2019 07:58 AKDT	3	70	**	**	10	65	53
PAFB	07/06/2019 08:58 AKDT	0	0	**	**	10	68	54
PAFB	07/06/2019 09:58 AKDT	0	0	**	**	10	72	55
PAFB	07/06/2019 10:58 AKDT	0	0	**	**	10	75	54
PAFB	07/06/2019 11:58 AKDT	6	310	**	**	7	79	51
PAFB	07/06/2019 12:58 AKDT	6	260	**	**	10	80	50
PAFB	07/06/2019 13:58 AKDT	5	300	**	**	8	81	50
PAFB	07/06/2019 14:58 AKDT	5	300	**	**	10	82	50
PAFB	07/06/2019 15:58 AKDT	5	300	**	**	7	83	49
PAFB	07/06/2019 16:58 AKDT	5	130	**	**	10	83	50
PAFB	07/06/2019 17:58 AKDT	0	0	**	**	10	84	51
PAFB	07/06/2019 18:58 AKDT	5	30	**	6 (Haze)	1	82	50
PAFB	07/06/2019 19:58 AKDT	3	190	**	6 (Haze)	5	83	50
PAFB	07/06/2019 20:58 AKDT	3	250	**	6 (Haze)	1	83	51
PAFB	07/06/2019 21:58 AKDT	3	60	**	6 (Haze)	1	79	50
PAFB	07/06/2019 22:58 AKDT	6	60	**	6 (Haze)	1	75	50
PAFB	07/06/2019 23:58 AKDT	6	60	**	6 (Haze)	1	71	49

Surface observations: Table 34 and 35 show recorded reduced visibility to smoke/haze in the evening observations as the smoke moved into the area. Ft Wainwright AAF's lowest visibility for the 24-hour period is one mile which equated to the "Very Unhealthy" category on the AQI chart.

July 7, 2019

AICC Report Fire Information: There were 6 new fire reported, for a total of 126 active fires burning statewide. For the 2019 fire season 753,936.4 acres have been burned, which was a 24-hour increase of 65,248.9 acres from the previous day.

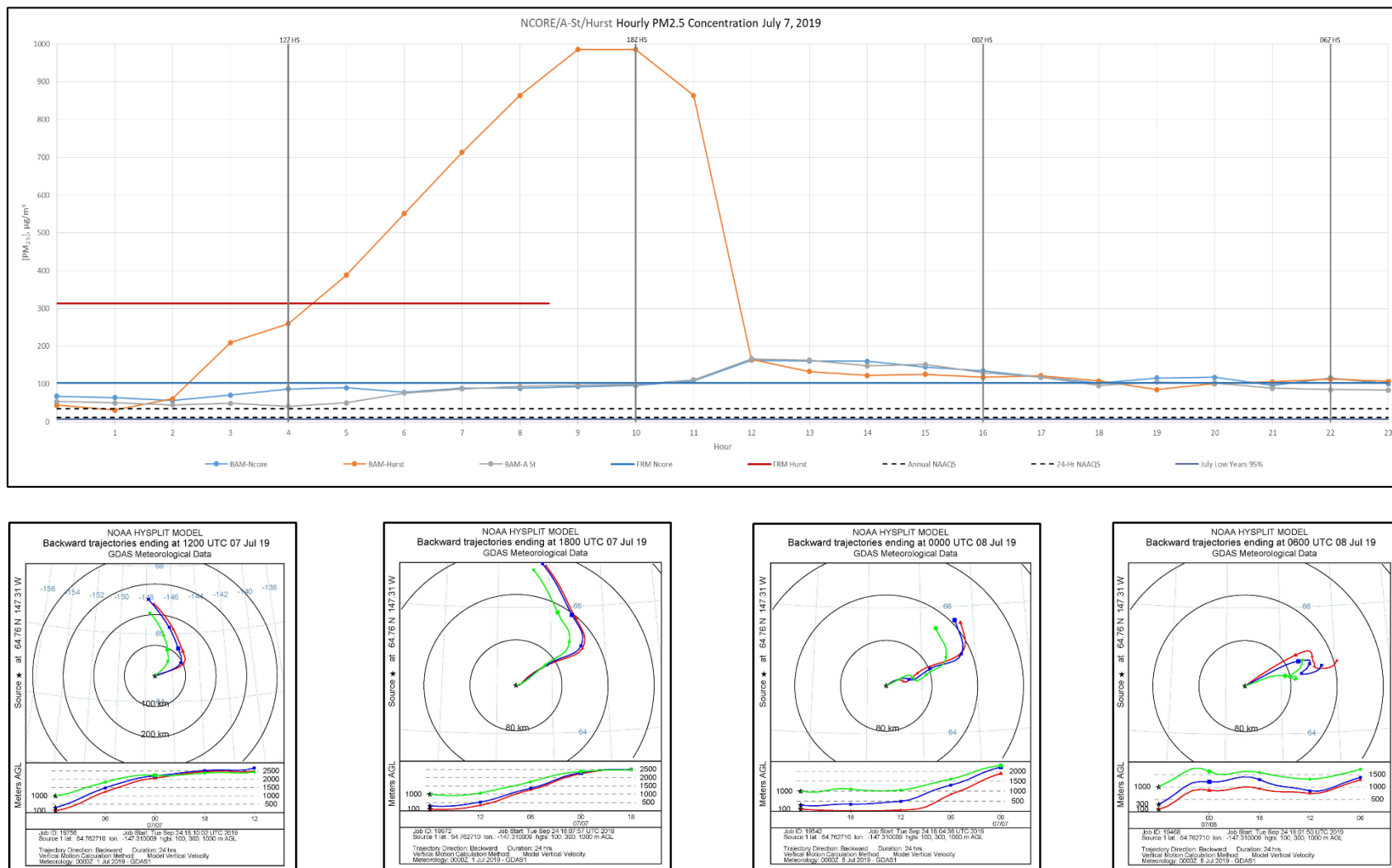


Figure 36. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 7, 2019

PM_{2.5} Data: Figure 36 depicts extremely high hourly PM 2.5 concentration throughout the day, July 7, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 105.0 ug/m³, NCORE continuous FRM PM 2.5 24-hour average was 102.7 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 306.7 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 314.5 ug/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 95.5 ug/m³.

HYSPLIT trajectory: The flow at the 100m/500m/1000m levels pass through the Nugget Creek and Beaver fire smoke field east of FNSB. The 08/00Z (07/1600L) HYSPLIT run has been overlaid on the Google Earth image, Figure 37. The fires in the region have experienced explosive growth during this period and elevated PM_{2.5} concentrations are a result of the smoke being advected into FNSB.

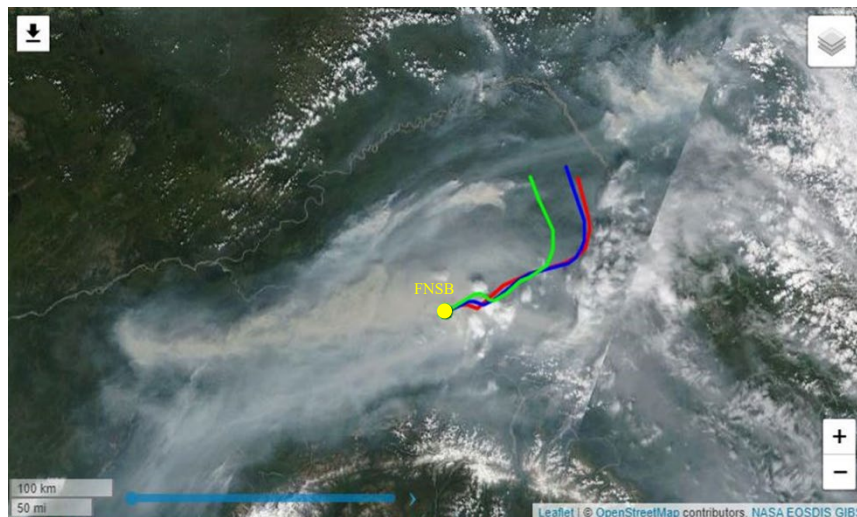
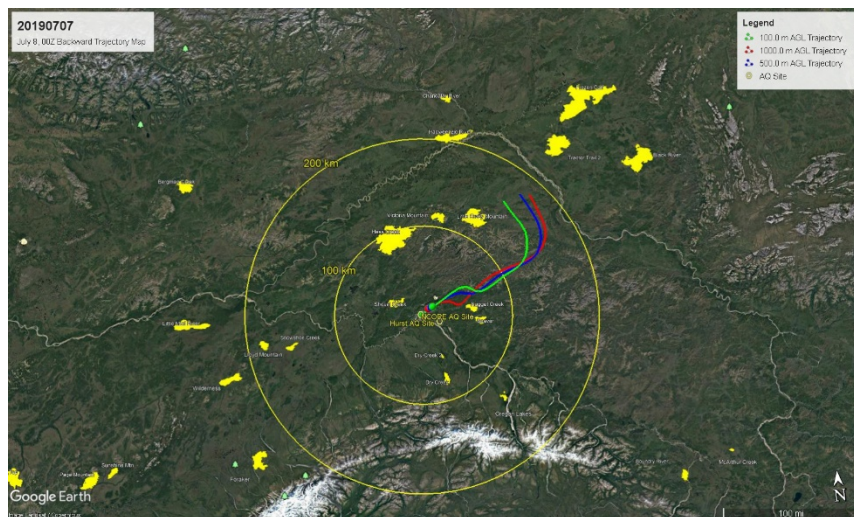


Figure 37. Google Earth with 2019 Fire Perimeters and 08/00Z HYSPLIT (07/1600L) 100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 7, 2019 MODIS satellite imagery overlaid with the 08/00Z HYSPLIT (07/1600L) 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 7, 2019 shows the 100m/500m/1000m back trajectory passing directly through the Nugget Creek and Beaver fire smoke field east of FNSB. A mixture of clouds and thick smoke are visible on the imagery throughout the interior of Alaska.

Table 36. Hourly observation for Fairbanks International Airport, July 7, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/07/2019 00:53 AKDT	6	350	**	7 (Smoke)	3	68	49
PAFA	07/07/2019 01:53 AKDT	5	360	**	7 (Smoke)	5	66	49
PAFA	07/07/2019 02:53 AKDT	5	60	**	7 (Smoke)	6	67	49
PAFA	07/07/2019 03:53 AKDT	5	40	**	7 (Smoke)	3	64	48
PAFA	07/07/2019 04:53 AKDT	5	20	**	7 (Smoke)	3	63	48
PAFA	07/07/2019 05:53 AKDT	5	30	**	7 (Smoke)	3	61	48
PAFA	07/07/2019 06:53 AKDT	8	40	**	7 (Smoke)	3	61	49
PAFA	07/07/2019 07:53 AKDT	7	360	**	7 (Smoke)	3	65	49
PAFA	07/07/2019 08:53 AKDT	0	0	**	7 (Smoke)	3	67	51
PAFA	07/07/2019 09:53 AKDT	0	0	**	7 (Smoke)	3	68	49
PAFA	07/07/2019 10:53 AKDT	3	80	**	7 (Smoke)	3	70	52
PAFA	07/07/2019 11:53 AKDT	3	50	**	7 (Smoke)	3	72	51
PAFA	07/07/2019 12:53 AKDT	7	40	**	7 (Smoke)	1	73	51
PAFA	07/07/2019 13:53 AKDT	7	40	**	7 (Smoke)	1	73	52
PAFA	07/07/2019 14:53 AKDT	5	20	**	7 (Smoke)	1	74	53
PAFA	07/07/2019 15:53 AKDT	6	350	**	7 (Smoke)	2	75	51
PAFA	07/07/2019 16:53 AKDT	6	350	**	7 (Smoke)	2	77	52
PAFA	07/07/2019 17:53 AKDT	6	340	**	7 (Smoke)	2	78	52
PAFA	07/07/2019 18:53 AKDT	5	340	**	7 (Smoke)	2	78	52
PAFA	07/07/2019 19:53 AKDT	3	300	**	7 (Smoke)	2	78	54
PAFA	07/07/2019 20:53 AKDT	0	0	**	7 (Smoke)	3	75	57
PAFA	07/07/2019 21:53 AKDT	0	0	**	7 (Smoke)	2	70	62
PAFA	07/07/2019 22:53 AKDT	0	0	**	7 (Smoke)	3	68	60
PAFA	07/07/2019 23:53 AKDT	0	0	**	7 (Smoke)	2	65	60

Table 37. Hourly observation for Ft. Wainwright AAF, July 7, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/07/2019 00:58 AKDT	3	40	**	6 (Haze)	1	69	49
PAFB	07/07/2019 01:58 AKDT	0	0	**	6 (Haze)	1	68	49
PAFB	07/07/2019 02:58 AKDT	0	0	**	6 (Haze)	1	64	50
PAFB	07/07/2019 03:58 AKDT	0	0	**	6 (Haze)	1	59	50
PAFB	07/07/2019 04:58 AKDT	3	30	**	6 (Haze)	1	57	51
PAFB	07/07/2019 05:58 AKDT	3	40	**	6 (Haze)	1	57	49
PAFB	07/07/2019 06:58 AKDT	3	70	**	6 (Haze)	1	59	48
PAFB	07/07/2019 07:58 AKDT	0	0	**	6 (Haze)	1	60	50
PAFB	07/07/2019 08:58 AKDT	0	0	**	6 (Haze)	1	62	51
PAFB	07/07/2019 09:58 AKDT	3	90	**	**	10	66	50
PAFB	07/07/2019 10:58 AKDT	0	0	**	**	10	68	51
PAFB	07/07/2019 11:58 AKDT	0	0	**	**	10	70	51
PAFB	07/07/2019 12:58 AKDT	5	50	**	6 (Haze)	2	72	52
PAFB	07/07/2019 13:58 AKDT	5	20	**	**	10	74	52
PAFB	07/07/2019 14:58 AKDT	0	0	**	**	10	74	53
PAFB	07/07/2019 15:58 AKDT	3	320	**	**	9	76	52
PAFB	07/07/2019 16:58 AKDT	3	340	**	6 (Haze)	5	79	52
PAFB	07/07/2019 17:58 AKDT	5	330	**	**	7	80	52
PAFB	07/07/2019 18:58 AKDT	5	340	**	6 (Haze)	3	79	55
PAFB	07/07/2019 19:58 AKDT	3	310	**	6 (Haze)	3	78	55
PAFB	07/07/2019 20:58 AKDT	0	0	**	6 (Haze)	2	78	55
PAFB	07/07/2019 21:58 AKDT	0	0	**	6 (Haze)	2	76	56
PAFB	07/07/2019 22:58 AKDT	0	0	**	6 (Haze)	0	68	60
PAFB	07/07/2019 23:58 AKDT	0	0	**	6 (Haze)	0	65	58

Surface observations: Tables 36 and 37 show reduced visibility the majority of all 24-hour observations for the day. The easterly wind component for the day carried the Nugget Creek and Beaver fires smoke field directly over the FNSB area. The lowest visibility report is zero miles at Ft Wainwright AAF in the late evening with calm winds which equated to the “Hazardous” category on the AQI chart.

July 8, 2019

AICC Report Fire Information: There were 5 new fires reported, for a total of 124 active fires burning statewide. For the 2019 fire season 944,448.4 acres have been burned, which was a 24-hour increase of 190,512.0 acres from the previous day.

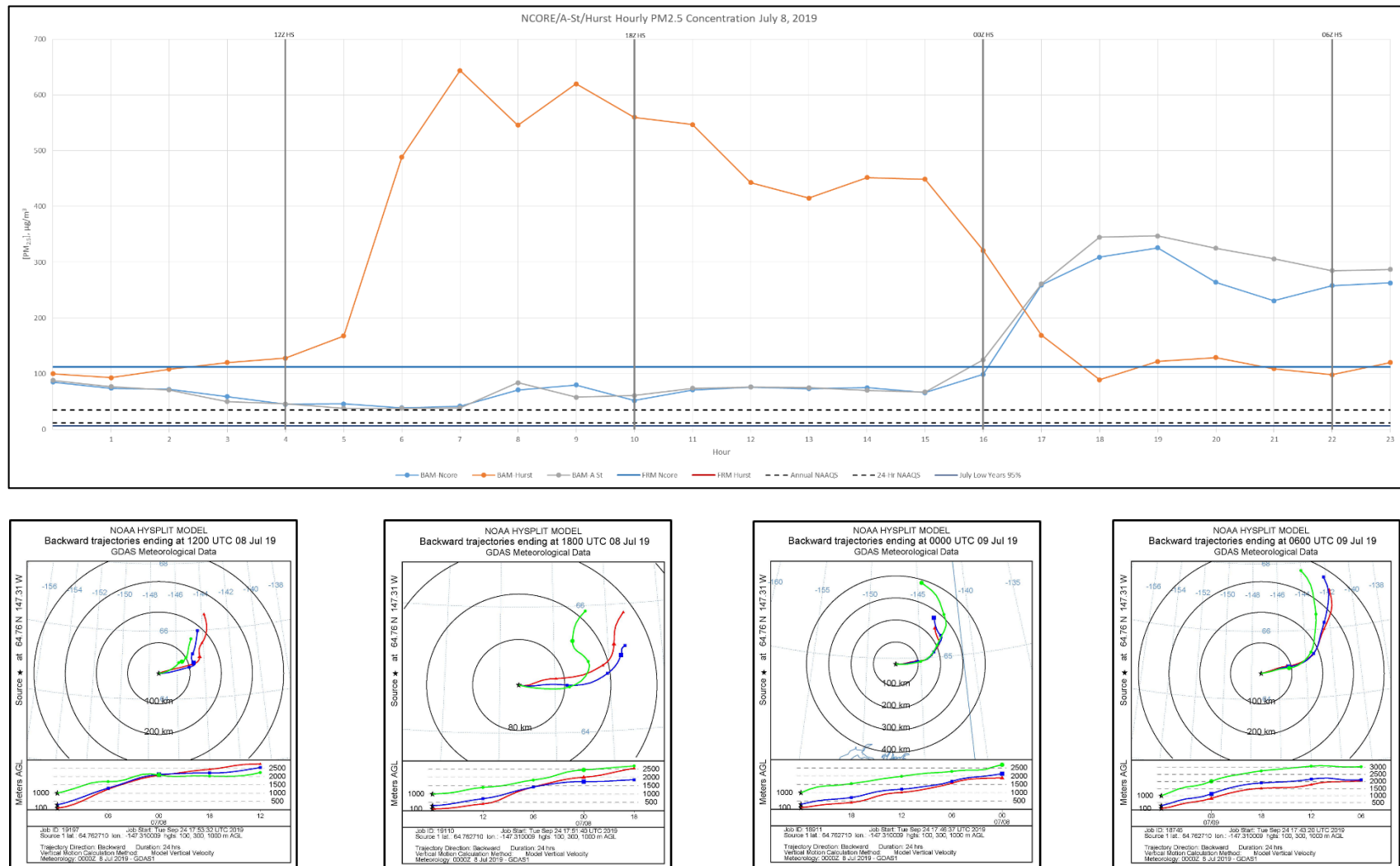


Figure 38. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 8, 2019

PM_{2.5} Data: Figure 38 depicts extremely high hourly PM_{2.5} concentration throughout the day, July 8, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 126.4 ug/m³, NCORE continuous FRM PM_{2.5} 24-hour average was 112.0 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 293.2 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was not available for the day, and the A-Street continuous BAM PM_{2.5} 24-hour average was 137.2 ug/m³.

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels from the east northeast throughout the day. The 09/00Z (08/1600L) HYSPLIT run has been overlaid on the Google Earth image, Figure 39. The fires in the region experienced explosive growth during this period and elevated PM_{2.5} concentrations are a result of the smoke being advected into FNSB.

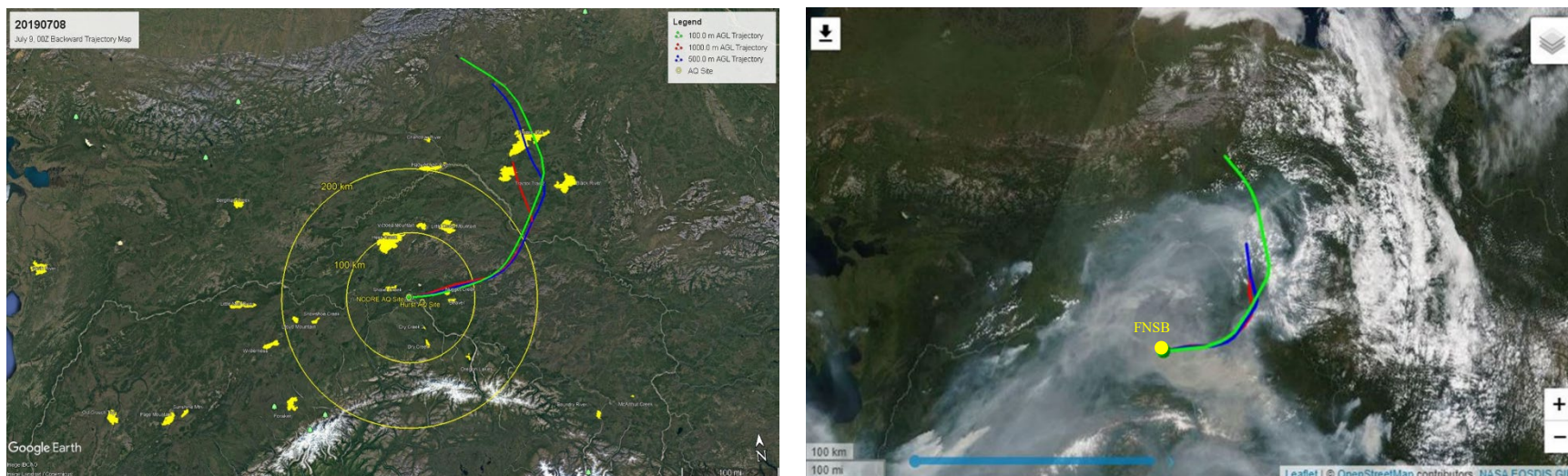


Figure 39. Google Earth with 2019 Fire Perimeters and 09/00Z (08/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 8, 2019 MODIS satellite imagery overlaid with 09/00Z (08/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 8, 2019 shows the 100m/500m/1000m back trajectory passing directly through the Frozen Calf, Tractor Trail 2, and Nugget Creek Fire's smoke field. A mixture of clouds and smoke are visible on the imagery throughout the interior of Alaska.

Table 38. Hourly observation for Fairbanks International Airport, July 8, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/08/2019 00:53 AKDT	0	0	**	7 (Smoke)	3	65	57
PAFA	07/08/2019 01:53 AKDT	5	40	**	7 (Smoke)	4	62	54
PAFA	07/08/2019 02:53 AKDT	0	0	**	7 (Smoke)	5	60	54
PAFA	07/08/2019 03:53 AKDT	5	30	**	7 (Smoke)	5	58	50
PAFA	07/08/2019 04:53 AKDT	5	90	**	7 (Smoke)	6	60	49
PAFA	07/08/2019 05:53 AKDT	5	70	**	7 (Smoke)	5	59	50
PAFA	07/08/2019 06:53 AKDT	0	0	**	7 (Smoke)	5	60	51
PAFA	07/08/2019 07:53 AKDT	0	0	**	7 (Smoke)	5	63	53
PAFA	07/08/2019 08:53 AKDT	0	0	**	7 (Smoke)	4	67	51
PAFA	07/08/2019 09:53 AKDT	0	0	**	7 (Smoke)	2	70	52
PAFA	07/08/2019 10:53 AKDT	0	0	**	7 (Smoke)	2	74	51
PAFA	07/08/2019 11:53 AKDT	6	70	**	7 (Smoke)	2	76	52
PAFA	07/08/2019 12:53 AKDT	9	60	**	7 (Smoke)	3	78	54
PAFA	07/08/2019 13:53 AKDT	7	60	**	7 (Smoke)	3	79	53
PAFA	07/08/2019 14:53 AKDT	6	90	**	7 (Smoke)	3	79	52
PAFA	07/08/2019 15:53 AKDT	3	120	**	7 (Smoke)	3	80	53
PAFA	07/08/2019 16:53 AKDT	3	100	**	7 (Smoke)	2	80	51
PAFA	07/08/2019 17:53 AKDT	3	120	**	7 (Smoke)	1	80	52
PAFA	07/08/2019 18:53 AKDT	0	0	**	7 (Smoke)	1	79	55
PAFA	07/08/2019 19:53 AKDT	0	0	**	7 (Smoke)	1	79	61
PAFA	07/08/2019 20:53 AKDT	0	0	**	7 (Smoke)	1	76	60
PAFA	07/08/2019 21:53 AKDT	0	0	**	7 (Smoke)	1	72	60
PAFA	07/08/2019 22:53 AKDT	0	0	**	7 (Smoke)	1	68	61
PAFA	07/08/2019 23:53 AKDT	0	0	**	7 (Smoke)	1	65	59

Table 39. Hourly observation for Ft. Wainwright AAF, July 8, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/08/2019 00:58 AKDT	0	0	**	6 (Haze)	0	62	58
PAFB	07/08/2019 01:58 AKDT	0	0	**	9	0	59	55
PAFB	07/08/2019 02:58 AKDT	0	0	**	6 (Haze)	0	57	53
PAFB	07/08/2019 03:58 AKDT	0	0	**	6 (Haze)	0	56	51
PAFB	07/08/2019 04:58 AKDT	0	0	**	6 (Haze)	0	57	51
PAFB	07/08/2019 05:58 AKDT	0	0	**	7 (Smoke)	4	56	50
PAFB	07/08/2019 06:58 AKDT	0	0	**	7 (Smoke)	4	59	52
PAFB	07/08/2019 07:58 AKDT	0	0	**	7 (Smoke)	4	63	50
PAFB	07/08/2019 08:58 AKDT	0	0	**	7 (Smoke)	4	67	50
PAFB	07/08/2019 09:58 AKDT	0	0	**	7 (Smoke)	4	70	52
PAFB	07/08/2019 10:58 AKDT	0	0	**	7 (Smoke)	4	75	54
PAFB	07/08/2019 11:58 AKDT	6	100	**	7 (Smoke)	4	77	53
PAFB	07/08/2019 12:58 AKDT	7	80	**	7 (Smoke)	3	78	52
PAFB	07/08/2019 13:58 AKDT	7	90	**	7 (Smoke)	3	78	52
PAFB	07/08/2019 14:58 AKDT	6	80	**	7 (Smoke)	3	80	50
PAFB	07/08/2019 15:58 AKDT	3	110	**	7 (Smoke)	3	81	51
PAFB	07/08/2019 16:58 AKDT	3	120	**	7 (Smoke)	3	82	49
PAFB	07/08/2019 17:58 AKDT	0	0	**	7 (Smoke)	1	81	52
PAFB	07/08/2019 18:58 AKDT	0	0	**	7 (Smoke)	0	80	53
PAFB	07/08/2019 19:58 AKDT	3	180	**	7 (Smoke)	0	81	50
PAFB	07/08/2019 20:58 AKDT	**	**	**	**	**	**	**
PAFB	07/08/2019 21:58 AKDT	0	0	**	7 (Smoke)	0	72	61
PAFB	07/08/2019 22:58 AKDT	0	0	**	7 (Smoke)	0	68	59
PAFB	07/08/2019 23:58 AKDT	0	0	**	6 (Haze)	0	66	59

Surface observations: Tables 38 and 39 show week surface winds the majority of the day. Smoke from the area fires has collected in the Tanana Flats and keeping both sites inundated with smoke/haze. During the morning and evening hours during calm winds the visibility dropped to below 1 mile which equated to the “Hazardous” category on the AQI chart.

July 9, 2019

AICC Report Fire Information: There were 7 new fires reported for a total of 299 active fires burning statewide. For the 2019 fire season 1,060,895.5 acres have been burned, which was a 24-hour increase of 116,447.1 acres from the previous day.

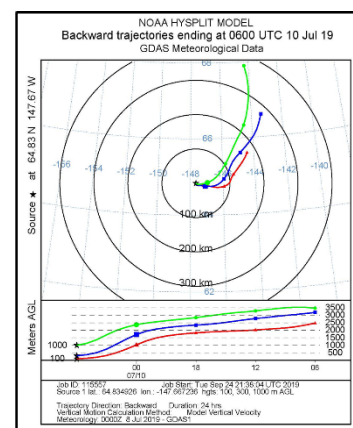
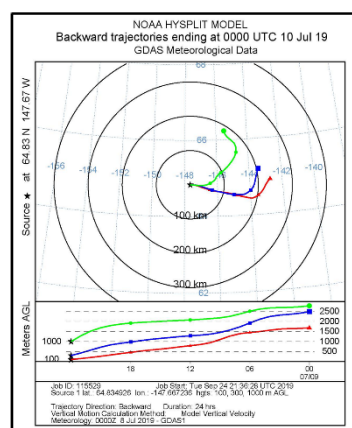
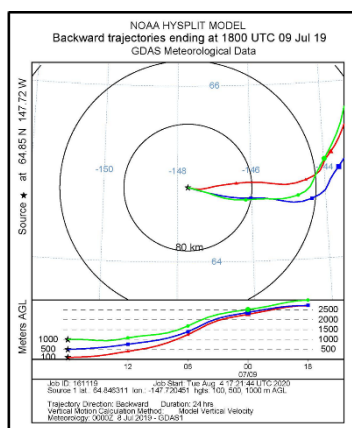
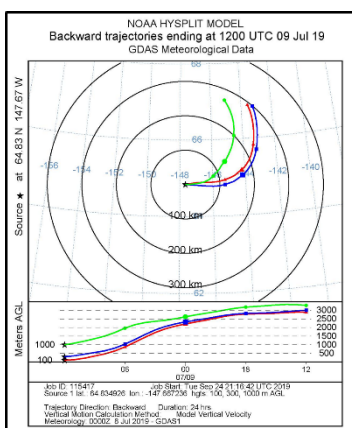
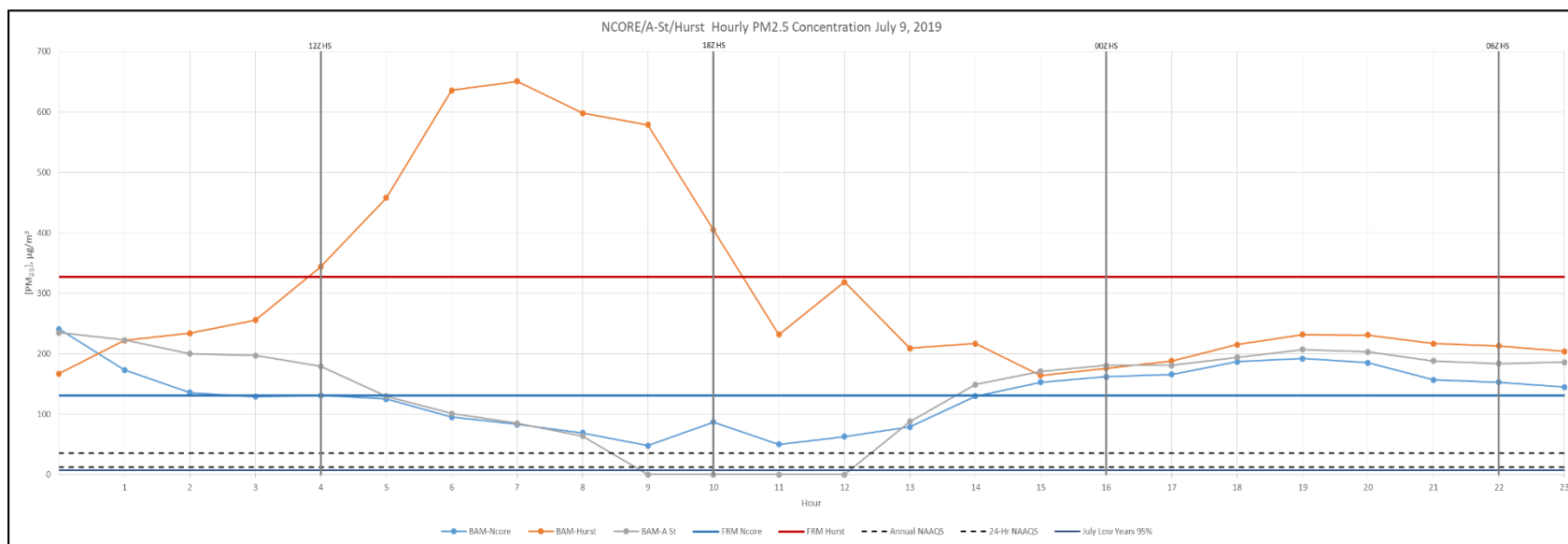


Figure 40. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 9, 2019

PM_{2.5} Data: Figure 40 depicts extremely high hourly PM 2.5 concentration throughout the day, July 9, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 130.7 ug/m³, NCORE continuous FRM PM 2.5 24-hour average was 130.9 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 306.9 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 327.0 ug/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 167.7 ug/m³.

HYSPLIT trajectory: All four HYSPLIT runs indicates a flow at the 100m/500m/1000m levels through the Nugget Creek and Beaver fire smoke field throughout the day. Hurst Rd. monitor experienced the highest hourly PM_{2.5} concentrations due to the close proximity to the fires.

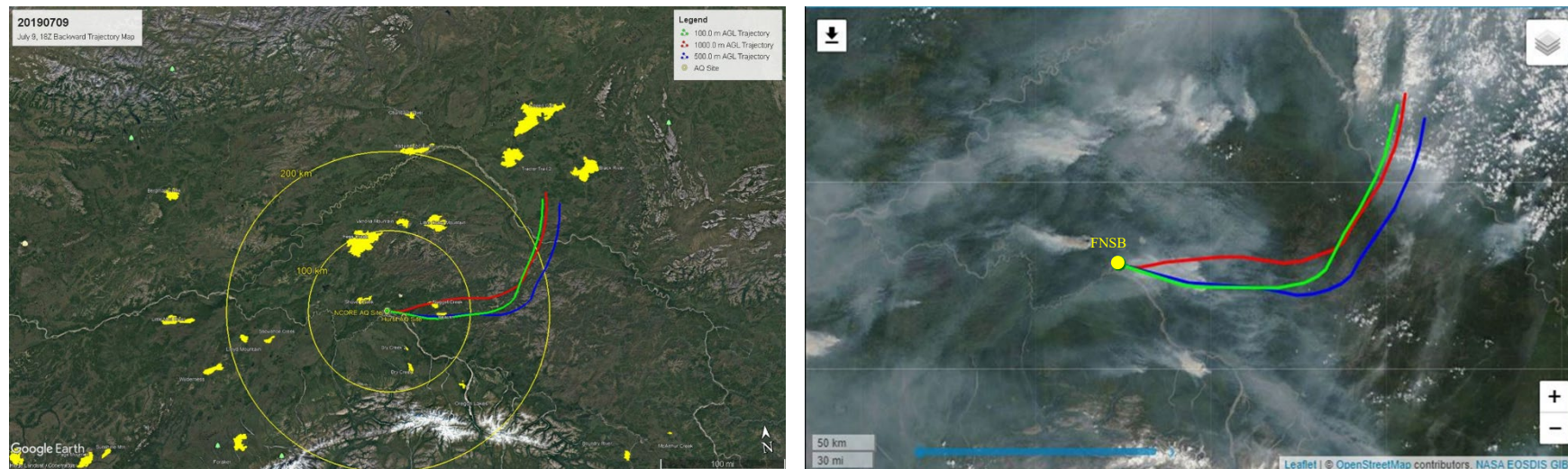


Figure 41. Google Earth with 2019 Fire Perimeters and 09/18Z HYSPLIT (09/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 9, 2019 MODIS satellite imagery is overlaid with the 09/18Z HYSPLIT (09/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 9, 2019 shows the smoke fields from the Interior fires surrounding FNSB. The Nugget Creek and Beaver fires sit just 22 miles east of North Pole, AK. Dense smoke from the fires can be seen advecting into the FNSB area, the 09/18Z HYSPLIT 100m/500m/1000m back trajectory paths run directly over the fires.

Table 40. Hourly observation for Fairbanks International Airport, July 9, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/09/2019 00:53 AKDT	7	40	**	7 (Smoke)	1	62	54
PAFA	07/09/2019 01:53 AKDT	5	30	**	7 (Smoke)	1	62	56
PAFA	07/09/2019 02:53 AKDT	0	0	**	7 (Smoke)	1	61	53
PAFA	07/09/2019 03:53 AKDT	5	100	**	7 (Smoke)	2	56	51
PAFA	07/09/2019 04:53 AKDT	7	60	**	7 (Smoke)	2	57	50
PAFA	07/09/2019 05:53 AKDT	0	0	**	7 (Smoke)	2	57	52
PAFA	07/09/2019 06:53 AKDT	0	0	**	7 (Smoke)	2	61	52
PAFA	07/09/2019 07:53 AKDT	5	40	**	7 (Smoke)	2	64	54
PAFA	07/09/2019 08:53 AKDT	0	0	**	7 (Smoke)	6	67	52
PAFA	07/09/2019 09:53 AKDT	0	0	**	7 (Smoke)	6	72	52
PAFA	07/09/2019 10:53 AKDT	3	30	**	7 (Smoke)	6	76	52
PAFA	07/09/2019 11:53 AKDT	7	60	**	7 (Smoke)	5	79	51
PAFA	07/09/2019 12:53 AKDT	5	130	**	7 (Smoke)	5	81	49
PAFA	07/09/2019 13:53 AKDT	5	120	**	7 (Smoke)	5	83	50
PAFA	07/09/2019 14:53 AKDT	6	60	**	7 (Smoke)	6	85	47
PAFA	07/09/2019 15:53 AKDT	6	150	**	7 (Smoke)	5	85	47
PAFA	07/09/2019 16:53 AKDT	3	100	**	7 (Smoke)	3	86	48
PAFA	07/09/2019 17:53 AKDT	0	0	**	7 (Smoke)	2	86	49
PAFA	07/09/2019 18:53 AKDT	0	0	**	7 (Smoke)	2	87	49
PAFA	07/09/2019 19:53 AKDT	3	30	**	7 (Smoke)	1	84	55
PAFA	07/09/2019 20:53 AKDT	0	0	**	7 (Smoke)	1	81	56
PAFA	07/09/2019 21:53 AKDT	0	0	**	7 (Smoke)	1	75	59
PAFA	07/09/2019 22:53 AKDT	0	0	**	7 (Smoke)	1	72	57
PAFA	07/09/2019 23:53 AKDT	0	0	**	7 (Smoke)	2	68	59

Table 41. Hourly observation for Ft. Wainwright AAF, July 9, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/09/2019 00:58 AKDT	7	40	**	Lgt Rain	1	64	55
PAFB	07/09/2019 01:58 AKDT	3	50	**	Lgt Rain	1	60	53
PAFB	07/09/2019 02:58 AKDT	0	0	**	6 (Haze)	1	60	52
PAFB	07/09/2019 03:58 AKDT	0	0	**	31	1	55	52
PAFB	07/09/2019 04:58 AKDT	5	120	**	6 (Haze)	1	54	48
PAFB	07/09/2019 05:58 AKDT	0	0	**	7 (Smoke)	3	59	50
PAFB	07/09/2019 06:58 AKDT	0	0	**	7 (Smoke)	3	59	52
PAFB	07/09/2019 07:58 AKDT	0	0	**	7 (Smoke)	3	63	51
PAFB	07/09/2019 08:58 AKDT	0	0	**	7 (Smoke)	3	67	52
PAFB	07/09/2019 09:58 AKDT	6	80	**	7 (Smoke)	3	73	51
PAFB	07/09/2019 10:58 AKDT	7	70	**	7 (Smoke)	4	77	50
PAFB	07/09/2019 11:58 AKDT	7	100	**	7 (Smoke)	4	80	46
PAFB	07/09/2019 12:58 AKDT	6		**	7 (Smoke)	5	82	47
PAFB	07/09/2019 13:58 AKDT	3		**	7 (Smoke)	3	84	46
PAFB	07/09/2019 14:58 AKDT	6	150	**	7 (Smoke)	3	84	44
PAFB	07/09/2019 15:58 AKDT	6	100	**	7 (Smoke)	2	86	46
PAFB	07/09/2019 16:58 AKDT	6	60	**	7 (Smoke)	2	86	45
PAFB	07/09/2019 17:58 AKDT	3	40	**	7 (Smoke)	2	86	46
PAFB	07/09/2019 18:58 AKDT	3	350	**	7 (Smoke)	2	85	47
PAFB	07/09/2019 19:58 AKDT	0	0	**	7 (Smoke)	2	84	51
PAFB	07/09/2019 20:58 AKDT	0	0	**	7 (Smoke)	2	81	55
PAFB	07/09/2019 21:58 AKDT	0	0	**	7 (Smoke)	2	76	58
PAFB	07/09/2019 22:58 AKDT	0	0	**	7 (Smoke)	2	71	58
PAFB	07/09/2019 23:58 AKDT	3	50	**	6 (Haze)	3	66	57

Surface observations: Tables 40 and 41 show easterly winds throughout the day. The Nugget Creek and Beaver fires smoke field was advected in the FNSB area and remained on site. The lowest visibility recorded for the day was 1 mile, which equated to the “Hazardous” category on the AQI chart.

July 10, 2019

AICC Report Fire Information: There were 8 new fires reported for a total of 128 active fires burning statewide. For the 2019 fire season 1,306,494.7 acres have been burned, which was a 24-hour increase of 245,599.2 acres from the previous day.

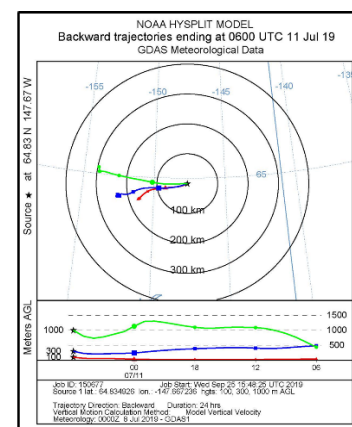
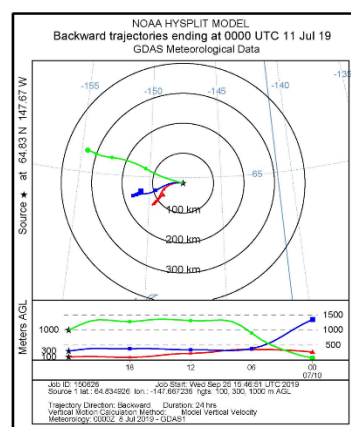
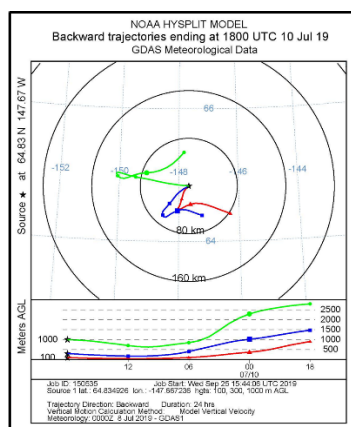
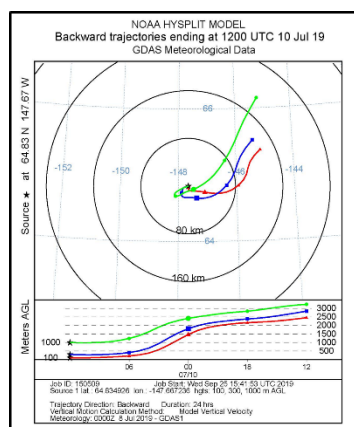
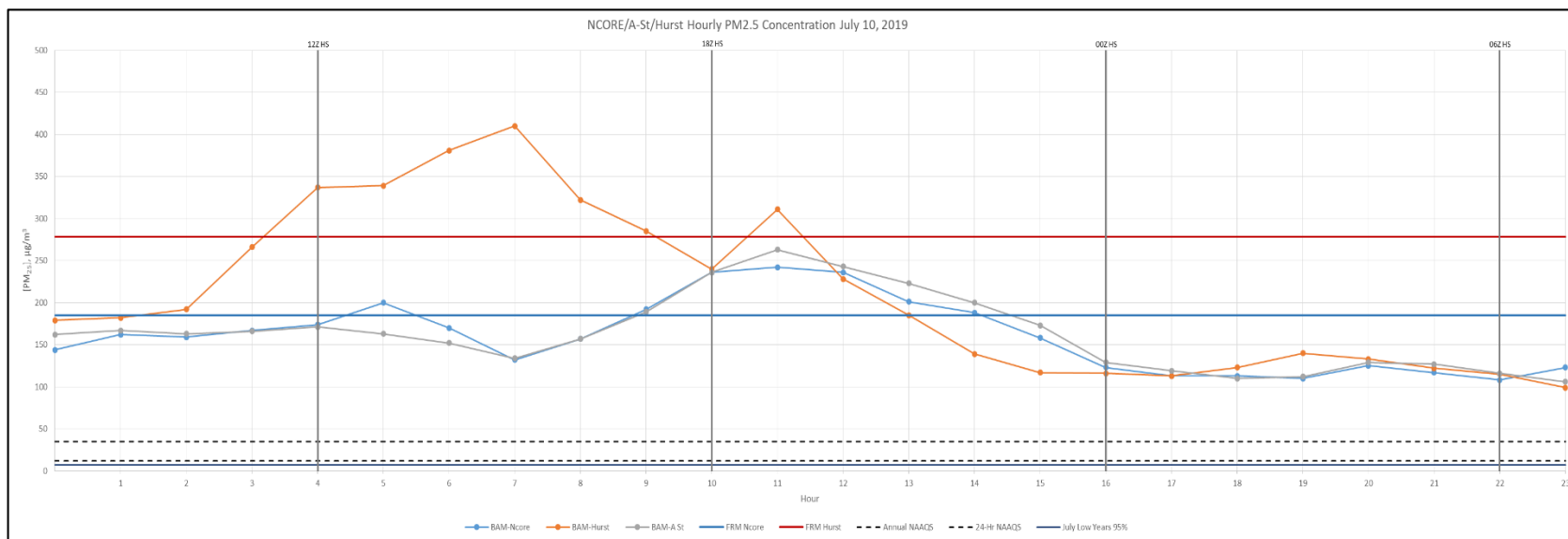


Figure 42. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 10, 2019

PM_{2.5} Data: Figure 42 depicts extremely high hourly PM_{2.5} concentration throughout the day, July 10, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 160.4 ug/m³, NCORE continuous FRM PM 2.5 24-hour average was 185.1 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 211.4 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 278.4 ug/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 162.9 ug/m³.

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels from east in the early morning hours over the Nugget Creek and Beaver fires. The trajectory changes to more westerly component by late morning. The 12Z HYSPLIT run has been overlaid on the Google Earth image, Figure 43. The fires in the region continued to produce heavy smoke that engulfs interior Alaska elevated PM_{2.5} concentrations in FNSB are a result of the smoke from the area fires.

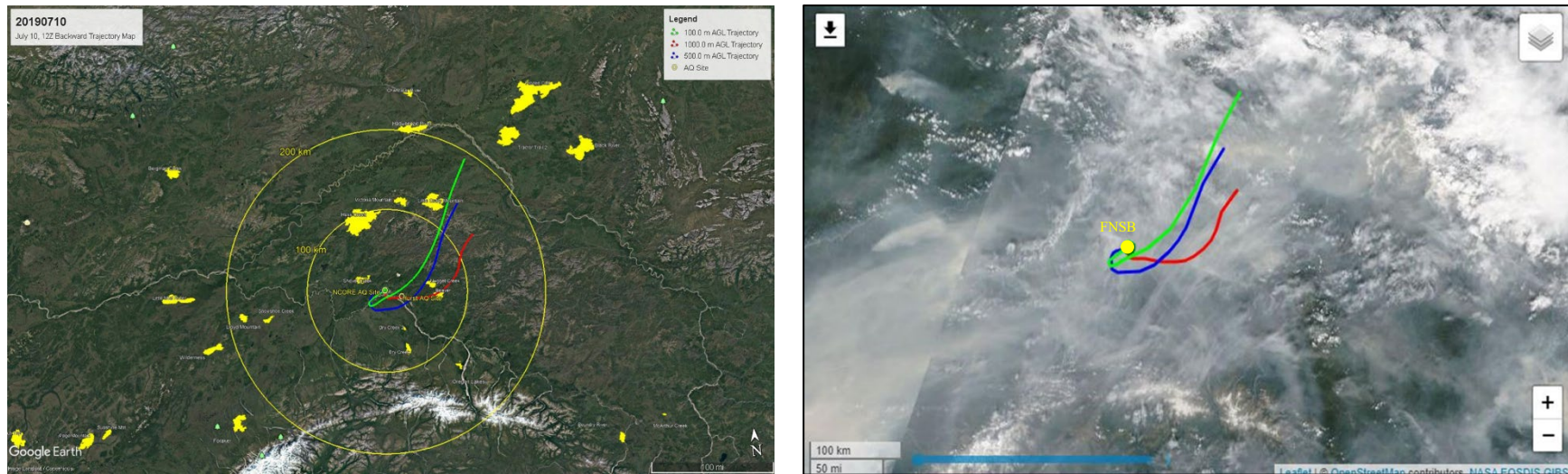


Figure 43. Google Earth with 2019 Fire Perimeters and 10/12Z HYSPLIT (10/0400L) 100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 10, 2019 MODIS satellite imagery overlaid with 10/12Z HYSPLIT (10/0400L) 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 10, 2019 shows Interior Alaska engulfed in smoke from the surrounding fires. Fire growth for the past twenty-four hours was over 200 thousand acres. The 12Z HYSPLIT 30/100/500m back trajectory passes through a dense smoke field surrounding FNSB.

Table 42. Hourly observation for Fairbanks International Airport, July 10, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/10/2019 00:53 AKDT	5	50	**	7 (Smoke)	2	65	57
PAFA	07/10/2019 01:53 AKDT	5	10	**	7 (Smoke)	2	66	51
PAFA	07/10/2019 02:53 AKDT	3	190	**	7 (Smoke)	2	62	52
PAFA	07/10/2019 03:53 AKDT	0	0	**	7 (Smoke)	2	59	53
PAFA	07/10/2019 04:53 AKDT	5	40	**	7 (Smoke)	1	57	51
PAFA	07/10/2019 05:53 AKDT	0	0	**	7 (Smoke)	1	58	49
PAFA	07/10/2019 06:53 AKDT	0	0	**	7 (Smoke)	1	59	50
PAFA	07/10/2019 07:53 AKDT	0	0	**	7 (Smoke)	1	61	52
PAFA	07/10/2019 08:53 AKDT	3	80	**	7 (Smoke)	1	62	52
PAFA	07/10/2019 09:53 AKDT	0	0	**	7 (Smoke)	1	64	51
PAFA	07/10/2019 10:53 AKDT	0	0	**	7 (Smoke)	1	65	53
PAFA	07/10/2019 11:53 AKDT	0	0	**	7 (Smoke)	1	68	53
PAFA	07/10/2019 12:53 AKDT	3	150	**	7 (Smoke)	1	70	54
PAFA	07/10/2019 13:53 AKDT	0	0	**	7 (Smoke)	1	73	54
PAFA	07/10/2019 14:53 AKDT	0	0	**	7 (Smoke)	1	75	57
PAFA	07/10/2019 15:53 AKDT	3	90	**	7 (Smoke)	1	78	58
PAFA	07/10/2019 16:53 AKDT	3	70	**	7 (Smoke)	2	80	60
PAFA	07/10/2019 17:53 AKDT	0	0	**	7 (Smoke)	2	81	61
PAFA	07/10/2019 18:53 AKDT	3	60	**	7 (Smoke)	3	83	61
PAFA	07/10/2019 19:53 AKDT	3	70	**	7 (Smoke)	2	80	63
PAFA	07/10/2019 20:53 AKDT	5	30	**	7 (Smoke)	2	78	64
PAFA	07/10/2019 21:53 AKDT	0	0	**	7 (Smoke)	2	75	62
PAFA	07/10/2019 22:53 AKDT	0	0	**	7 (Smoke)	2	72	63
PAFA	07/10/2019 23:53 AKDT	0	0	**	7 (Smoke)	2	69	63

Table 43. Hourly observation for Ft. Wainwright AAF, July 10, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/10/2019 00:58 AKDT	3	50	**	6 (Haze)	3	65	54
PAFB	07/10/2019 01:58 AKDT	0	0	**	6 (Haze)	3	61	53
PAFB	07/10/2019 02:58 AKDT	0	0	**	6 (Haze)	2	58	53
PAFB	07/10/2019 03:58 AKDT	3	70	**	31 (Mist)	3	55	51
PAFB	07/10/2019 04:58 AKDT	0	0	**	6 (Haze)	3	56	50
PAFB	07/10/2019 05:58 AKDT	3	80	**	7 (Smoke)	2	57	50
PAFB	07/10/2019 06:58 AKDT	5	50	**	7 (Smoke)	2	57	49
PAFB	07/10/2019 07:58 AKDT	0	0	**	7 (Smoke)	2	59	50
PAFB	07/10/2019 08:58 AKDT	3	70	**	7 (Smoke)	2	62	50
PAFB	07/10/2019 09:58 AKDT	0	0	**	7 (Smoke)	2	64	51
PAFB	07/10/2019 10:58 AKDT	3	80	**	7 (Smoke)	1	67	51
PAFB	07/10/2019 11:58 AKDT	0	0	**	7 (Smoke)	1	69	52
PAFB	07/10/2019 12:58 AKDT	3		**	7 (Smoke)	1	72	55
PAFB	07/10/2019 13:58 AKDT	0	0	**	7 (Smoke)	1	74	54
PAFB	07/10/2019 14:58 AKDT	0	0	**	7 (Smoke)	1	76	55
PAFB	07/10/2019 15:58 AKDT	0	0	**	7 (Smoke)	1	78	57
PAFB	07/10/2019 16:58 AKDT	0	0	**	7 (Smoke)	1	80	57
PAFB	07/10/2019 17:58 AKDT	0	0	**	7 (Smoke)	2	81	58
PAFB	07/10/2019 18:58 AKDT	0	0	**	7 (Smoke)	2	80	58
PAFB	07/10/2019 19:58 AKDT	0	0	**	7 (Smoke)	2	80	61
PAFB	07/10/2019 20:58 AKDT	6	60	**	7 (Smoke)	2	78	62
PAFB	07/10/2019 21:58 AKDT	0	0	**	7 (Smoke)	2	75	63
PAFB	07/10/2019 22:58 AKDT	0	0	**	7 (Smoke)	2	72	62
PAFB	07/10/2019 23:58 AKDT	3	90	**	**	10	71	61

Surface observations: Tables 42 and 43 show the light and variable winds throughout the day, during periods of calm winds the visibility dropped to a consistent 1 mile or less at both locations. The lowest visibility reported was 1 mile which equated to the “Hazardous” category on the AQI chart.

July 11, 2019

AICC Report Fire Information: There were 19 new fires reported for a total of 144 active fires burning statewide. For the 2019 fire season 1,319,372.2 acres have been burned, which was a 24-hour increase of 12,877.5 acres from the previous day.

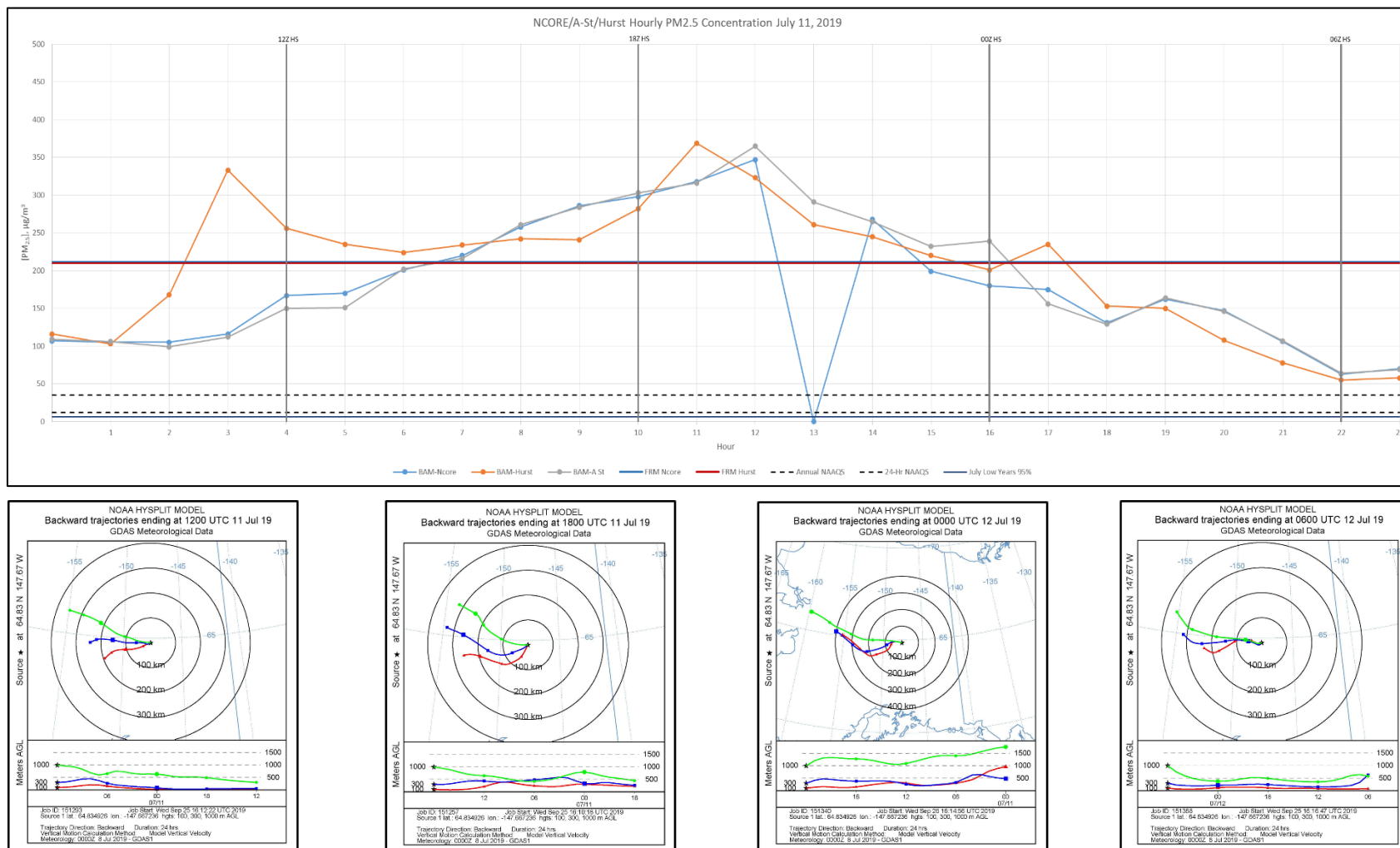


Figure 44. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 11, 2019

PM_{2.5} Data: Figure 44 depicts extremely high hourly PM_{2.5} concentration throughout the day, July 11, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 182.5 ug/m³, NCORE continuous FRM PM 2.5 24-hour average was 211.6 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 203.7 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 210.0 ug/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 189.0 ug/m³.

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels from the west throughout the day. The 18Z HYSPLIT run has been overlaid on the Google Earth image, Figure 45. Even though there was not much fire/smoke growth from the previous day, smoke still occupies Interior Alaska. Little Mud River fire to the west of FNSB is the only fire to increase in size during the day, smoke from that fire advected into FNSB and aided in elevating PM_{2.5} concentrations for July 11th.

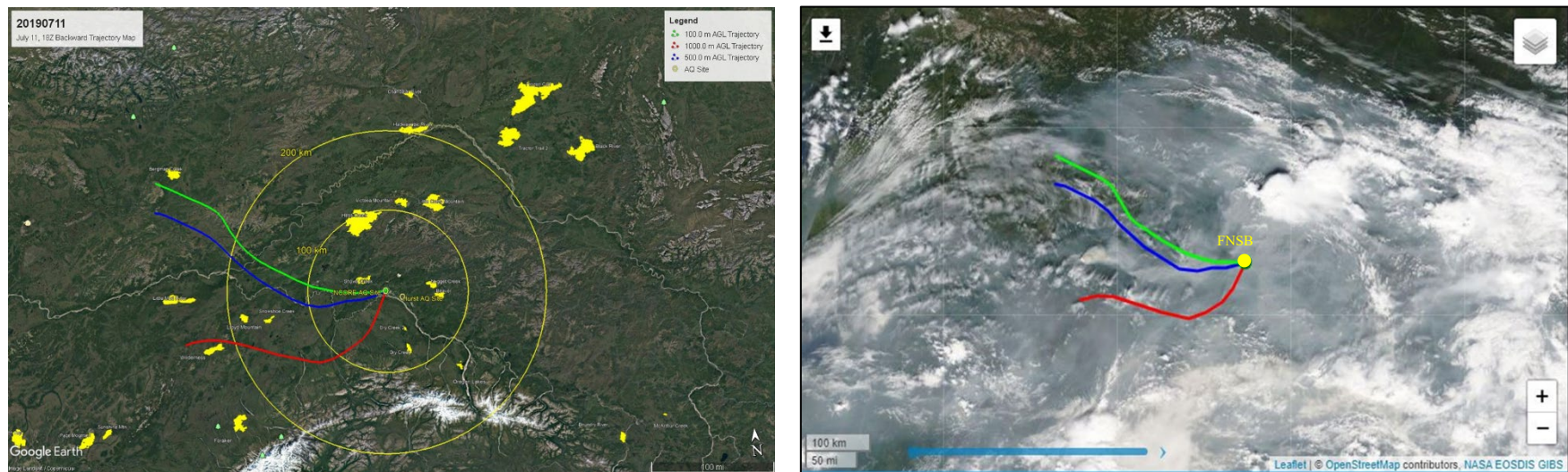


Figure 45. Google Earth with 2019 Fire Perimeters and 11/18Z HYSPLIT (11/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 11, 2019 MODIS satellite imagery overlaid with 11/18Z HYSPLIT (11/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 11, 2019 shows the 100m/500m/1000m back trajectory originating in some cleaner air to the west, but the Little Mud River is situated between the 100m and 500m trajectory. It has experienced significant growth for the day and its smoke is advecting into FNSB.

Table 44. Hourly observation for Fairbanks International Airport, July 11, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/11/2019 00:53 AKDT	3	80	**	7 (Smoke)	2	68	62
PAFA	07/11/2019 01:53 AKDT	3	140	**	7 (Smoke)	2	68	60
PAFA	07/11/2019 02:53 AKDT	0	0	**	7 (Smoke)	2	65	59
PAFA	07/11/2019 03:53 AKDT	0	0	**	7 (Smoke)	2	63	59
PAFA	07/11/2019 04:53 AKDT	0	0	**	7 (Smoke)	1	63	58
PAFA	07/11/2019 05:53 AKDT	5	30	**	7 (Smoke)	1	62	59
PAFA	07/11/2019 06:53 AKDT	6	40	**	7 (Smoke)	1	63	59
PAFA	07/11/2019 07:53 AKDT	6	30	**	7 (Smoke)	1	64	58
PAFA	07/11/2019 08:53 AKDT	3	30	**	7 (Smoke)	1	66	58
PAFA	07/11/2019 09:53 AKDT	0	0	**	7 (Smoke)	1	68	58
PAFA	07/11/2019 10:53 AKDT	0	0	**	7 (Smoke)	1	70	59
PAFA	07/11/2019 11:53 AKDT	3	**	**	7 (Smoke)	1	72	59
PAFA	07/11/2019 12:53 AKDT	3	30	**	7 (Smoke)	1	75	60
PAFA	07/11/2019 13:53 AKDT	3	100	**	7 (Smoke)	1	78	60
PAFA	07/11/2019 14:53 AKDT	7	270	**	7 (Smoke)	1	82	53
PAFA	07/11/2019 15:53 AKDT	10	250	**	7 (Smoke)	1	80	53
PAFA	07/11/2019 16:53 AKDT	12	310	**	7 (Smoke)	2	81	50
PAFA	07/11/2019 17:53 AKDT	9	310	**	7 (Smoke)	1	82	53
PAFA	07/11/2019 18:53 AKDT	7	280	**	7 (Smoke)	2	82	51
PAFA	07/11/2019 19:53 AKDT	6	10	**	7 (Smoke)	1	79	55
PAFA	07/11/2019 20:53 AKDT	5	150	**	7 (Smoke)	2	77	57
PAFA	07/11/2019 21:53 AKDT	12	210	21	7 (Smoke)	2	68	57
PAFA	07/11/2019 22:53 AKDT	5	200	**	7 (Smoke)	3	66	55
PAFA	07/11/2019 23:53 AKDT	3	200	**	7 (Smoke)	2	63	55

Table 45. Hourly observation for Ft. Wainwright AAF, July 11, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/11/2019 00:58 AKDT	8	90	**	**	10	72	59
PAFB	07/11/2019 01:58 AKDT	7	130	**	31 (Mist)	4	68	61
PAFB	07/11/2019 02:58 AKDT	0	0	**	31 (Mist)	8	65	62
PAFB	07/11/2019 03:58 AKDT	0	0	**	31 (Mist)	4	63	62
PAFB	07/11/2019 04:58 AKDT	5	60	**	31 (Mist)	4	62	60
PAFB	07/11/2019 05:58 AKDT	8	70	**	31 (Mist)	2	61	60
PAFB	07/11/2019 06:58 AKDT	9	70	**	7 (Smoke)	2	60	59
PAFB	07/11/2019 07:58 AKDT	7	70	**	7 (Smoke)	2	61	58
PAFB	07/11/2019 08:58 AKDT	7	70	**	7 (Smoke)	1	62	59
PAFB	07/11/2019 09:58 AKDT	6	90	**	7 (Smoke)	1	66	60
PAFB	07/11/2019 10:58 AKDT	3	120	**	7 (Smoke)	1	68	61
PAFB	07/11/2019 11:58 AKDT	0	0	**	7 (Smoke)	1	72	63
PAFB	07/11/2019 12:58 AKDT	0	0	**	7 (Smoke)	1	74	60
PAFB	07/11/2019 13:58 AKDT	0	0	**	7 (Smoke)	1	77	59
PAFB	07/11/2019 14:58 AKDT	3	360	**	7 (Smoke)	1	79	59
PAFB	07/11/2019 15:58 AKDT	8	290	**	7 (Smoke)	1	81	54
PAFB	07/11/2019 16:58 AKDT	**	**	**	**	**	**	**
PAFB	07/11/2019 17:58 AKDT	8	320	**	7 (Smoke)	1	82	54
PAFB	07/11/2019 18:58 AKDT	3	340	**	7 (Smoke)	2	81	54
PAFB	07/11/2019 19:58 AKDT	6	20	**	7 (Smoke)	2	79	57
PAFB	07/11/2019 20:58 AKDT	0	0	**	07 (Smoke)	2	77	59
PAFB	07/11/2019 21:58 AKDT	12	200	**	07 (Smoke)	2	68	57
PAFB	07/11/2019 22:58 AKDT	**	**	**	**	**	**	**
PAFB	07/11/2019 23:58 AKDT	6	240	**	7 (Smoke)	2	64	56

Surface observations: Tables 44 and 45 show light and variable winds in the morning and west northwest in the afternoon evening periods. Smoke is observed in all 24-hour observations at both locations. The lowest visibility reported was 1 mile which equated to the “Hazardous” category on the AQI chart.

July 12, 2019

AICC Report Fire Information: There were 27 new fires reported for a total of 165 active fires burning statewide. For the 2019 fire season 1,498,545.8 acres have been burned, which was a 24-hour increase of 179,173.6 acres from the previous day.

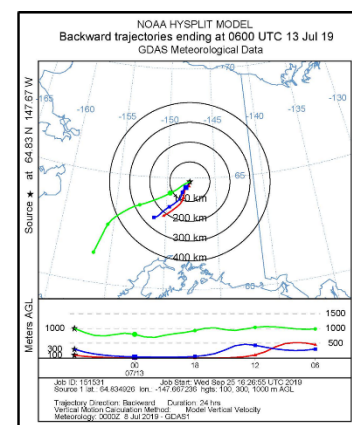
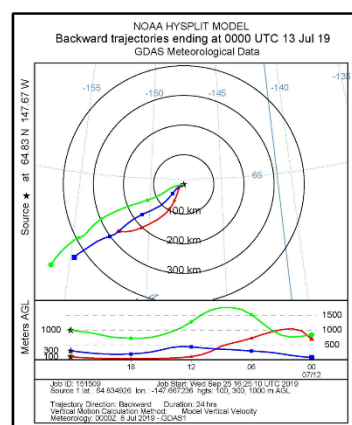
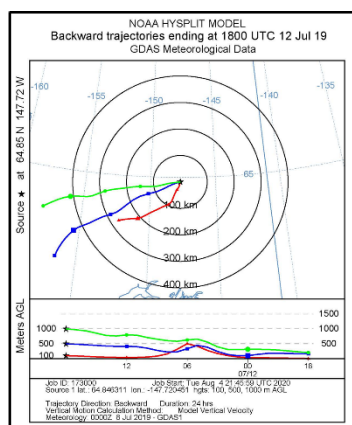
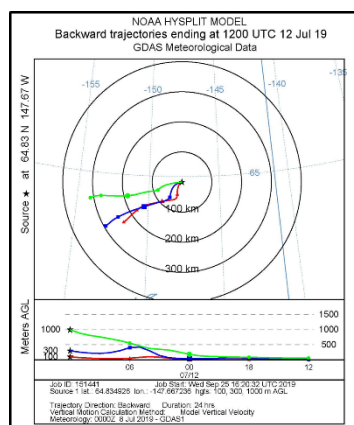
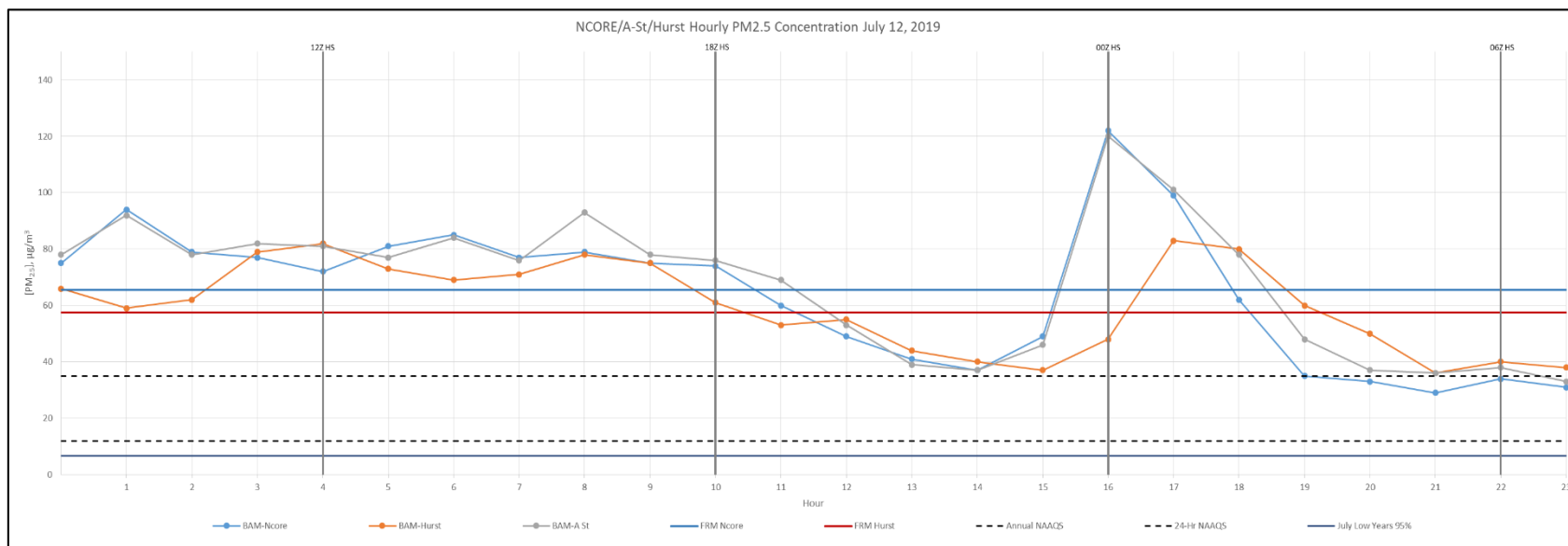


Figure 46. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 12, 2019

PM_{2.5} Data: Figure 46 depicts high hourly PM_{2.5} concentration throughout the day, July 12, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 64.5 ug/m³, NCORE continuous FRM PM 2.5 24-hour average was 65.5 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 59.9 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 57.4 ug/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 67.9 ug/m³.

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels from the southwest throughout the day. The 18Z HYSPLIT run has been overlaid on the Google Earth image, Figure 47. As the cold front stretched over central interior Alaska, it trapped smoke under the clouds and pushed much of the smoke back over FNSB.

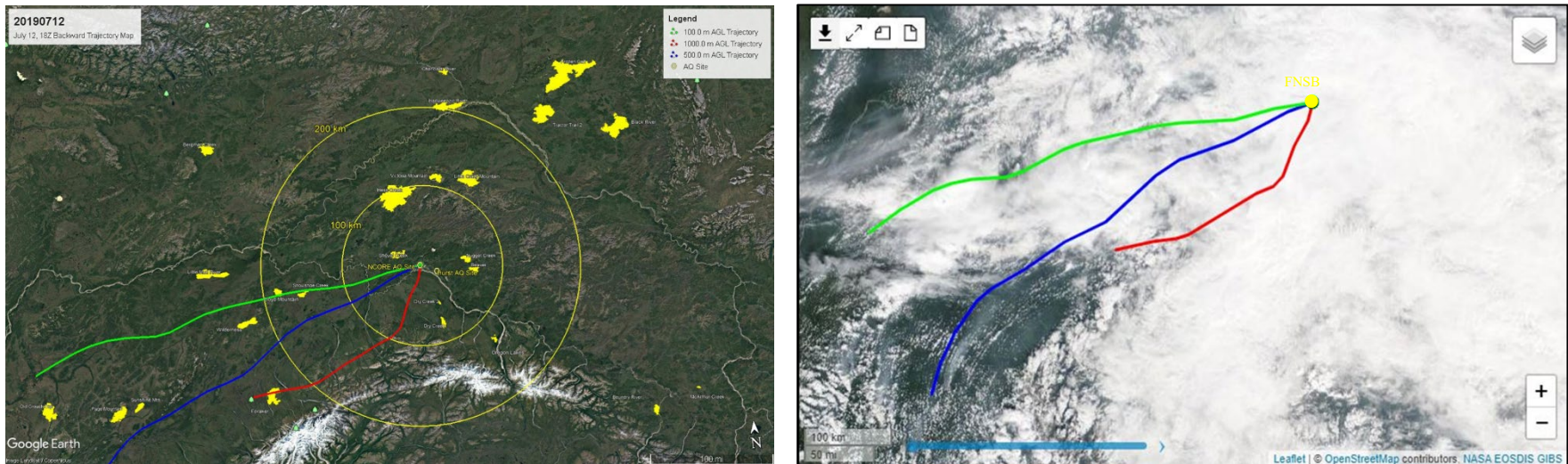


Figure 47. Google Earth with 2019 Fire Perimeters and 12/18Z HYSPLIT (12/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 12, 2019 MODIS satellite imagery overlaid with 12/18Z HYSPLIT (12/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 12, 2019 shows the 100m/500m/1000m back trajectory advecting smoke in from the southwest, causing the smoke to move under the cloud layers of the passing cold front as it is advected into FNSB.

Table 46. Hourly observation for Fairbanks International Airport, July 12, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/12/2019 00:53 AKDT	3	230	**	7 (Smoke)	2	64	56
PAFA	07/12/2019 01:53 AKDT	6	240	**	7 (Smoke)	2	64	55
PAFA	07/12/2019 02:53 AKDT	6	260	**	7 (Smoke)	2	64	55
PAFA	07/12/2019 03:53 AKDT	8	260	**	7 (Smoke)	2	63	56
PAFA	07/12/2019 04:53 AKDT	8	220	**	7 (Smoke)	3	62	56
PAFA	07/12/2019 05:53 AKDT	0	0	**	7 (Smoke)	3	61	57
PAFA	07/12/2019 06:53 AKDT	5	170	**	7 (Smoke)	3	62	57
PAFA	07/12/2019 07:53 AKDT	6	160	**	7 (Smoke)	3	60	56
PAFA	07/12/2019 08:53 AKDT	0	0	**	7 (Smoke)	2	60	57
PAFA	07/12/2019 09:53 AKDT	0	0	**	7 (Smoke)	2	61	57
PAFA	07/12/2019 10:53 AKDT	0	0	**	7 (Smoke)	2	61	57
PAFA	07/12/2019 11:53 AKDT	0	0	**	7 (Smoke)	2	61	58
PAFA	07/12/2019 12:53 AKDT	3	200	**	7 (Smoke)	2	61	59
PAFA	07/12/2019 13:53 AKDT	5	210	**	7 (Smoke)	2	61	59
PAFA	07/12/2019 14:53 AKDT	5	210	**	7 (Smoke)	2	61	59
PAFA	07/12/2019 15:53 AKDT	5	230	**	7 (Smoke)	2	62	59
PAFA	07/12/2019 16:53 AKDT	0	0	**	7 (Smoke)	2	64	59
PAFA	07/12/2019 17:53 AKDT	0	0	**	7 (Smoke)	2	65	58
PAFA	07/12/2019 18:53 AKDT	3	180	**	7 (Smoke)	3	65	59
PAFA	07/12/2019 19:53 AKDT	3	170	**	7 (Smoke)	3	64	60
PAFA	07/12/2019 20:53 AKDT	0	0	**	7 (Smoke)	4	64	60
PAFA	07/12/2019 21:53 AKDT	3	170	**	7 (Smoke)	6	64	60
PAFA	07/12/2019 22:53 AKDT	3	120	**	7 (Smoke)	5	63	60
PAFA	07/12/2019 23:53 AKDT	3	100	**	7 (Smoke)	5	62	60

Table 47. Hourly observation for Ft. Wainwright AAF, July 12, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/12/2019 00:58 AKDT	6	250	**	7 (Smoke)	3	64	56
PAFB	07/12/2019 01:58 AKDT	7	250	**	7 (Smoke)	3	64	56
PAFB	07/12/2019 02:58 AKDT	6	270	**	7 (Smoke)	2	64	56
PAFB	07/12/2019 03:58 AKDT	0	0	**	7 (Smoke)	3	62	56
PAFB	07/12/2019 04:58 AKDT	5	270	**	Lgt Rain	3	63	58
PAFB	07/12/2019 05:58 AKDT	3	110	**	7 (Smoke)	4	59	58
PAFB	07/12/2019 06:58 AKDT	6	150	**	7 (Smoke)	4	60	58
PAFB	07/12/2019 07:58 AKDT	5	160	**	7 (Smoke)	3	61	58
PAFB	07/12/2019 08:58 AKDT	5	50	**	7 (Smoke)	3	60	58
PAFB	07/12/2019 09:58 AKDT	0	0	**	7 (Smoke)3	3	60	59
PAFB	07/12/2019 10:58 AKDT	3	70	**	7 (Smoke)	3	61	59
PAFB	07/12/2019 11:58 AKDT	3	190	**	Lgt Rain	3	61	59
PAFB	07/12/2019 12:58 AKDT	**	**	**	**	**	**	**
PAFB	07/12/2019 13:58 AKDT	6	190	**	7 (Smoke)	2	62	60
PAFB	07/12/2019 14:58 AKDT	7	220	**	7 (Smoke)	1	61	60
PAFB	07/12/2019 15:58 AKDT	7	220	**	7 (Smoke)	2	62	61
PAFB	07/12/2019 16:58 AKDT	7	250	**	7 (Smoke)	2	62	60
PAFB	07/12/2019 17:58 AKDT	5	290	**	7 (Smoke)	2	64	60
PAFB	07/12/2019 18:58 AKDT	0	0	**	7 (Smoke)	2	65	59
PAFB	07/12/2019 19:58 AKDT	7	170	**	7 (Smoke)	2	64	61
PAFB	07/12/2019 20:58 AKDT	0	0	**	7 (Smoke)	3	64	62
PAFB	07/12/2019 21:58 AKDT	0	0	**	7 (Smoke)	3	63	62
PAFB	07/12/2019 22:58 AKDT	3	100	**	7 (Smoke)	3	62	61
PAFB	07/12/2019 23:58 AKDT	0	0	**	**	10	62	61

Surface observations: Tables 46 and 47 show consistent winds from the south southwest majority of the day. Smoke is observed in all 24-hour observations at both locations. The lowest visibility reported was 1 mile which equated to the “Hazardous” category on the AQI chart.

July 13, 2019

AICC Report Fire Information: There was 18 new fires reported for a total of 180 fires burning statewide. For the 2019 fire season 1,534,934.7 acres have been burned, which was a 24-hour increase of 36,388.9 acres from the previous day.

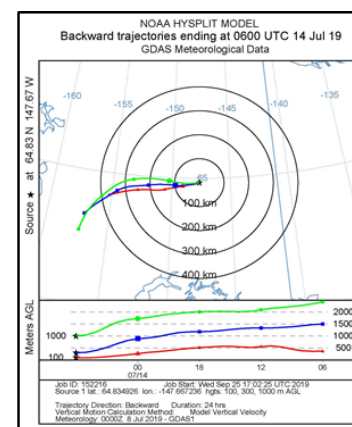
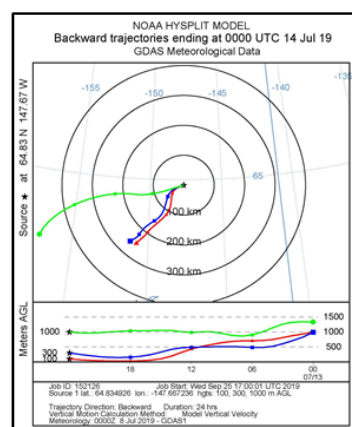
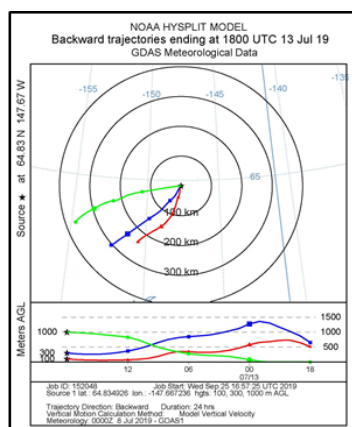
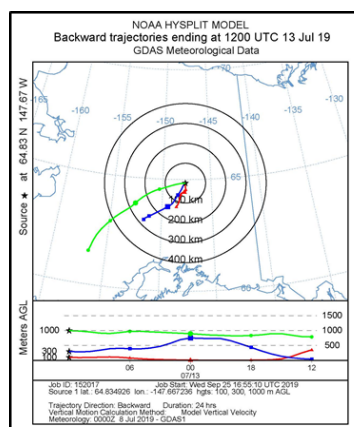
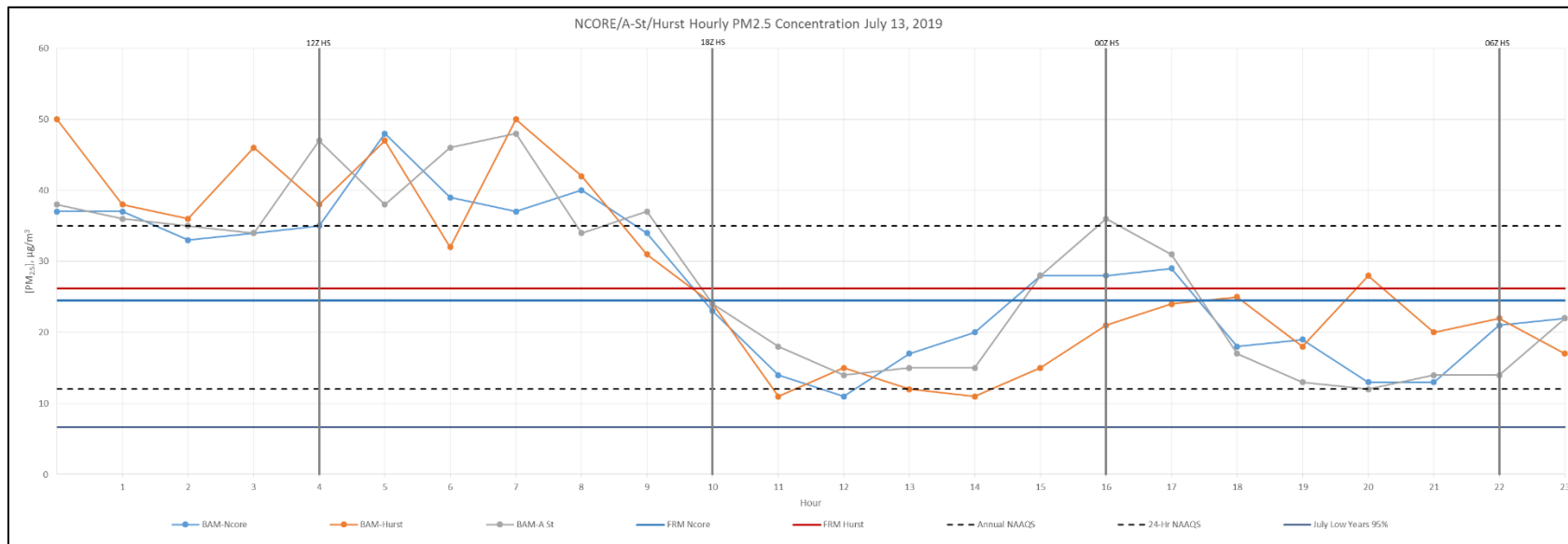


Figure 48. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 13, 2019

PM_{2.5} Data: Figure 48 depicts moderately high hourly PM_{2.5} concentration throughout the day, July 13, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 27.0 ug/m³, NCORE continuous FRM PM_{2.5} 24-hour average was 24.5 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 28.0 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 26.2 ug/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 27.7 ug/m³.

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels from the west southwest throughout the day. The 12Z HYSPLIT run has been overlaid on the Google Earth image, Figure 49. Upstream from FNSB the air is cleaner, the majority of the smoke in the interior is north of the trajectories.

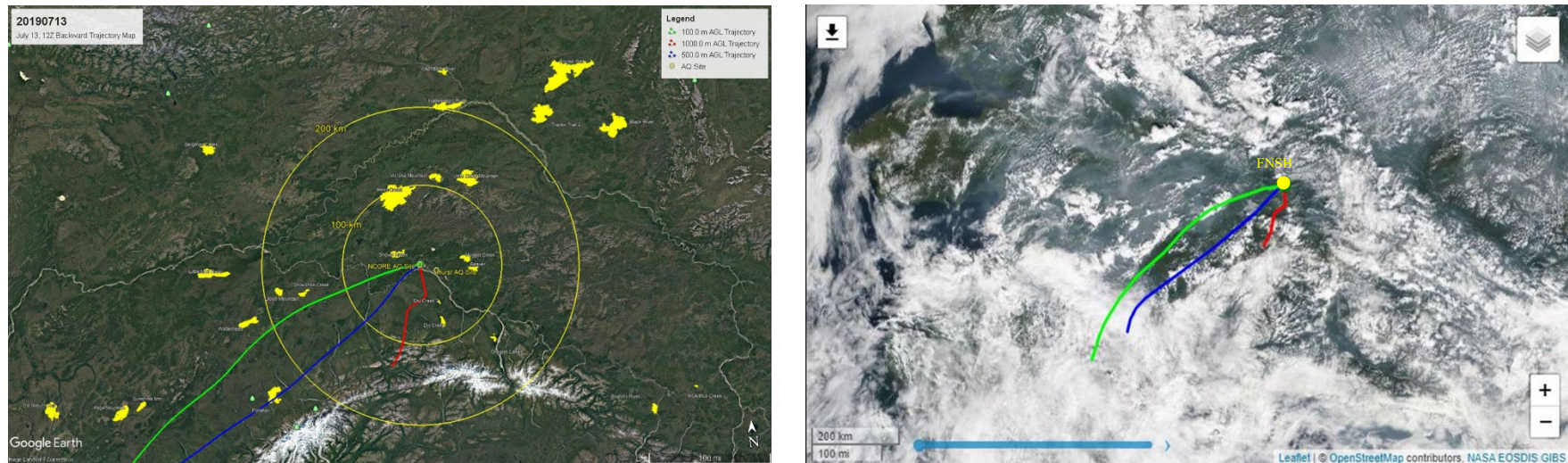


Figure 49. Google Earth with 2019 Fire Perimeters and 13/12Z HYSPLIT (13/0400L)100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 13, 2019 MODIS satellite imagery overlaid with 13/12Z HYSPLIT (13/0400L) 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: The short-lived frontal system cleaned out lower levels of the heavy smoke from the surrounding fires, but there was not enough wetting rains to douse the fires and cease smoke production. The majority of the smoke in the MODIS image is elevated interior smoke.

Table 48. Hourly observation for Fairbanks International Airport, July 13, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/13/2019 00:53 AKDT	0	0	**	7 (Smoke)	3	62	59
PAFA	07/13/2019 01:53 AKDT	0	0	**	7 (Smoke)	5	61	59
PAFA	07/13/2019 02:53 AKDT	0	0	**	7 (Smoke)	5	61	59
PAFA	07/13/2019 03:53 AKDT	0	0	**	7 (Smoke)	4	61	59
PAFA	07/13/2019 04:53 AKDT	3	120	**	7 (Smoke)	4	60	58
PAFA	07/13/2019 05:53 AKDT	0	0	**	7 (Smoke)	4	60	57
PAFA	07/13/2019 06:53 AKDT	0	0	**	7 (Smoke)	4	60	57
PAFA	07/13/2019 07:53 AKDT	3	140	**	7 (Smoke)	4	60	57
PAFA	07/13/2019 08:53 AKDT	0	0	**	7 (Smoke)	2	60	58
PAFA	07/13/2019 09:53 AKDT	0	0	**	7 (Smoke)	3	62	58
PAFA	07/13/2019 10:53 AKDT	6	140	**	**	7	64	58
PAFA	07/13/2019 11:53 AKDT	6	180	**	**	7	66	58
PAFA	07/13/2019 12:53 AKDT	5	170	**	**	10	68	56
PAFA	07/13/2019 13:53 AKDT	5	**	**	**	10	72	56
PAFA	07/13/2019 14:53 AKDT	8	200	**	**	10	75	53
PAFA	07/13/2019 15:53 AKDT	8	200	**	**	10	76	53
PAFA	07/13/2019 16:53 AKDT	7	**	**	**	8	77	52
PAFA	07/13/2019 17:53 AKDT	6	**	**	**	9	77	51
PAFA	07/13/2019 18:53 AKDT	**	**	**	**	9	74	54
PAFA	07/13/2019 19:53 AKDT	8	200	**	**	9	71	54
PAFA	07/13/2019 20:53 AKDT	3	190	**	**	9	73	57
PAFA	07/13/2019 21:53 AKDT	3	210	**	**	10	70	56
PAFA	07/13/2019 22:53 AKDT	3	200	**	**	10	66	59
PAFA	07/13/2019 23:53 AKDT	6	**	**	**	9	66	51

Table 49. Hourly observation for Ft. Wainwright AAF, July 13, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/13/2019 00:58 AKDT	3	50	**	**	9	62	61
PAFB	07/13/2019 01:58 AKDT	0	0	**	**	9	62	60
PAFB	07/13/2019 02:58 AKDT	0	0	**	**	10	61	60
PAFB	07/13/2019 03:58 AKDT	0	0	**	**	7	60	59
PAFB	07/13/2019 04:58 AKDT	3	110	**	31 (Mist)	6	60	59
PAFB	07/13/2019 05:58 AKDT	0	0	**	31 (Mist)	4	60	59
PAFB	07/13/2019 06:58 AKDT	0	0	**	31 (Mist)	6	60	59
PAFB	07/13/2019 07:58 AKDT	5	50	**	31 (Mist)	5	60	59
PAFB	07/13/2019 08:58 AKDT	0	0	**	**	9	61	59
PAFB	07/13/2019 09:58 AKDT	0	0	**	**	10	62	60
PAFB	07/13/2019 10:58 AKDT	5	130	**	**	10	65	58
PAFB	07/13/2019 11:58 AKDT	6	160	**	**	10	65	58
PAFB	07/13/2019 12:58 AKDT	6	190	**	**	10	67	57
PAFB	07/13/2019 13:58 AKDT	5	170	**	**	10	70	57
PAFB	07/13/2019 14:58 AKDT	5	250	**	**	10	73	57
PAFB	07/13/2019 15:58 AKDT	6	240	**	**	10	75	52
PAFB	07/13/2019 16:58 AKDT	7	230	**	**	10	76	51
PAFB	07/13/2019 17:58 AKDT	9	190	**	**	10	77	50
PAFB	07/13/2019 18:58 AKDT	14	200	**	**	10	75	56
PAFB	07/13/2019 19:58 AKDT	6	190	**	**	10	73	56
PAFB	07/13/2019 20:58 AKDT	6	170	**	**	10	72	57
PAFB	07/13/2019 21:58 AKDT	0	0	**	**	10	70	58
PAFB	07/13/2019 22:58 AKDT	0	0	**	**	10	66	59
PAFB	07/13/2019 23:58 AKDT	8	250	**	**	9	67	55

Surface observations: Tables 48 and 49 report smoke as an obstruction to visibility in the early morning hours during calm or light and variable winds. As the speeds increased during the day the visibility increased gradually. The lowest visibility report is two miles which equated to the “Unhealthy” category on the AQI chart.

July 14, 2019

AICC Report Fire Information: There were 14 new fires reported for a total of 188 active fires burning statewide. For the 2019 fire season 1,584,907.6 acres have been burned, which was a 24-hour increase of 55,443.1 acres from the previous day.

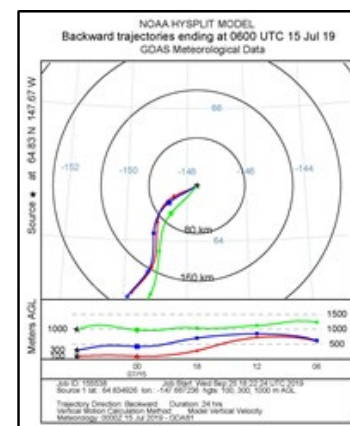
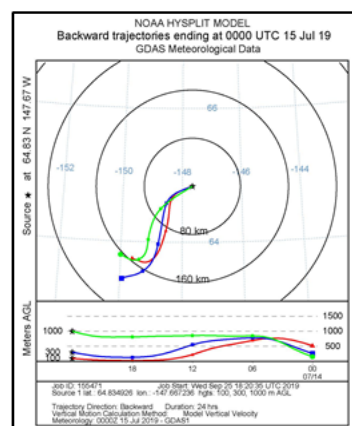
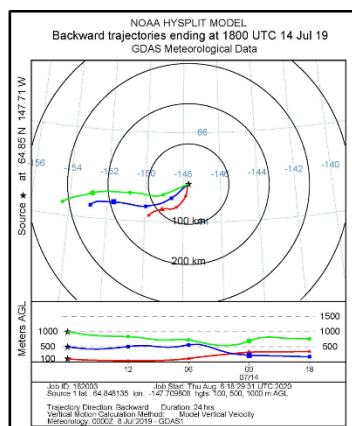
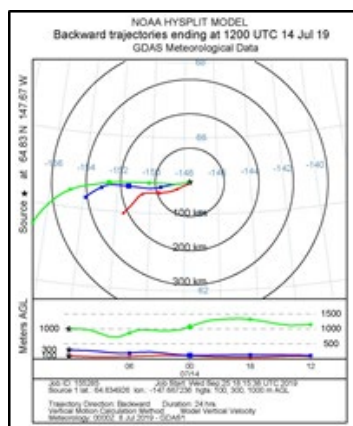
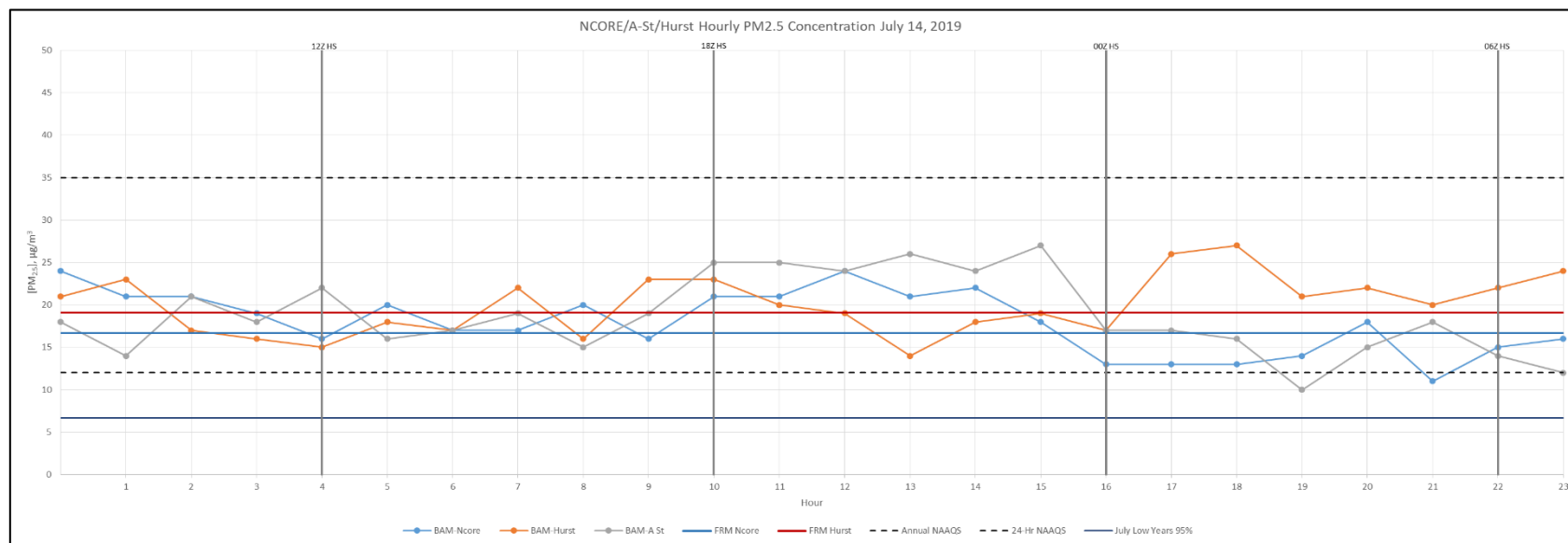


Figure 50. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 14, 2019

PM_{2.5} Data: Figure 50 depicts slightly higher hourly PM_{2.5} concentration throughout the day, July 14, 2019. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 17.9 ug/m³, NCORE continuous FRM PM_{2.5} 24-hour average was 16.7 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 20.0 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 19.1 ug/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 18.7 ug/m³.

HYSPLIT trajectory: Indicates a weak flow at the 100m/500m/1000m levels from the west. The 18Z HYSPLIT run has been overlaid on the Google Earth image, Figure 51. PM_{2.5} concentrations were slightly elevated throughout the day in FNSB.

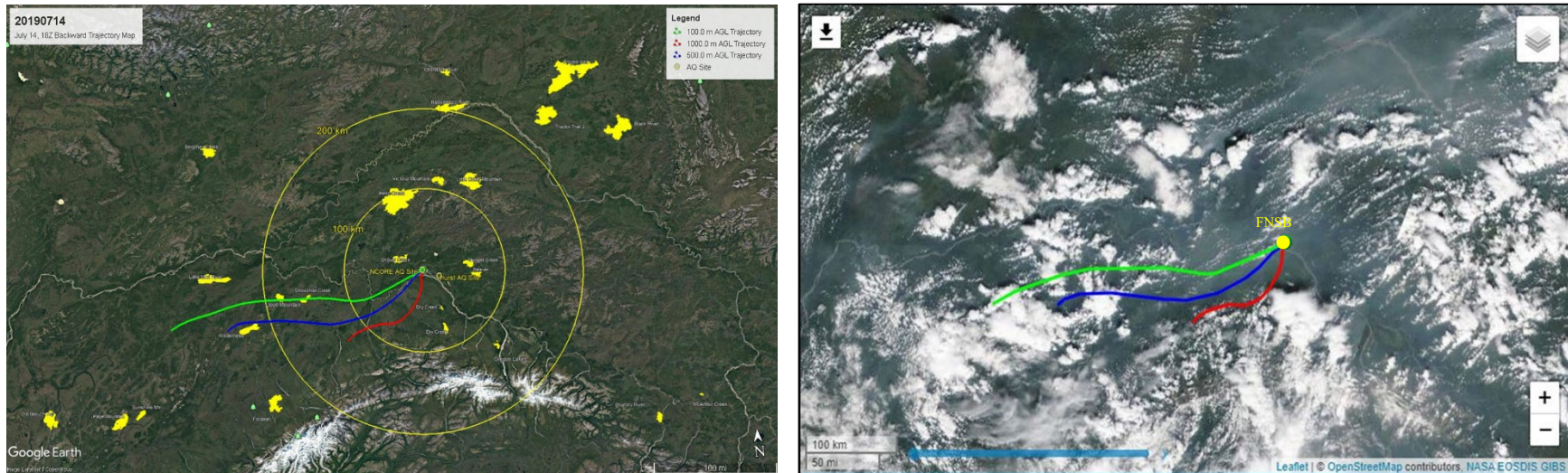


Figure 51. Google Earth with 2019 Fire Perimeters and 14/18Z HYSPLIT (14/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 14, 2019 MODIS satellite imagery overlaid with the 14/18Z HYSPLIT (14/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 14, 2019 shows the 500m/1000m back trajectory passing near the fires out west. The low-level 100m back trajectory avoids any of the fires which helps keep the lower levels somewhat cleaner from the recent days. Smoke is still visibly present in the afternoon MODIS imagery. Westerly flow can be seen pushing the smoke fields in the upper Yukon Flats to the northeast.

Table 50. Hourly observation for Fairbanks International Airport, July 14, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/14/2019 00:53 AKDT	8	200	**	**	9	64	51
PAFA	07/14/2019 01:53 AKDT	7	200	**	**	9	59	52
PAFA	07/14/2019 02:53 AKDT	0	0	**	**	9	58	52
PAFA	07/14/2019 03:53 AKDT	0	0	**	**	9	57	53
PAFA	07/14/2019 04:53 AKDT	0	0	**	**	9	55	52
PAFA	07/14/2019 05:53 AKDT	0	0	**	**	9	55	52
PAFA	07/14/2019 06:53 AKDT	0	0	**	**	9	57	52
PAFA	07/14/2019 07:53 AKDT	0	0	**	**	9	59	52
PAFA	07/14/2019 08:53 AKDT	3	100	**	**	10	61	53
PAFA	07/14/2019 09:53 AKDT	0	0	**	**	10	64	53
PAFA	07/14/2019 10:53 AKDT	0	0	**	**	10	66	54
PAFA	07/14/2019 11:53 AKDT	6	180	**	**	10	69	55
PAFA	07/14/2019 12:53 AKDT	3	120	**	**	10	72	55
PAFA	07/14/2019 13:53 AKDT	5	190	**	**	10	73	55
PAFA	07/14/2019 14:53 AKDT	9	190	**	**	10	76	53
PAFA	07/14/2019 15:53 AKDT	5	**	**	**	10	77	49
PAFA	07/14/2019 16:53 AKDT	0	0	**	**	10	77	50
PAFA	07/14/2019 17:53 AKDT	8	190	**	**	10	77	52
PAFA	07/14/2019 18:53 AKDT	6	200	**	**	10	73	53
PAFA	07/14/2019 19:53 AKDT	3	**	**	**	10	75	54
PAFA	07/14/2019 20:53 AKDT	0	0	**	**	10	75	55
PAFA	07/14/2019 21:53 AKDT	0	0	**	**	10	71	58
PAFA	07/14/2019 22:53 AKDT	5	50	**	**	10	67	57
PAFA	07/14/2019 23:53 AKDT	3	250	**	**	10	66	55

Table 51. Hourly observation for Ft. Wainwright AAF, July 14, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/14/2019 00:58 AKDT	7	200	**	**	9	66	52
PAFB	07/14/2019 01:58 AKDT	0	0	**	**	10	60	54
PAFB	07/14/2019 02:58 AKDT	3	140	**	**	10	59	54
PAFB	07/14/2019 03:58 AKDT	0	0	**	**	9	54	52
PAFB	07/14/2019 04:58 AKDT	5	60	**	**	9	54	53
PAFB	07/14/2019 05:58 AKDT	5	80	**	**	8	55	53
PAFB	07/14/2019 06:58 AKDT	5	70	**	**	9	56	54
PAFB	07/14/2019 07:58 AKDT	3	70	**	**	10	58	54
PAFB	07/14/2019 08:58 AKDT	3	90	**	**	10	61	53
PAFB	07/14/2019 09:58 AKDT	0	0	**	**	10	64	54
PAFB	07/14/2019 10:58 AKDT	3	150	**	**	10	68	55
PAFB	07/14/2019 11:58 AKDT	7	200	**	**	10	69	53
PAFB	07/14/2019 12:58 AKDT	5	210	**	**	10	71	53
PAFB	07/14/2019 13:58 AKDT	7	200	**	**	10	73	52
PAFB	07/14/2019 14:58 AKDT	5	210	**	**	10	75	52
PAFB	07/14/2019 15:58 AKDT	8	190	**	**	10	76	50
PAFB	07/14/2019 16:58 AKDT	8	190	**	**	10	77	48
PAFB	07/14/2019 17:58 AKDT	7	200	**	**	10	76	50
PAFB	07/14/2019 18:58 AKDT	7	190	**	**	10	76	51
PAFB	07/14/2019 19:58 AKDT	7	190	**	**	10	75	54
PAFB	07/14/2019 20:58 AKDT	5	170	**	**	10	74	52
PAFB	07/14/2019 21:58 AKDT	5	160	**	**	10	73	53
PAFB	07/14/2019 22:58 AKDT	0	0	**	**	10	68	57
PAFB	07/14/2019 23:58 AKDT	0	0	**	**	10	63	58

Surface observations: Tables 50 and 51 recorded minimum reduction in visibility of 9 statute miles in the early morning hours. The surface winds have a southerly component pumping in cleaner air into the FNSB area.

July 15, 2019

AICC Report Fire Information: There were 11 new fires reported for a total of 197 active fires burning statewide. For the 2019 fire season 1,642,391.0 acres have been burned, which was a 24-hour increase of 57,483.4 acres from the previous day.

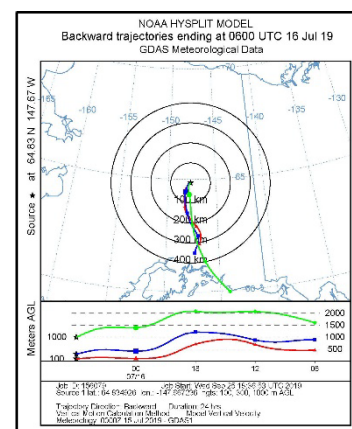
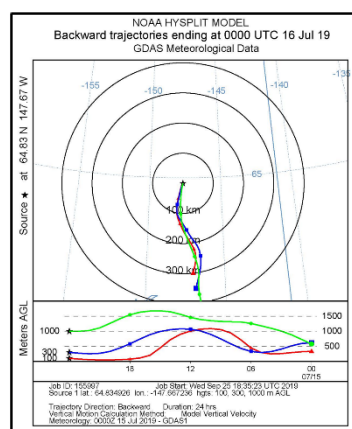
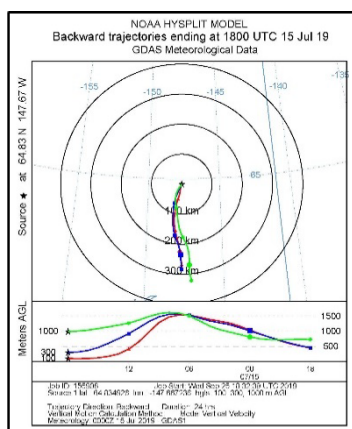
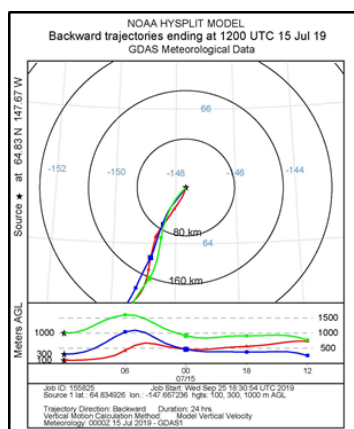
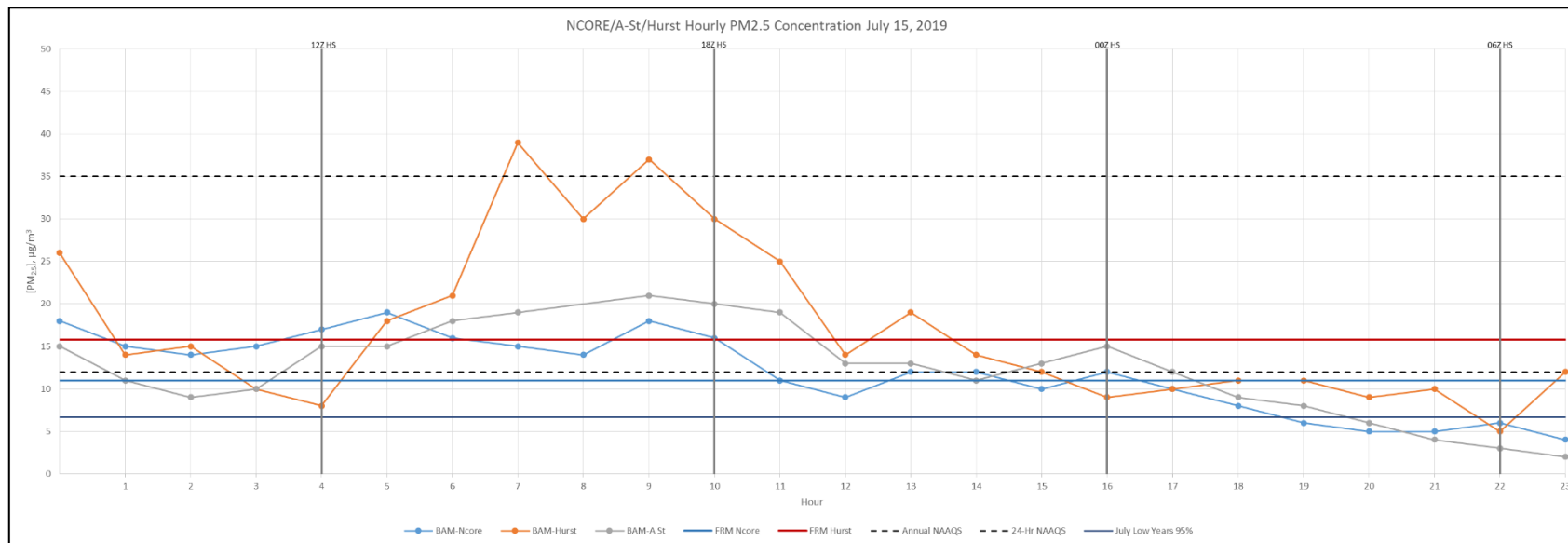


Figure 52. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 15, 2019

PM_{2.5} Data: Figure 52 depicts slightly higher hourly PM_{2.5} concentration throughout the day, July 15, 2019. Concentrations were elevated in the mid-morning hours during when the temperature inversion was at its strongest. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 11.9 ug/m³, NCORE continuous FRM PM_{2.5} 24-hour average was 11.0 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 17.0 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 15.8 ug/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 12.2 ug/m³.

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels being from the south throughout the day July 15, 2019. Smoke from the surrounding fires is being transported to the North away from FNSB. The 18Z HYSPLIT run has been overlaid on the Google Earth image, Figure 53.

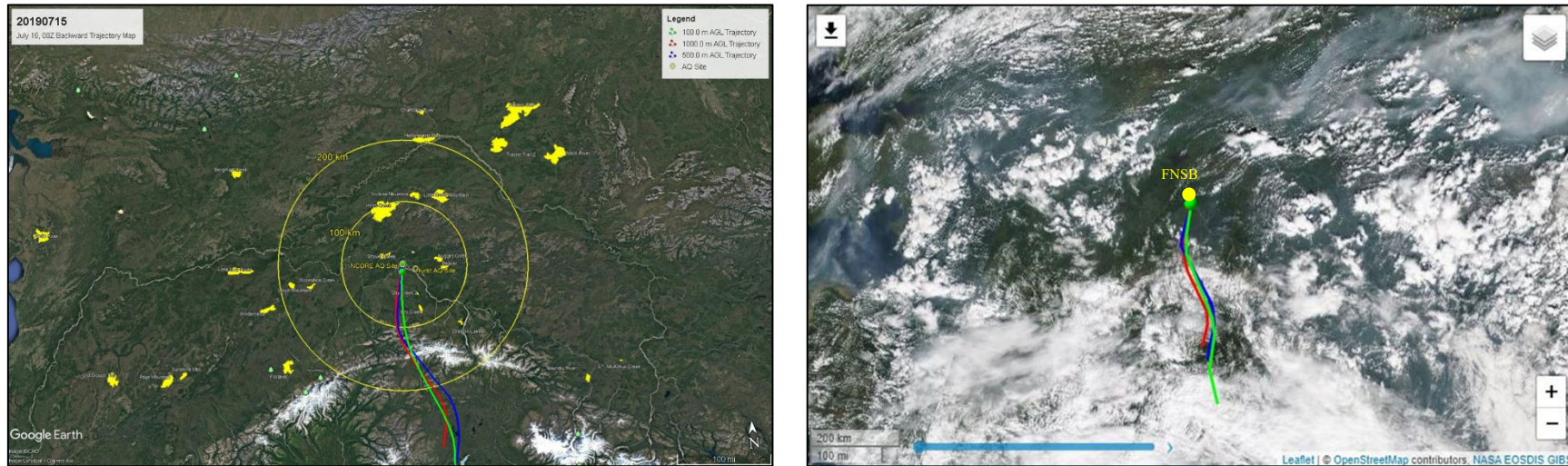


Figure 53. Google Earth with 2019 Fire Perimeters and 16/00Z (15/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 15, 2019 MODIS satellite imagery overlaid with the 16/00Z (15/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 15, 2019 shows the 100m/500m/1000m back trajectory originating to the south of FNSB. There is no visible smoke to the south of FNSB. Smoke from the surrounding fires is being transported to the North away from the FNSB area.

Table 52. Hourly observation for Fairbanks International Airport, July 15, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/15/2019 00:53 AKDT	7	190	**	**	10	62	52
PAFA	07/15/2019 01:53 AKDT	0	0	**	**	10	58	53
PAFA	07/15/2019 02:53 AKDT	7	40	**	**	10	56	52
PAFA	07/15/2019 03:53 AKDT	0	0	**	**	10	54	52
PAFA	07/15/2019 04:53 AKDT	6	140	**	**	10	54	51
PAFA	07/15/2019 05:53 AKDT	0	0	**	**	10	54	51
PAFA	07/15/2019 06:53 AKDT	5	40	**	**	10	57	53
PAFA	07/15/2019 07:53 AKDT	3	40	**	**	10	59	53
PAFA	07/15/2019 08:53 AKDT	5	50	**	**	10	62	53
PAFA	07/15/2019 09:53 AKDT	3	110	**	**	10	64	52
PAFA	07/15/2019 10:53 AKDT	0	0	**	**	10	67	54
PAFA	07/15/2019 11:53 AKDT	5	30	**	**	10	70	54
PAFA	07/15/2019 12:53 AKDT	3	**	**	**	10	73	50
PAFA	07/15/2019 13:53 AKDT	5	**	**	**	10	74	49
PAFA	07/15/2019 14:53 AKDT	0	0	**	**	10	76	50
PAFA	07/15/2019 15:53 AKDT	0	0	**	**	10	77	51
PAFA	07/15/2019 16:53 AKDT	5	310	**	**	10	78	50
PAFA	07/15/2019 17:53 AKDT	3	**	**	**	10	78	50
PAFA	07/15/2019 18:53 AKDT	3	250	**	**	10	78	48
PAFA	07/15/2019 19:53 AKDT	0	0	**	**	10	78	47
PAFA	07/15/2019 20:53 AKDT	10	210	17	**	10	75	49
PAFA	07/15/2019 21:53 AKDT	5	**	**	**	10	71	48
PAFA	07/15/2019 22:53 AKDT	5	240	**	**	10	69	49
PAFA	07/15/2019 23:53 AKDT	6	190	**	**	10	64	50

Table 53. Hourly observation for Ft. Wainwright AAF, July 15, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/15/2019 00:58 AKDT	3	190	**	**	10	63	56
PAFB	07/15/2019 01:58 AKDT	5	270	**	**	10	60	54
PAFB	07/15/2019 02:58 AKDT	3	80	**	**	8	57	54
PAFB	07/15/2019 03:58 AKDT	5	40	**	**	9	54	53
PAFB	07/15/2019 04:58 AKDT	3	80	**	**	8	53	52
PAFB	07/15/2019 05:58 AKDT	0	0	**	**	9	54	52
PAFB	07/15/2019 06:58 AKDT	5	70	**	**	9	55	53
PAFB	07/15/2019 07:58 AKDT	5	60	**	**	9	59	54
PAFB	07/15/2019 08:58 AKDT	5	50	**	**	10	62	54
PAFB	07/15/2019 09:58 AKDT	0	0	**	**	10	65	54
PAFB	07/15/2019 10:58 AKDT	0	0	**	**	10	67	54
PAFB	07/15/2019 11:58 AKDT	0	0	**	**	10	71	53
PAFB	07/15/2019 12:58 AKDT	0	0	**	**	10	72	49
PAFB	07/15/2019 13:58 AKDT	5	250	**	**	10	75	47
PAFB	07/15/2019 14:58 AKDT	3	290	**	**	10	76	46
PAFB	07/15/2019 15:58 AKDT	0	0	**	**	10	77	47
PAFB	07/15/2019 16:58 AKDT	0	0	**	**	10	77	47
PAFB	07/15/2019 17:58 AKDT	6	240	**	**	10	77	47
PAFB	07/15/2019 18:58 AKDT	0	0	**	**	10	78	48
PAFB	07/15/2019 19:58 AKDT	3	220	**	**	10	77	47
PAFB	07/15/2019 20:58 AKDT	5	250	**	**	10	77	47
PAFB	07/15/2019 21:58 AKDT	10	250	**	**	10	72	49
PAFB	07/15/2019 22:58 AKDT	5	280	**	**	9	70	49
PAFB	07/15/2019 23:58 AKDT	7	250	**	**	10	71	48

Surface observations: Tables 52 and 53 show a minimum reduction in visibility of 8-9 statute miles from 0500-8000L. No WX restrictor was present in the observations but that was during the period when the FNSB air quality monitors recorded a slight increase in PM_{2.5} concentrations.

July 18, 2019

AICC Report Fire Information: There were 15 new fires reported for a total of 290 active fires burning statewide. For the 2019 fire season 1,659,536.8 acres have been burned, which was a 24-hour increase of 12,060.5 acres from the previous day.

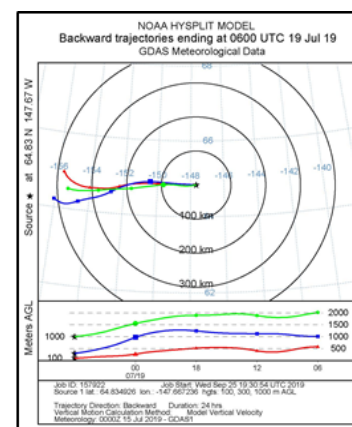
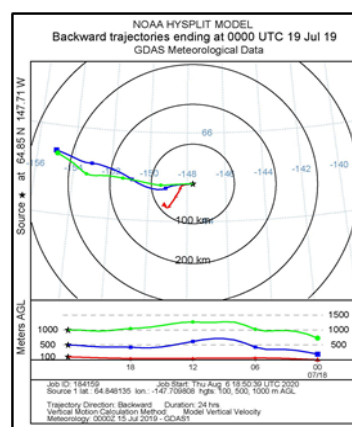
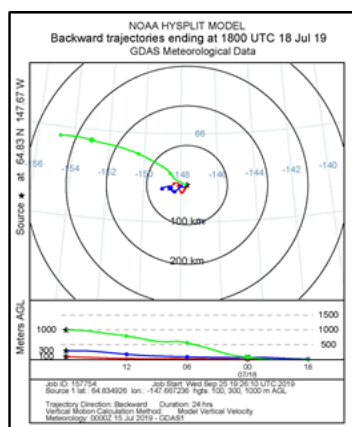
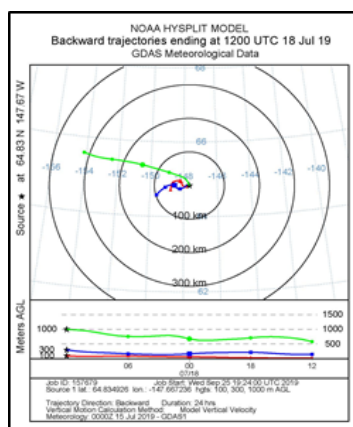
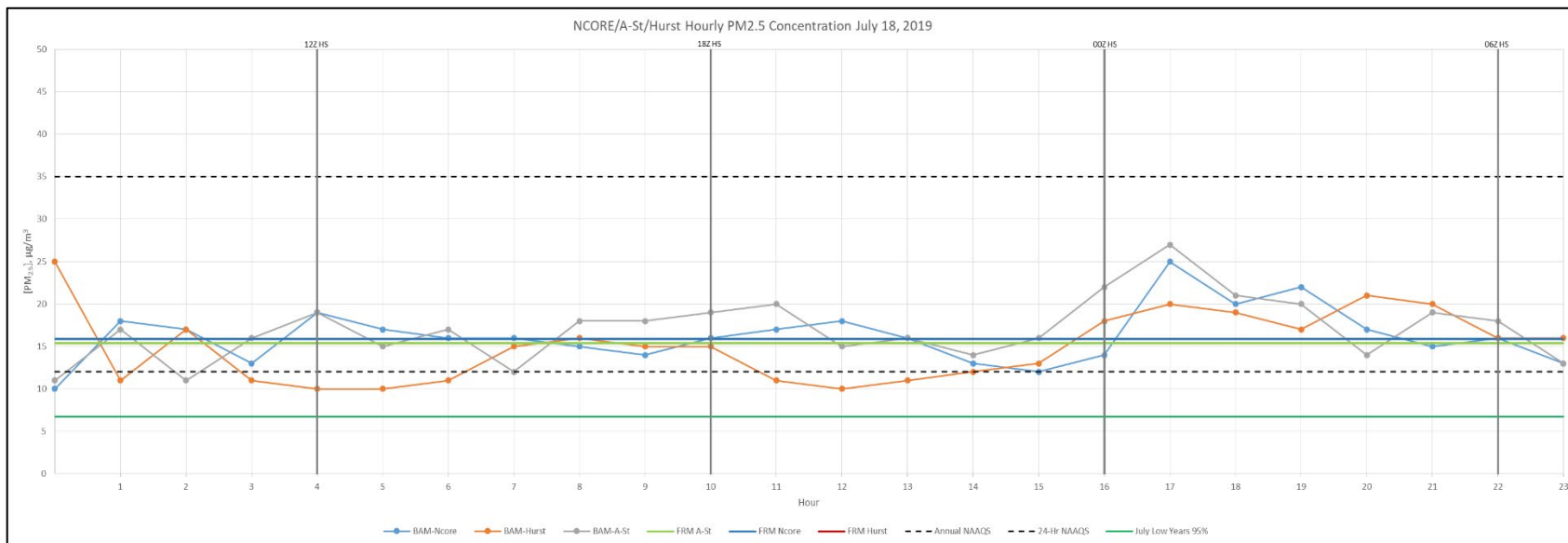


Figure 54. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 18, 2019

PM_{2.5} Data: Figure 54 depicts slightly higher hourly PM_{2.5} concentration throughout the day, July 18, 2019. Concentrations were elevated in the mid-morning hours during when the temperature inversion was at its strongest. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 16.2 ug/m³, NCORE continuous FRM PM_{2.5} 24-hour average was 15.9 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 15.0 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was not available for the day. The A-Street continuous BAM PM_{2.5} 24-hour average was 17.0 ug/m³ and the A-Street continuous FRM PM_{2.5} 24-hour average was 15.4 ug/m³

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels from the west throughout the day, directly from the western fires. The 19/00Z HYSPLIT run has been overlaid on the Google Earth image, Figure 55.

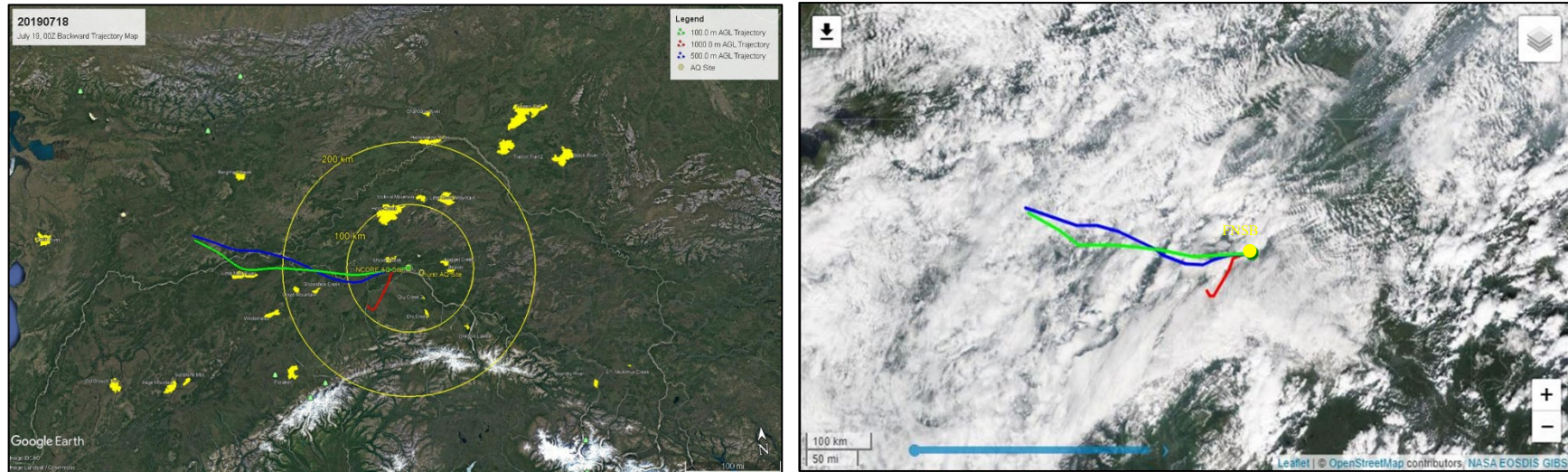


Figure 55. Google Earth with 2019 Fire Perimeters and 19/00Z (18/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 18, 2019 MODIS satellite imagery overlaid with the 19/00Z (18/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 18, 2019 shows the 100m/500m/1000m back trajectory passing through the clouds to the west of FNSB. Wetting rains in the region have washed much of the lower-level smoke out of the atmosphere.

Table 54. Hourly observation for Fairbanks International Airport, July 18, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/18/2019 00:53 AKDT	6	50	**	**	10	63	59
PAFA	07/18/2019 01:53 AKDT	3	340	**	**	10	64	58
PAFA	07/18/2019 02:53 AKDT	0	0	**	**	10	62	58
PAFA	07/18/2019 03:53 AKDT	3	110	**	**	10	62	58
PAFA	07/18/2019 04:53 AKDT	0	0	**	**	10	60	56
PAFA	07/18/2019 05:53 AKDT	0	0	**	**	10	60	56
PAFA	07/18/2019 06:53 AKDT	5	100	**	**	10	60	55
PAFA	07/18/2019 07:53 AKDT	0	0	**	Lgt Rain	10	59	55
PAFA	07/18/2019 08:53 AKDT	0	0	**	**	10	60	56
PAFA	07/18/2019 09:53 AKDT	5	230	**	**	10	62	57
PAFA	07/18/2019 10:53 AKDT	0	0	**	**	10	64	58
PAFA	07/18/2019 11:53 AKDT	0	0	**	**	10	64	57
PAFA	07/18/2019 12:53 AKDT	5	150	**	**	10	66	58
PAFA	07/18/2019 13:53 AKDT	7	100	**	**	10	68	59
PAFA	07/18/2019 14:53 AKDT	8	170	**	**	10	72	59
PAFA	07/18/2019 15:53 AKDT	8	190	**	**	10	75	58
PAFA	07/18/2019 16:53 AKDT	8	250	**	**	10	77	55
PAFA	07/18/2019 17:53 AKDT	3	270	**	**	10	75	54
PAFA	07/18/2019 18:53 AKDT	6	190	**	**	10	75	56
PAFA	07/18/2019 19:53 AKDT	8	220	**	**	10	74	56
PAFA	07/18/2019 20:53 AKDT	7	210	**	**	10	73	58
PAFA	07/18/2019 21:53 AKDT	6	240	**	**	10	72	55
PAFA	07/18/2019 22:53 AKDT	6	210	**	**	10	68	57
PAFA	07/18/2019 23:53 AKDT	9	280	**	**	10	68	53

Table 55. Hourly observation for Ft. Wainwright AAF, July 18, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/18/2019 00:58 AKDT	0	0	**	**	10	64	57
PAFB	07/18/2019 01:58 AKDT	0	0	**	**	10	63	58
PAFB	07/18/2019 02:58 AKDT	5	60	**	**	9	61	57
PAFB	07/18/2019 03:58 AKDT	3	90	**	**	9	60	57
PAFB	07/18/2019 04:58 AKDT	3	80	**	**	9	58	55
PAFB	07/18/2019 05:58 AKDT	6	90	**	**	8	57	54
PAFB	07/18/2019 06:58 AKDT	6	90	**	**	9	60	54
PAFB	07/18/2019 07:58 AKDT	3	60	**	**	9	60	55
PAFB	07/18/2019 08:58 AKDT	0	0	**	**	9	62	56
PAFB	07/18/2019 09:58 AKDT	5	260	**	**	8	61	59
PAFB	07/18/2019 10:58 AKDT	0	0	**	**	10	62	58
PAFB	07/18/2019 11:58 AKDT	0	0	**	**	10	64	58
PAFB	07/18/2019 12:58 AKDT	**	**	**	**	**	**	**
PAFB	07/18/2019 13:58 AKDT	5	140	**	**	10	69	58
PAFB	07/18/2019 14:58 AKDT	5	270	**	**	10	72	59
PAFB	07/18/2019 15:58 AKDT	3	200	**	**	10	74	59
PAFB	07/18/2019 16:58 AKDT	8	250	**	**	10	76	57
PAFB	07/18/2019 17:58 AKDT	0	0	**	**	10	77	55
PAFB	07/18/2019 18:58 AKDT	10	220	**	**	10	75	55
PAFB	07/18/2019 19:58 AKDT	15	220	**	**	10	73	57
PAFB	07/18/2019 20:58 AKDT	7	190	**	**	10	74	56
PAFB	07/18/2019 21:58 AKDT	**	**	**	**	**	**	**
PAFB	07/18/2019 22:58 AKDT	**	**	**	**	**	**	**
PAFB	07/18/2019 23:58 AKDT	5	260	**	**	10	66	58

Surface observations: Tables 54 and 55 show a minimum reduction in visibility of 8-9 statute miles from 0300-1000L. No WX restrictor was present in the observations.

July 20, 2019

AICC Report Fire Information: There were 6 new fires reported for a total of 222 active fires burning statewide. For the 2019 fire season 1,728,293.8 acres have been burned, which was a 24-hour increase of 57,928.2 acres from the previous day.

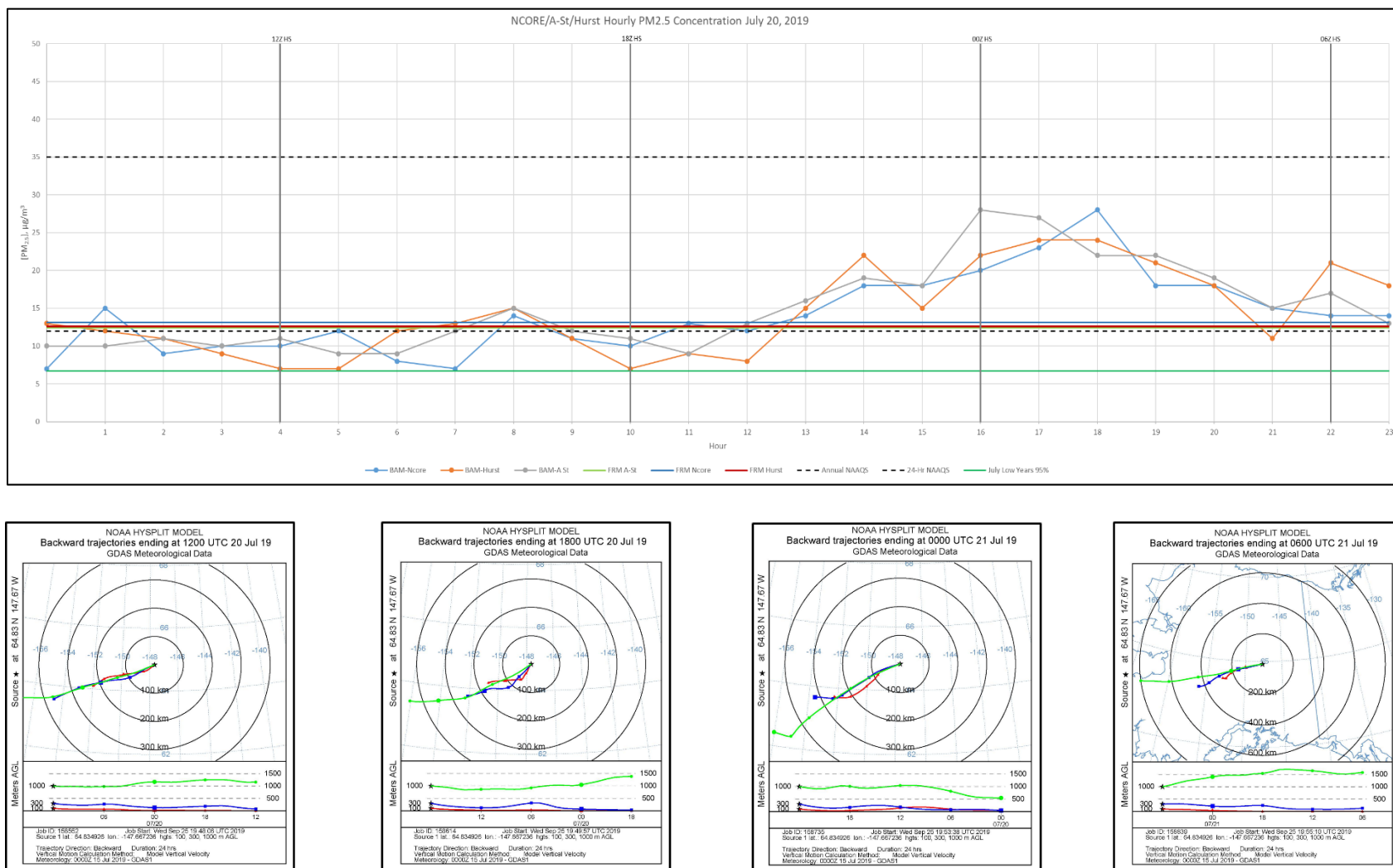


Figure 56. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 20, 2019

PM_{2.5} Data: Figure 56 depicts slightly higher hourly PM_{2.5} concentrations beginning in the afternoon on the day, July 20, 2019. Concentrations were elevated in the mid-morning hours during when the temperature inversion was at its strongest. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 14.0 ug/m³, NCORE continuous FRM PM_{2.5} 24-hour average was 13.1 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 14.3 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 12.6 ug/m³, and the A-Street continuous BAM PM_{2.5} 24-hour average was 14.9 ug/m³ and the A-Street continuous 24-hour FRM PM_{2.5} concentration was 12.4 ug/m³

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels from the west southwest throughout the day. The 21/00Z HYSPLIT run has been overlaid on the Google Earth image, Figure 57. The winds ahead of the weak trough helped disperse the smoke field from the western fire complex. As a result, recorded PM_{2.5} concentrations were slightly above normal for the day.

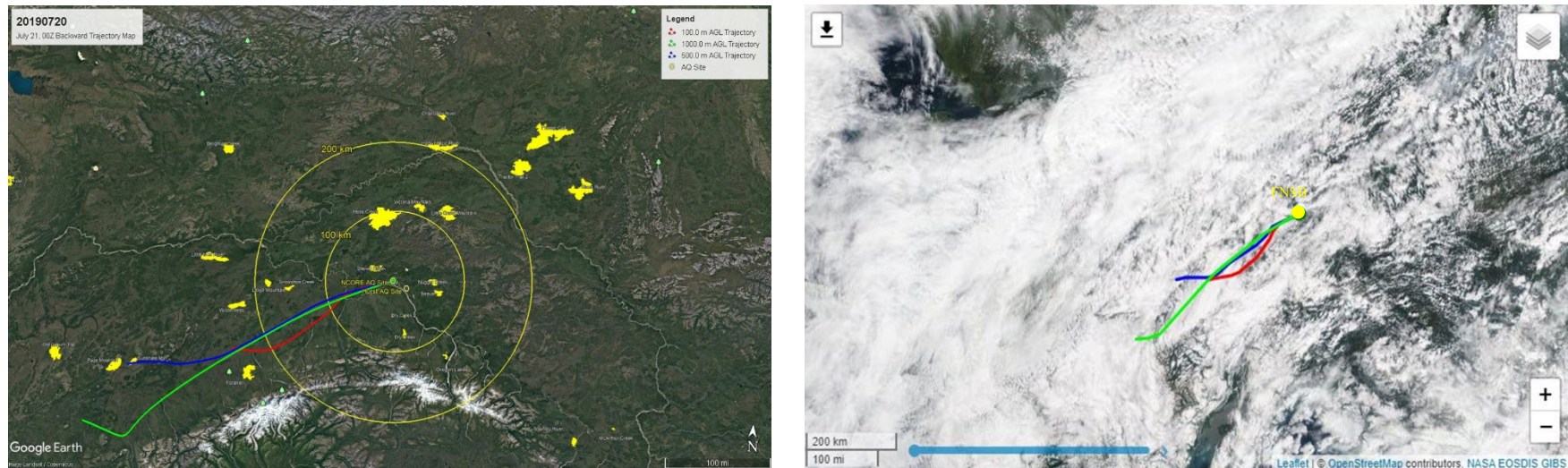


Figure 57. Google Earth with 2019 Fire Perimeters and 21/00Z (20/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 20, 2019 MODIS satellite imagery overlaid with 21/00Z (20/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 20, 2019 shows the clouds associated with the weak trough to the west southwest, the increased winds has cleared out much of the smoke to the west. A few fires to the northwest are still producing some heavy smoke, but the winds are transporting it to the north of FNSB.

Table 56. Hourly observation for Fairbanks International Airport, July 20, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/20/2019 00:53 AKDT	3	190	**	**	10	57	53
PAFA	07/20/2019 01:53 AKDT	0	0	**	**	10	56	52
PAFA	07/20/2019 02:53 AKDT	0	0	**	**	10	54	51
PAFA	07/20/2019 03:53 AKDT	0	0	**	**	10	54	50
PAFA	07/20/2019 04:53 AKDT	0	0	**	**	10	55	51
PAFA	07/20/2019 05:53 AKDT	0	0	**	**	10	55	51
PAFA	07/20/2019 06:53 AKDT	0	0	**	**	10	54	51
PAFA	07/20/2019 07:53 AKDT	0	0	**	**	10	56	51
PAFA	07/20/2019 08:53 AKDT	0	0	**	**	10	58	52
PAFA	07/20/2019 09:53 AKDT	0	0	**	**	10	59	52
PAFA	07/20/2019 10:53 AKDT	0	0	**	**	10	63	53
PAFA	07/20/2019 11:53 AKDT	8	210	**	**	10	65	53
PAFA	07/20/2019 12:53 AKDT	7	210	**	**	10	67	53
PAFA	07/20/2019 13:53 AKDT	10	240	16	**	10	69	52
PAFA	07/20/2019 14:53 AKDT	9	240	**	**	10	67	51
PAFA	07/20/2019 15:53 AKDT	15	250	23	**	10	69	51
PAFA	07/20/2019 16:53 AKDT	13	250	18	**	10	68	51
PAFA	07/20/2019 17:53 AKDT	14	250	23	**	10	68	49
PAFA	07/20/2019 18:53 AKDT	14	250	22	**	10	67	49
PAFA	07/20/2019 19:53 AKDT	9	250	16	**	10	65	50
PAFA	07/20/2019 20:53 AKDT	9	250	**	**	10	65	50
PAFA	07/20/2019 21:53 AKDT	5	240	**	**	10	64	50
PAFA	07/20/2019 22:53 AKDT	5	230	**	**	10	63	50
PAFA	07/20/2019 23:53 AKDT	5	190	**	**	10	61	50

Table 57. Hourly observation for Ft. Wainwright AAF, July 20, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/20/2019 00:58 AKDT	0	0	**	**	10	57	52
PAFB	07/20/2019 01:58 AKDT	0	0	**	**	10	55	52
PAFB	07/20/2019 02:58 AKDT	5	110	**	**	10	51	49
PAFB	07/20/2019 03:58 AKDT	3	50	**	**	8	51	50
PAFB	07/20/2019 04:58 AKDT	7	60	**	**	9	53	51
PAFB	07/20/2019 05:58 AKDT	5	80	**	**	10	52	50
PAFB	07/20/2019 06:58 AKDT	6	70	**	**	10	53	50
PAFB	07/20/2019 07:58 AKDT	5	80	**	**	8	56	52
PAFB	07/20/2019 08:58 AKDT	3	110	**	**	9	58	52
PAFB	07/20/2019 09:58 AKDT	3	120	**	**	9	60	52
PAFB	07/20/2019 10:58 AKDT	0	0	**	**	10	61	53
PAFB	07/20/2019 11:58 AKDT	5	110	**	**	9	63	54
PAFB	07/20/2019 12:58 AKDT	9	190	**	**	9	66	54
PAFB	07/20/2019 13:58 AKDT	13	230	**	**	10	69	51
PAFB	07/20/2019 14:58 AKDT	16	230	**	**	9	69	52
PAFB	07/20/2019 15:58 AKDT	15	240	**	**	9	69	52
PAFB	07/20/2019 16:58 AKDT	18	260	**	**	9	71	49
PAFB	07/20/2019 17:58 AKDT	16	260	**	**	8	71	49
PAFB	07/20/2019 18:58 AKDT	17	270	21	**	8	68	49
PAFB	07/20/2019 19:58 AKDT	17	260	**	**	8	66	50
PAFB	07/20/2019 20:58 AKDT	12	250	**	**	9	66	50
PAFB	07/20/2019 21:58 AKDT	9	240	**	**	9	65	50
PAFB	07/20/2019 22:58 AKDT	8	210	**	**	10	64	51
PAFB	07/20/2019 23:58 AKDT	8	230	**	**	10	63	50

Surface observations: Tables 56 and 57 show the predominant winds out of the west-southwest during the second half of the day. Slightly elevated PM_{2.5} caused the visibility to drop to 8-9 statute miles during the day July 20, 2019.

July 22, 2019

AICC Report Fire Information: There were 5 new fires reported for a total of 224 active fires burning statewide. For the 2019 fire season 1,884,795.4 acres have been burned, which was a 24-hour increase of 193,043.1 acres from the previous day.

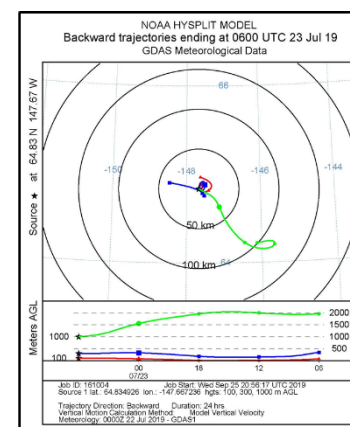
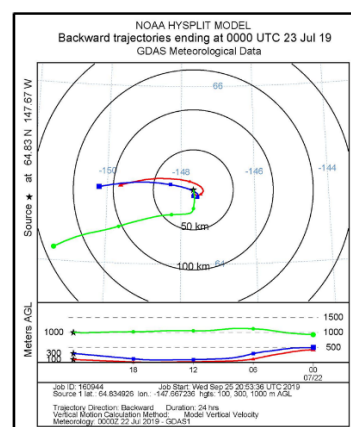
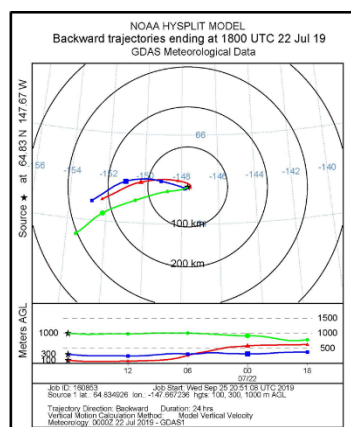
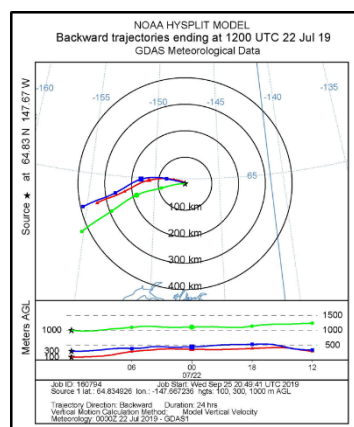
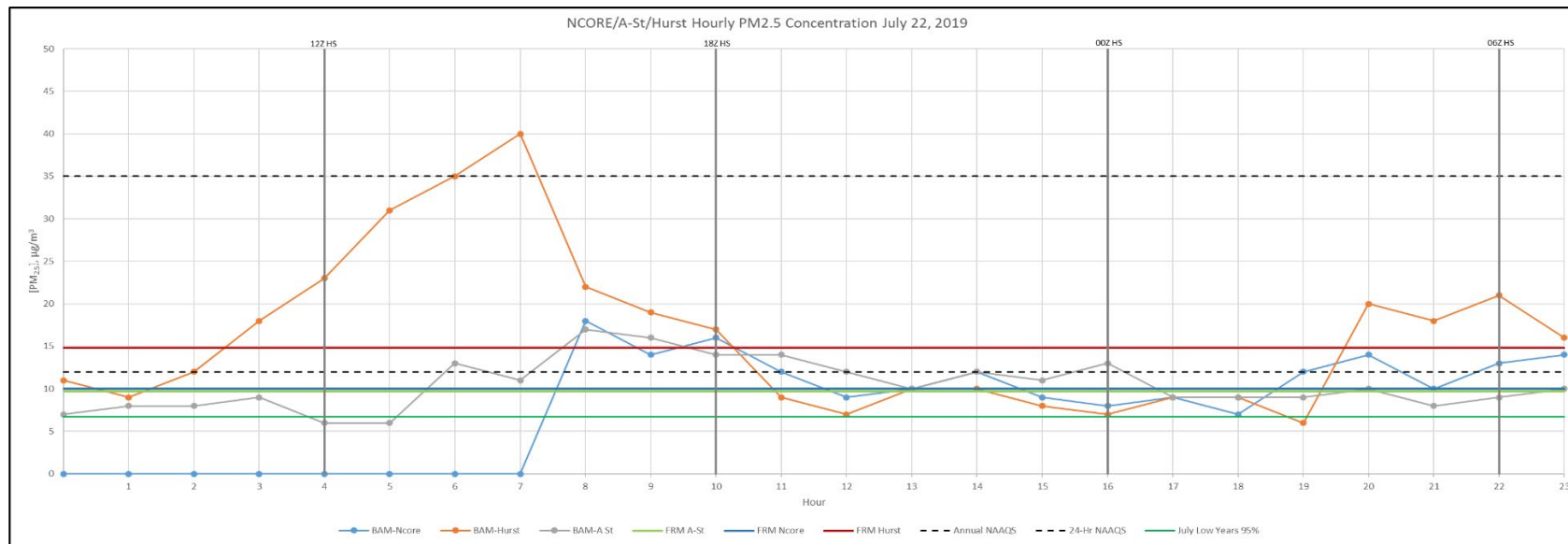


Figure 58. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 22, 2019

PM_{2.5} Data: Figure 58 depicts slightly higher hourly PM_{2.5} concentration throughout the day, July 22, 2019. Concentrations were elevated in the mid-morning hours during when the temperature inversion was at its strongest. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 11.6 ug/m³, NCORE continuous FRM PM_{2.5} 24-hour average was 10.0 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 16.1 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 14.8 ug/m³, the A-Street continuous BAM PM_{2.5} 24-hour average was 10.4 ug/m³, and the A-Street continuous 24-hour FRM PM_{2.5} concentration was 9.7 ug/m³.

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels from the west-southwest majority of the day. The 18Z HYSPLIT run has been overlaid on the Google Earth image, Figure 59. A weak frontal boundary stretched through the interior west of FNSB, lighter winds over the western fires allowed the smoke to accumulate in the Tanana Valley during the early morning hours and impact FNSB area on July 22, 2019.

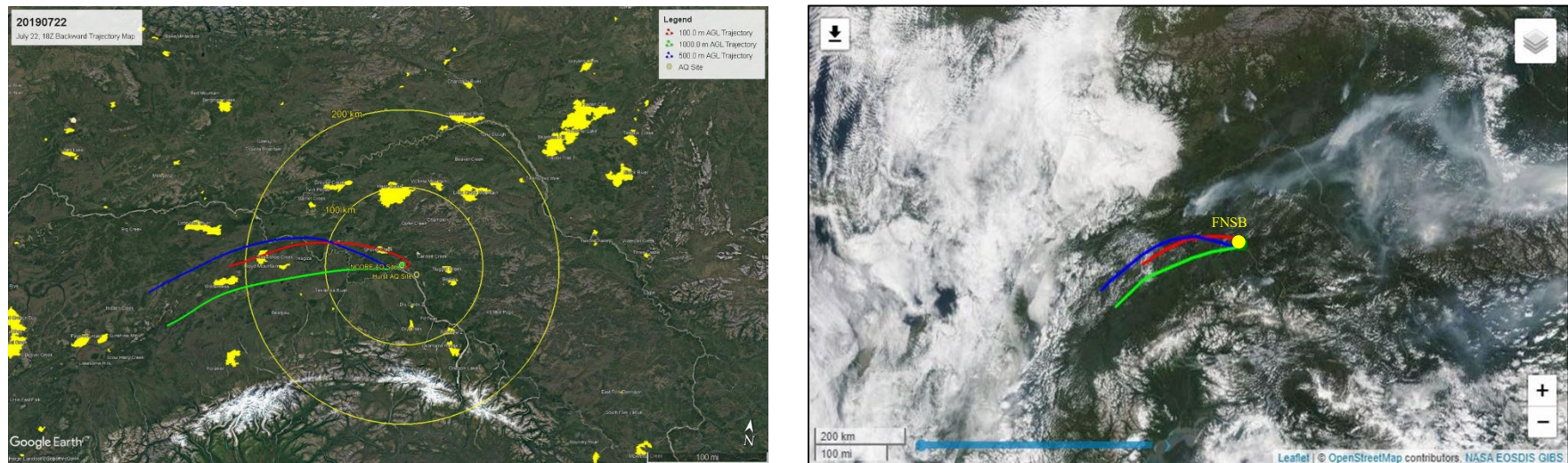


Figure 59. Google Earth with 2019 Fire Perimeters and 22/18Z HYSPLIT (22/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 22, 2019 MODIS satellite imagery overlaid with the 22/18Z HYSPLIT (22/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 22, 2019 shows the 100m/500m/1000m back trajectory passing directly through clouds and clean air to the west. Wetting rains from the previous day helped keep smoke production from the western fires at a minimum, but to the north through northeast of FNSB the clear skies and windy conditions contributed to the fire/smoke growth in the Yukon Flats.

Table 58. Hourly observation for Fairbanks International Airport, July 22, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/22/2019 00:53 AKDT	5	20	**	**	10	61	54
PAFA	07/22/2019 01:53 AKDT	0	0	**	**	10	59	54
PAFA	07/22/2019 02:53 AKDT	5	80	**	**	10	56	51
PAFA	07/22/2019 03:53 AKDT	5	40	**	**	10	56	50
PAFA	07/22/2019 04:53 AKDT	0	0	**	**	10	55	50
PAFA	07/22/2019 05:53 AKDT	3	30	**	**	10	55	51
PAFA	07/22/2019 06:53 AKDT	5	30	**	**	10	58	51
PAFA	07/22/2019 07:53 AKDT	5	50	**	**	10	60	52
PAFA	07/22/2019 08:53 AKDT	3	**	**	**	10	64	52
PAFA	07/22/2019 09:53 AKDT	0	0	**	**	10	67	52
PAFA	07/22/2019 10:53 AKDT	3	170	**	**	10	68	53
PAFA	07/22/2019 11:53 AKDT	0	0	**	**	10	71	54
PAFA	07/22/2019 12:53 AKDT	3	120	**	**	10	74	53
PAFA	07/22/2019 13:53 AKDT	5	160	**	**	10	76	52
PAFA	07/22/2019 14:53 AKDT	0	0	**	**	10	78	51
PAFA	07/22/2019 15:53 AKDT	3	**	**	**	10	79	50
PAFA	07/22/2019 16:53 AKDT	0	0	**	**	10	80	51
PAFA	07/22/2019 17:53 AKDT	6	140	**	**	10	80	49
PAFA	07/22/2019 18:53 AKDT	3	170	**	**	10	80	48
PAFA	07/22/2019 19:53 AKDT	0	0	**	**	10	80	49
PAFA	07/22/2019 20:53 AKDT	0	0	**	**	10	78	51
PAFA	07/22/2019 21:53 AKDT	0	0	**	**	10	75	55
PAFA	07/22/2019 22:53 AKDT	0	0	**	**	10	70	57
PAFA	07/22/2019 23:53 AKDT	6	40	**	**	10	67	56

Table 59. Hourly observation for Ft. Wainwright AAF, July 22, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/22/2019 00:58 AKDT	0	0	**	**	10	60	53
PAFB	07/22/2019 01:58 AKDT	0	0	**	**	9	56	51
PAFB	07/22/2019 02:58 AKDT	5	60	**	**	9	57	52
PAFB	07/22/2019 03:58 AKDT	6	90	**	**	9	55	51
PAFB	07/22/2019 04:58 AKDT	5	90	**	**	8	55	51
PAFB	07/22/2019 05:58 AKDT	5	50	**	**	7	54	50
PAFB	07/22/2019 06:58 AKDT	6	70	**	**	7	55	50
PAFB	07/22/2019 07:58 AKDT	6	80	**	**	7	60	51
PAFB	07/22/2019 08:58 AKDT	5	90	**	**	9	64	52
PAFB	07/22/2019 09:58 AKDT	0	0	**	**	9	67	52
PAFB	07/22/2019 10:58 AKDT	3	130	**	**	9	70	53
PAFB	07/22/2019 11:58 AKDT	0	0	**	**	10	73	53
PAFB	07/22/2019 12:58 AKDT	0	0	**	**	10	75	53
PAFB	07/22/2019 13:58 AKDT	0	0	**	**	10	77	52
PAFB	07/22/2019 14:58 AKDT	0	0	**	**	10	78	50
PAFB	07/22/2019 15:58 AKDT	0	0	**	**	10	79	50
PAFB	07/22/2019 16:58 AKDT	0	0	**	**	10	80	49
PAFB	07/22/2019 17:58 AKDT	5	150	**	**	10	80	50
PAFB	07/22/2019 18:58 AKDT	5	180	**	**	10	80	49
PAFB	07/22/2019 19:58 AKDT	3	200	**	**	10	80	49
PAFB	07/22/2019 20:58 AKDT	3	180	**	**	10	79	50
PAFB	07/22/2019 21:58 AKDT	0	0	**	**	10	76	55
PAFB	07/22/2019 22:58 AKDT	0	0	**	**	9	69	56
PAFB	07/22/2019 23:58 AKDT	0	0	**	**	10	65	56

Surface observations: Tables 58 and 59 show the morning winds were light and variable and by late afternoon the winds shifted to a more southerly component. Smoke was not reported in any observation for the day but Ft Wainwright AAF recorded a visibility between 7-9 statute miles during the morning hours.

July 23, 2019

AICC Report Fire Information: There were 13 new fires reported for a total of 236 active fires burning statewide. For the 2019 fire season 2,068,188.1 acres have been burned, which was a 24-hour increase of 183,392.7 acres from the previous day.

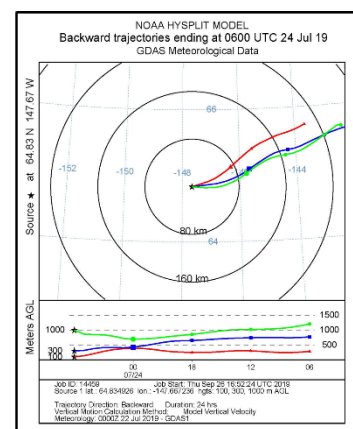
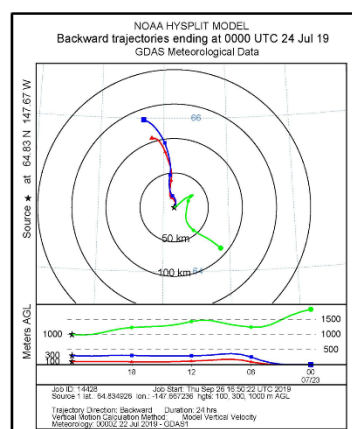
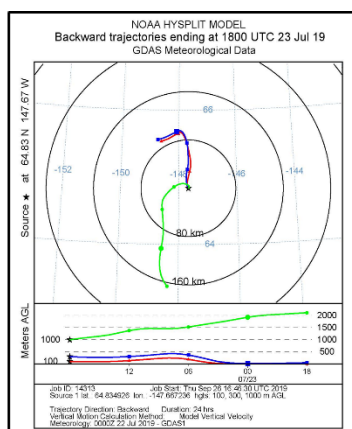
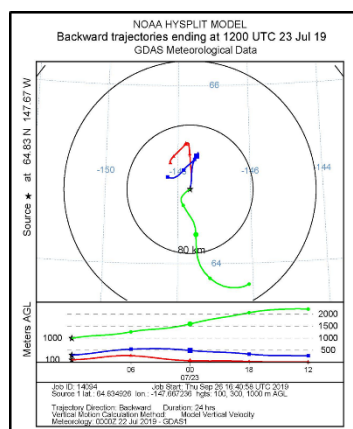
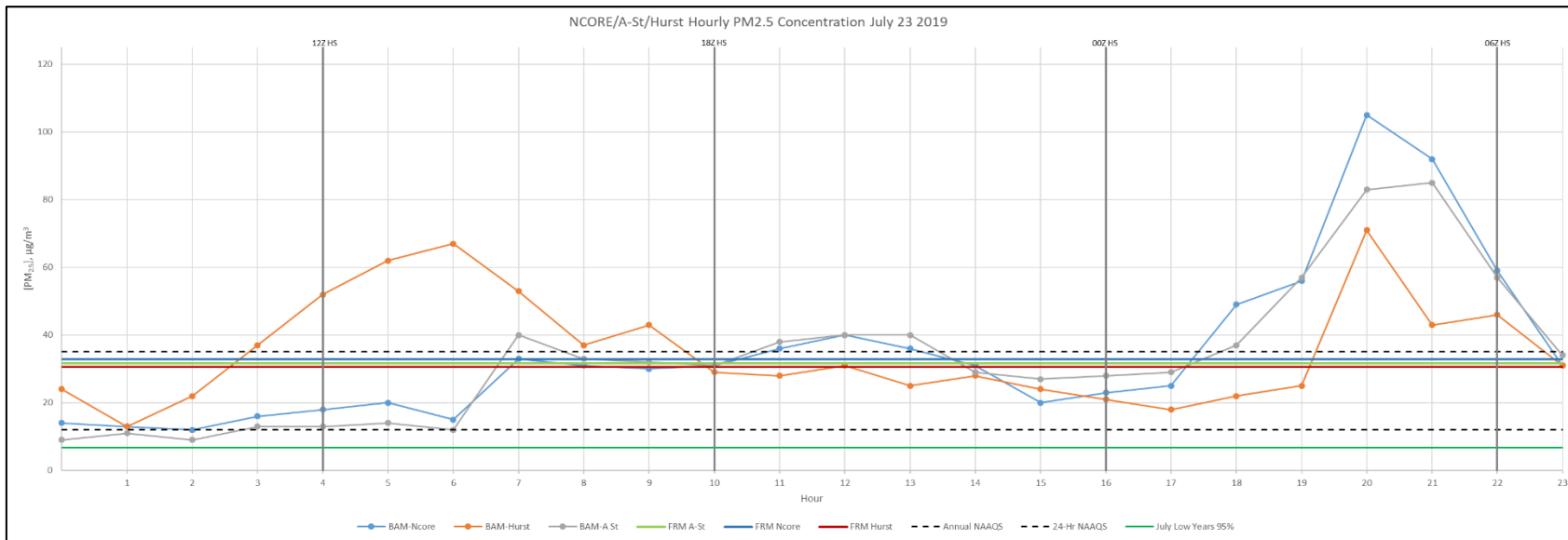


Figure 60. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 23, 2019

PM_{2.5} Data: Figure 60 depicts slightly higher hourly PM_{2.5} concentration throughout the day, July 23, 2019. Concentrations were elevated in the mid-morning hours during when the temperature inversion was at its strongest. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 34.8 ug/m³, NCORE continuous FRM PM_{2.5} 24-hour average was 32.8 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 35.5 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 30.6 ug/m³, the A-Street continuous BAM PM_{2.5} 24-hour average was 33.3 ug/m³, and the A-Street continuous 24-hour FRM PM_{2.5} concentration was 31.7 ug/m³.

HYSPLIT trajectory: Indicates a weak flow at the 100m/500m levels from the north throughout most of the day. The flow from the 1000m level was from the south until the wind shifted late in the evening and all levels originated out of the northeast. The 24/00Z (23/1600L) HYSPLIT run has been overlaid on the Google Earth image, Figure 61.

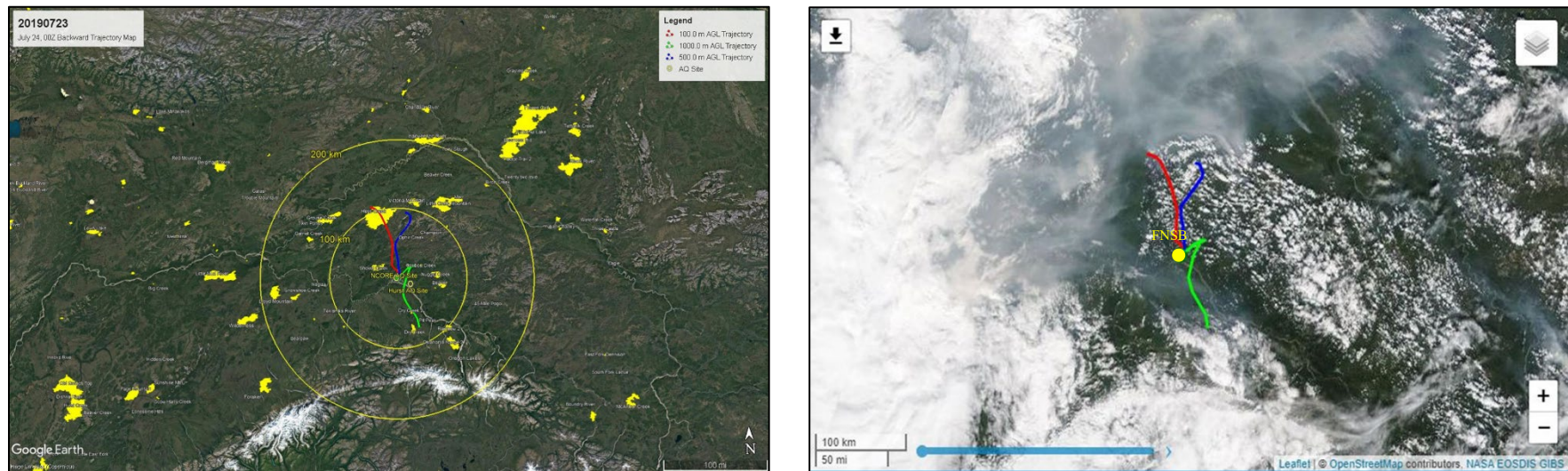


Figure 61. Google Earth with 2019 Fire Perimeters and 24/00Z (23/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 23, 2019 MODIS satellite imagery overlaid with the 24/00Z (23/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 23, 2019 shows an abundance of smoke in the interior of Alaska. The afternoon cumuliform clouds are from daytime diurnal heating, as the winds increase in the afternoon hours the low-level smoke is lifted and moved throughout the region. To the west there is an approaching low pressure/surface trough entering the region.

Table 60. Hourly observation for Fairbanks International Airport, July 23, 2019

PAFA	07/23/2019 00:53 AKDT	0	0	**	**	10	67	52
PAFA	07/23/2019 01:53 AKDT	3	60	**	**	10	61	53
PAFA	07/23/2019 02:53 AKDT	0	0	**	**	10	63	53
PAFA	07/23/2019 03:53 AKDT	0	0	**	**	10	59	54
PAFA	07/23/2019 04:53 AKDT	0	0	**	**	10	58	52
PAFA	07/23/2019 05:53 AKDT	0	0	**	**	10	59	53
PAFA	07/23/2019 06:53 AKDT	3	60	**	**	10	60	53
PAFA	07/23/2019 07:53 AKDT	3	100	**	**	10	63	54
PAFA	07/23/2019 08:53 AKDT	0	0	**	**	10	66	55
PAFA	07/23/2019 09:53 AKDT	0	0	**	**	10	67	56
PAFA	07/23/2019 10:53 AKDT	0	0	**	**	10	71	55
PAFA	07/23/2019 11:53 AKDT	0	0	**	**	8	75	55
PAFA	07/23/2019 12:53 AKDT	5	170	**	**	7	77	55
PAFA	07/23/2019 13:53 AKDT	5	160	**	**	10	80	57
PAFA	07/23/2019 14:53 AKDT	6	150	**	**	10	82	52
PAFA	07/23/2019 15:53 AKDT	5	170	**	**	10	83	51
PAFA	07/23/2019 16:53 AKDT	0	0	**	**	10	84	51
PAFA	07/23/2019 17:53 AKDT	6	160	**	**	10	84	52
PAFA	07/23/2019 18:53 AKDT	3	**	**	**	10	85	51
PAFA	07/23/2019 19:53 AKDT	9	330	**	7 (Smoke)	4	83	54
PAFA	07/23/2019 20:53 AKDT	7	330	**	7 (Smoke)	4	81	55
PAFA	07/23/2019 21:53 AKDT	7	350	**	7 (Smoke)	2	79	56
PAFA	07/23/2019 22:53 AKDT	9	80	**	7 (Smoke)	4	75	54
PAFA	07/23/2019 23:53 AKDT	9	110	**	7 (Smoke)	5	74	52

Table 61. Hourly observation for Ft. Wainwright AAF, July 23, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/23/2019 00:58 AKDT	0	0	**	**	10	61	54
PAFB	07/23/2019 01:58 AKDT	0	0	**	**	10	59	55
PAFB	07/23/2019 02:58 AKDT	0	0	**	**	10	59	53
PAFB	07/23/2019 03:58 AKDT	0	0	**	**	10	56	52
PAFB	07/23/2019 04:58 AKDT	0	0	**	**	9	56	53
PAFB	07/23/2019 05:58 AKDT	0	0	**	**	10	55	52
PAFB	07/23/2019 06:58 AKDT	0	0	**	**	10	58	53
PAFB	07/23/2019 07:58 AKDT	5	70	**	**	9	61	53
PAFB	07/23/2019 08:58 AKDT	3	80	**	**	9	64	54
PAFB	07/23/2019 09:58 AKDT	0	0	**	7 (Smoke)	7	68	54
PAFB	07/23/2019 10:58 AKDT	0	0	**	7 (Smoke)	6	71	55
PAFB	07/23/2019 11:58 AKDT	0	0	**	7 (Smoke)	7	75	54
PAFB	07/23/2019 12:58 AKDT	0	0	**	7 (Smoke)	7	79	54
PAFB	07/23/2019 13:58 AKDT	5	210	**	7 (Smoke)	7	82	53
PAFB	07/23/2019 14:58 AKDT	0	0	**	7 (Smoke)	7	83	51
PAFB	07/23/2019 15:58 AKDT	6	200	**	7 (Smoke)	7	85	49
PAFB	07/23/2019 16:58 AKDT	3	270	**	**	10	85	49
PAFB	07/23/2019 17:58 AKDT	3	310	**	**	10	87	49
PAFB	07/23/2019 18:58 AKDT	5	320	**	**	10	85	49
PAFB	07/23/2019 19:58 AKDT	7	330	**	**	10	85	51
PAFB	07/23/2019 20:58 AKDT	6	340	**	7 (Smoke)	8	83	53
PAFB	07/23/2019 21:58 AKDT	14	60	**	7 (Smoke)	4	73	61
PAFB	07/23/2019 22:58 AKDT	7	60	**	7 (Smoke)	5	69	61
PAFB	07/23/2019 23:58 AKDT	10	110	**	**	8	72	54

Surface observations: Tables 60 and 61 report observed smoke in the late afternoon/evening. The lowest recorded visibility for the day was 2 statute miles at the Fairbanks International Airport during the 2200L observation.

July 24, 2019

AICC Report Fire Information: There were 12 new fires reported for a total of 243 active fires burning statewide. For the 2019 fire season 2,056,175.5 acres have been burned, which was a 24-hour increase of 12,012.6 acres from the previous day.

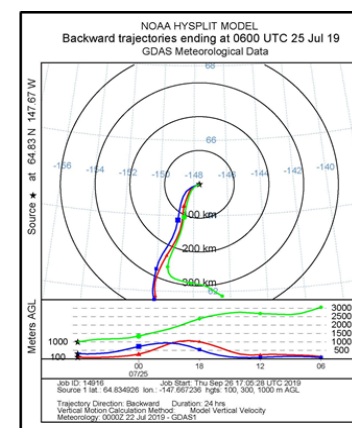
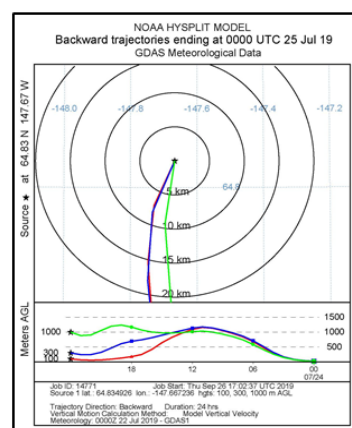
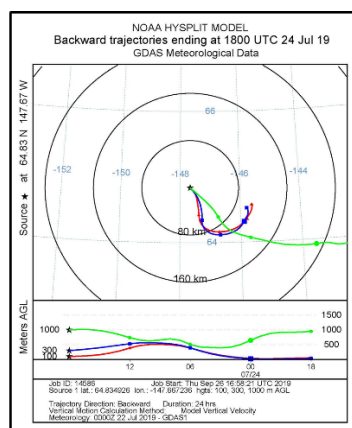
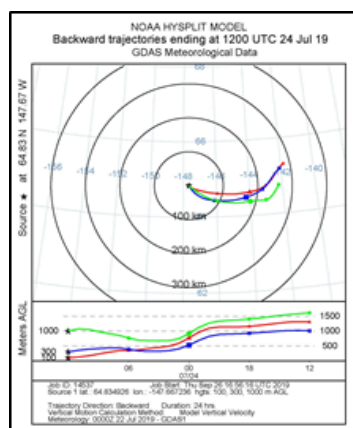
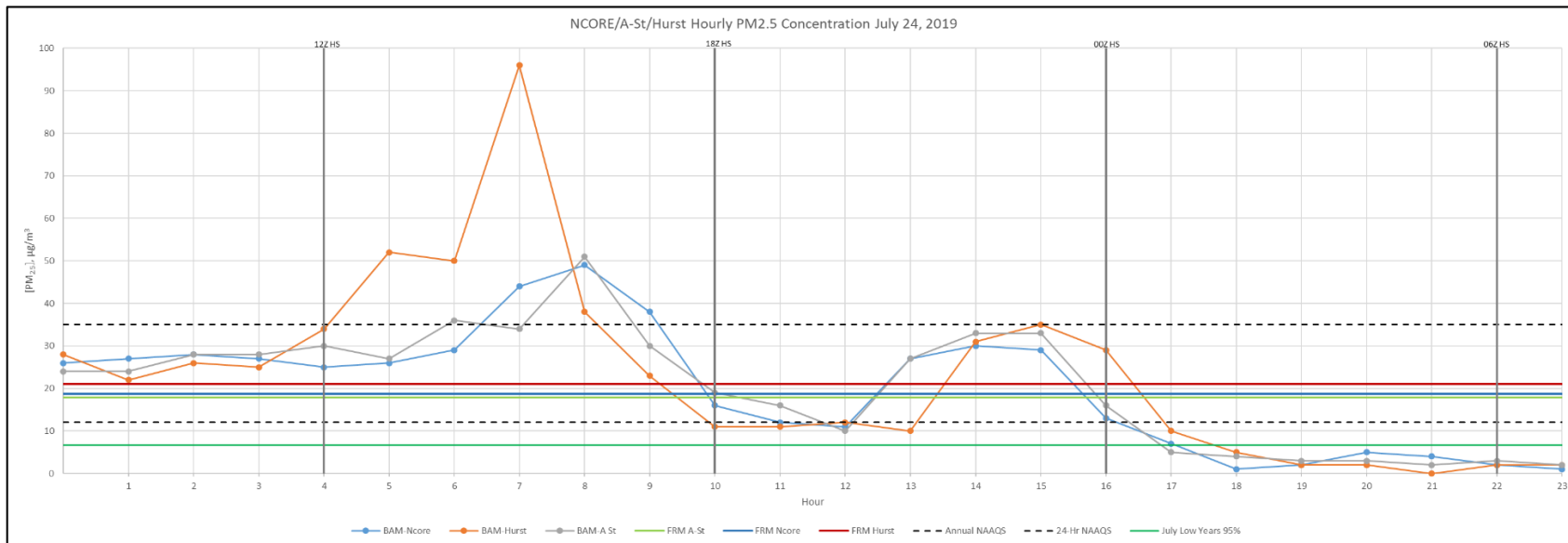


Figure 62. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 24, 2019

PM_{2.5} Data: Figure 62 depicts slightly higher hourly PM_{2.5} concentration throughout the day, July 24, 2019. Concentrations were elevated in the mid-morning hours during when the temperature inversion was at its strongest. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 19.9 ug/m³, NCORE continuous FRM PM_{2.5} 24-hour average was 18.7 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 23.1 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 21.0 ug/m³, the A-Street continuous BAM PM_{2.5} 24-hour average was 20.3 ug/m³, and the A-Street continuous 24-hour FRM PM_{2.5} concentration was 17.9 ug/m³.

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels start off from the east and migrates to a southerly flow as the low pressure/surface trough passes through the region. The 25/00Z (24/1600L) HYSPLIT run has been overlaid on the Google Earth image, Figure 63.

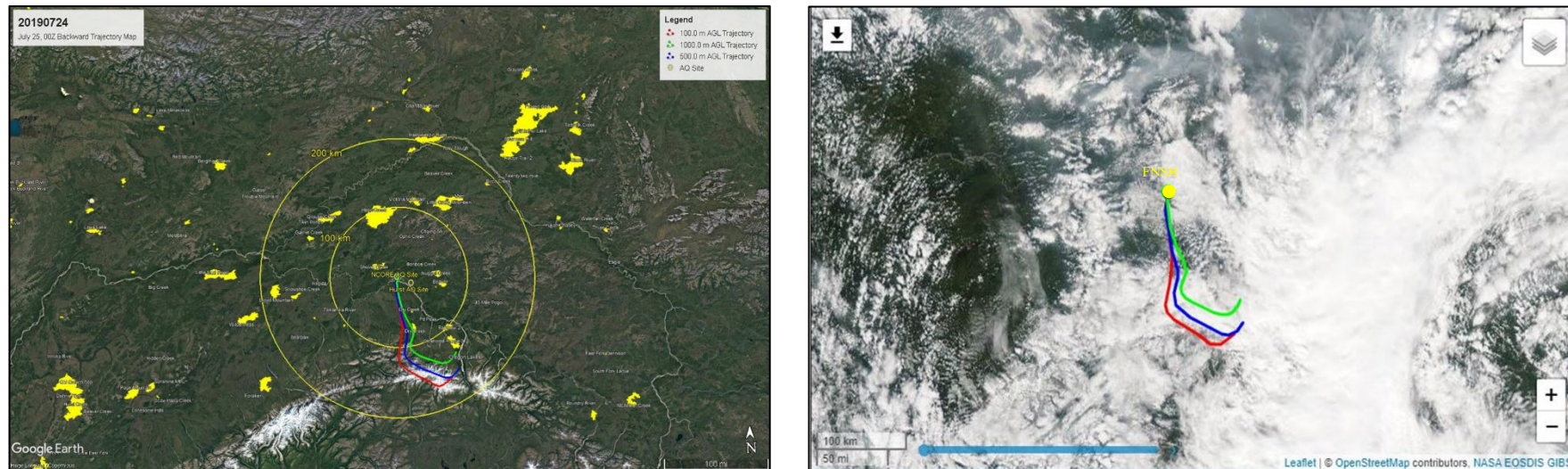


Figure 63. Google Earth with 2019 Fire Perimeters and 25/00Z (24/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 24, 2019 MODIS satellite imagery overlaid with the 25/00Z (24/1600L) HYSPLIT 100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 23, 2019 shows an abundance of clouds from the low pressure/surface trough that has moved through the region. Spotty showery precipitation has cleaned the smoke out the atmosphere from the western fires. There is still smoke visible in the satellite imagery to the north of FNSB. The spikes in PM concentration were from the smoke trapped beneath the clouds as it passed over FNSB.

Table 62. Hourly observation for Fairbanks International Airport, July 24, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/24/2019 00:53 AKDT	3	140	**	**	8	71	53
PAFA	07/24/2019 01:53 AKDT	0	0	**	**	8	68	55
PAFA	07/24/2019 02:53 AKDT	3	150	**	**	8	67	54
PAFA	07/24/2019 03:53 AKDT	0	0	**	**	8	66	54
PAFA	07/24/2019 04:53 AKDT	3	70	**	**	9	64	56
PAFA	07/24/2019 05:53 AKDT	0	0	**	**	7	65	55
PAFA	07/24/2019 06:53 AKDT	0	0	**	7 (Smoke)	6	66	54
PAFA	07/24/2019 07:53 AKDT	3	200	**	7 (Smoke)	6	65	55
PAFA	07/24/2019 08:53 AKDT	0	0	**	7 (Smoke)	6	66	55
PAFA	07/24/2019 09:53 AKDT	3	360	**	7 (Smoke)	5	70	56
PAFA	07/24/2019 10:53 AKDT	0	0	**	**	7	72	55
PAFA	07/24/2019 11:53 AKDT	3	**	**	**	9	74	56
PAFA	07/24/2019 12:53 AKDT	5	**	**	**	10	76	55
PAFA	07/24/2019 13:53 AKDT	0	0	**	**	9	77	55
PAFA	07/24/2019 14:53 AKDT	5	170	**	**	9	77	53
PAFA	07/24/2019 15:53 AKDT	5	210	**	**	9	77	54
PAFA	07/24/2019 16:53 AKDT	5	220	**	**	10	78	53
PAFA	07/24/2019 17:53 AKDT	7	**	**	**	10	78	50
PAFA	07/24/2019 18:53 AKDT	10	250	**	**	10	78	50
PAFA	07/24/2019 19:53 AKDT	10	240	**	**	10	76	50
PAFA	07/24/2019 20:53 AKDT	14	240	18	**	10	74	53
PAFA	07/24/2019 21:53 AKDT	6	230	**	**	10	72	51
PAFA	07/24/2019 22:53 AKDT	5	220	**	**	10	71	53
PAFA	07/24/2019 23:53 AKDT	5	220	**	**	10	68	54

Table 63. Hourly observation for Ft. Wainwright AAF, July 24, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/24/2019 00:58 AKDT	5	60	**	**	10	68	55
PAFB	07/24/2019 01:58 AKDT	6	90	**	**	10	66	55
PAFB	07/24/2019 02:58 AKDT	0	0	**	**	10	66	57
PAFB	07/24/2019 03:58 AKDT	0	0	**	**	10	64	56
PAFB	07/24/2019 04:58 AKDT	3	80	**	**	9	64	56
PAFB	07/24/2019 05:58 AKDT	0	0	**	**	8	62	56
PAFB	07/24/2019 06:58 AKDT	0	0	**	**	7	64	55
PAFB	07/24/2019 07:58 AKDT	0	0	**	**	7	65	55
PAFB	07/24/2019 08:58 AKDT	3	70	**	7 (Smoke)	6	66	56
PAFB	07/24/2019 09:58 AKDT	0	0	**	7 (Smoke)	7	70	56
PAFB	07/24/2019 10:58 AKDT	**	**	**	**	**	**	**
PAFB	07/24/2019 11:58 AKDT	3	150	**	**	10	75	55
PAFB	07/24/2019 12:58 AKDT	6	210	**	**	10	76	53
PAFB	07/24/2019 13:58 AKDT	0	0	**	**	10	78	53
PAFB	07/24/2019 14:58 AKDT	7	210	**	**	10	79	53
PAFB	07/24/2019 15:58 AKDT	10	230	**	**	10	79	53
PAFB	07/24/2019 16:58 AKDT	12	220	**	**	10	79	53
PAFB	07/24/2019 17:58 AKDT	14	240	**	**	10	80	51
PAFB	07/24/2019 18:58 AKDT	13	220	**	**	10	79	49
PAFB	07/24/2019 19:58 AKDT	13	230	**	**	10	78	48
PAFB	07/24/2019 20:58 AKDT	12	240	**	**	10	75	53
PAFB	07/24/2019 21:58 AKDT	12	250	**	**	10	73	51
PAFB	07/24/2019 22:58 AKDT	9	230	**	**	10	71	52
PAFB	07/24/2019 23:58 AKDT	13	230	**	**	10	69	55

Surface observations: Tables 62 and 63 show smoke in the present WX condition just before the surface trough passes and winds shift to the south. This was the smoke trapped below the cloud layers. Minimum visibility for the day was 5 statute miles recorded at Fairbanks International Airport.

July 26, 2019

AICC Report Fire Information: There were 6 new fires reported for a total of 254 active fires burning statewide. For the 2019 fire season 2,196,193 acres have been burned, which was a 24-hour increase of 6,978 acres from the previous day.

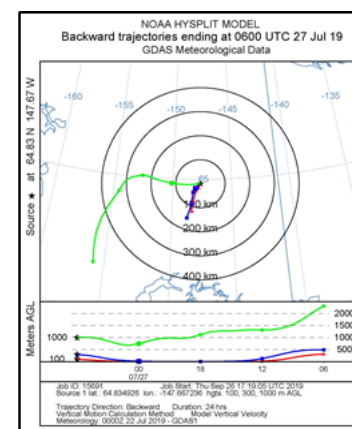
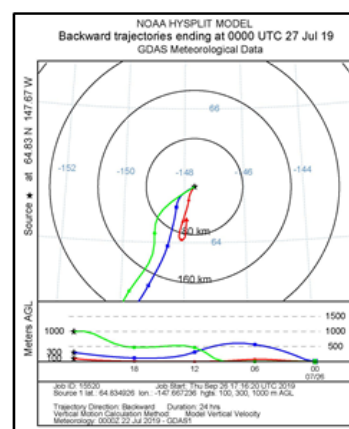
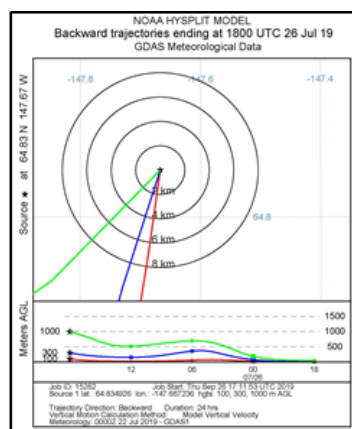
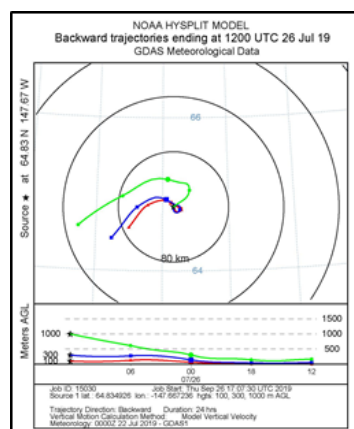
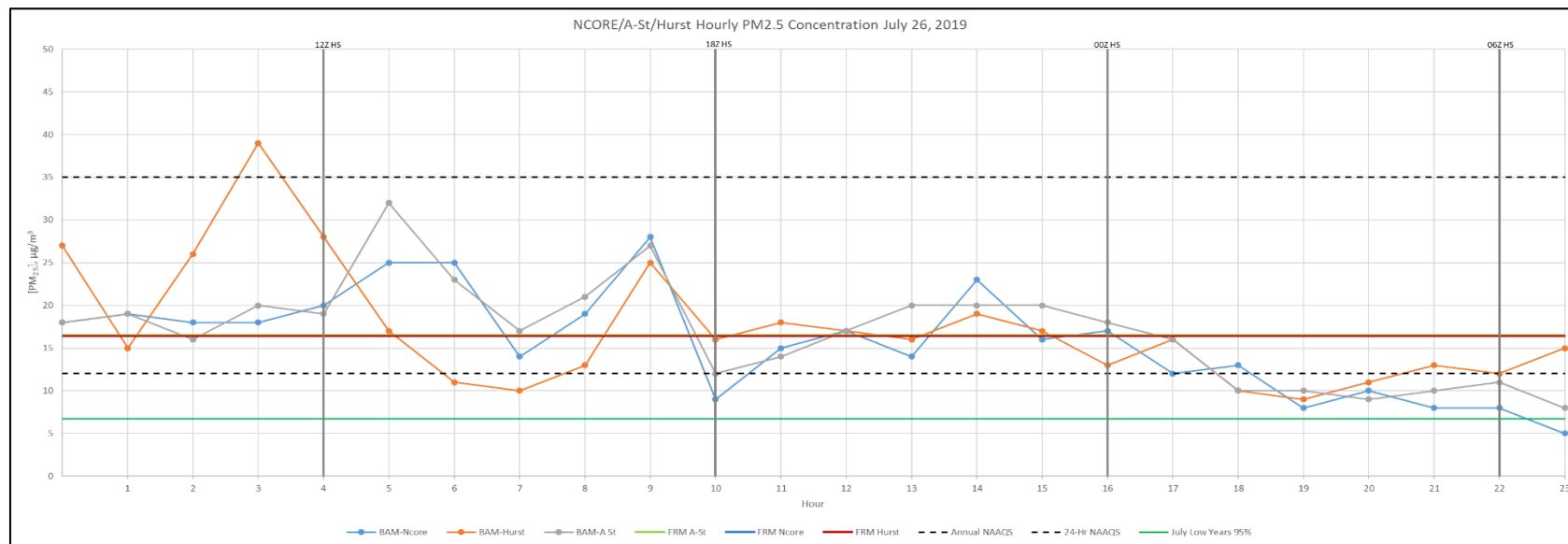


Figure 64. FNSB PM_{2.5} concentrations, NAAQS Annual/24hr Standard, and 6 hr HYSPLIT runs for July 26, 2019

PM_{2.5} Data: Figure 64 depicts slightly higher hourly PM_{2.5} concentration throughout the day, July 26, 2019. Concentrations were elevated in the early morning hours. The NCORE continuous BAM PM_{2.5} 24-hour average concentration was 15.7 ug/m³, NCORE continuous FRM PM_{2.5} 24-hour average was 16.5 ug/m³, Hurst continuous BAM PM_{2.5} 24-hour average concentration was 17.2 ug/m³, Hurst continuous 24-hour FRM PM_{2.5} concentration was 16.4 ug/m³, the A-Street continuous BAM PM_{2.5} 24-hour average was 16.9 ug/m³, and the A-Street continuous FRM PM_{2.5} concentration was 16.5 ug/m³.

HYSPLIT trajectory: Indicates a flow at the 100m/500m/1000m levels originating from the local Tanana Flats underneath the overcast skies. The 18Z HYSPLIT run has been overlaid on the Google Earth image, Figure 65.

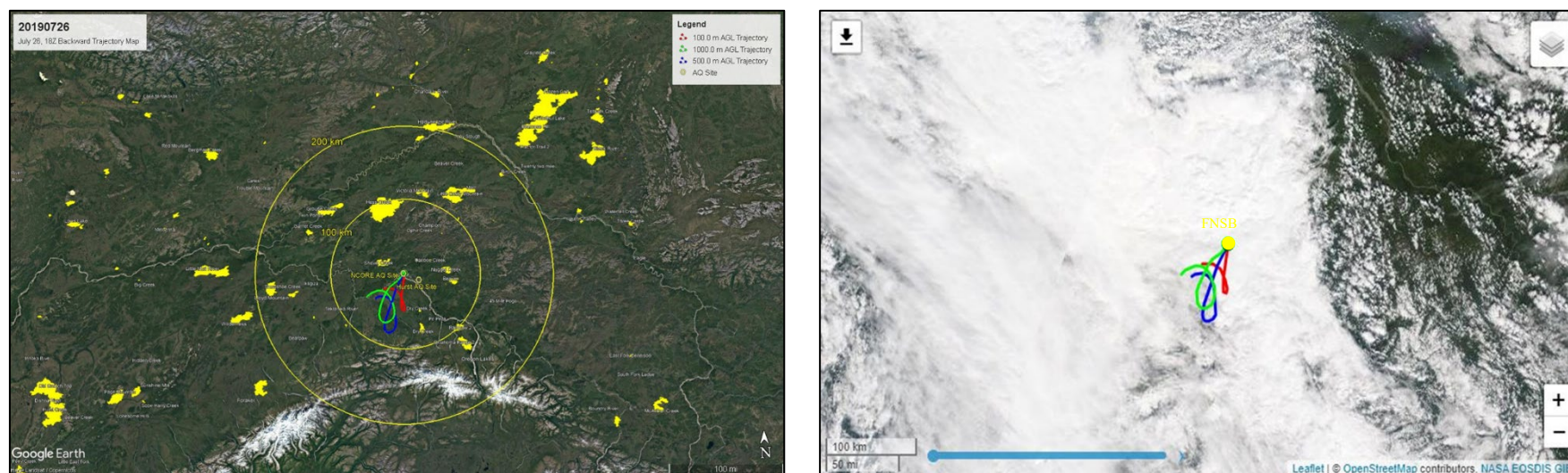


Figure 65. Google Earth with 2019 Fire Perimeters and 29/18Z HYSPLIT (29/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory. July 26, 2019 MODIS satellite imagery overlaid with the 29/18Z HYSPLIT (29/1000L)100m (Red)/500m (Blue)/1000m (Green) back trajectory.

MODIS image: Imagery for July 26, 2019 shows thick cloud cover over the FNSB area. The frontal system is moving to the northeast with little smoke upstream from FNSB (no fires to the southwest of FNSB).

Table 64. Hourly observation for Fairbanks International Airport, July 26, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/26/2019 00:53 AKDT	8	100	**	**	9	64	55
PAFA	07/26/2019 01:53 AKDT	6	80	**	**	10	63	55
PAFA	07/26/2019 02:53 AKDT	5	80	**	**	10	63	55
PAFA	07/26/2019 03:53 AKDT	3	90	**	Lgt Rain	10	61	56
PAFA	07/26/2019 04:53 AKDT	0	0	**	**	7	61	56
PAFA	07/26/2019 05:53 AKDT	3	70	**	7 (Smoke)	4	61	56
PAFA	07/26/2019 06:53 AKDT	3	80	**	7 (Smoke)	2	60	57
PAFA	07/26/2019 07:53 AKDT	0	0	**	Lgt Rain	2	59	57
PAFA	07/26/2019 08:53 AKDT	3	190	**	Lgt Rain	2	59	57
PAFA	07/26/2019 09:53 AKDT	0	0	**	Lgt Rain	2	59	56
PAFA	07/26/2019 10:53 AKDT	7	210	**	Mist	4	58	54
PAFA	07/26/2019 11:53 AKDT	5	210	**	Mist	6	58	54
PAFA	07/26/2019 12:53 AKDT	5	210	**	Lgt Rain	6	59	54
PAFA	07/26/2019 13:53 AKDT	5	200	**	**	7	59	53
PAFA	07/26/2019 14:53 AKDT	3	200	**	Lgt Rain	7	59	53
PAFA	07/26/2019 15:53 AKDT	5	150	**	Lgt Rain	7	59	54
PAFA	07/26/2019 16:53 AKDT	0	0	**	Lgt Rain	10	60	54
PAFA	07/26/2019 17:53 AKDT	0	0	**	Lgt Rain	10	61	54
PAFA	07/26/2019 18:53 AKDT	0	0	**	**	10	61	54
PAFA	07/26/2019 19:53 AKDT	0	0	**	**	10	61	53
PAFA	07/26/2019 20:53 AKDT	0	0	**	**	10	60	54
PAFA	07/26/2019 21:53 AKDT	0	0	**	Lgt Rain	10	59	54
PAFA	07/26/2019 22:53 AKDT	0	0	**	Lgt Rain	10	58	53
PAFA	07/26/2019 23:53 AKDT	3	220	**	**	10	57	53

Table 65. Hourly observation for Ft. Wainwright AAF, July 26, 2019

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/26/2019 00:58 AKDT	7	80	**	**	10	64	56
PAFB	07/26/2019 01:58 AKDT	5	80	**	**	10	62	58
PAFB	07/26/2019 02:58 AKDT	3	60	**	Lgt Rain	6	60	58
PAFB	07/26/2019 03:58 AKDT	5	70	**	**	8	60	58
PAFB	07/26/2019 04:58 AKDT	5	50	**	**	10	59	58
PAFB	07/26/2019 05:58 AKDT	0	0	**	Lgt Rain	3	59	58
PAFB	07/26/2019 06:58 AKDT	3	50	**	Lgt Rain	1	58	58
PAFB	07/26/2019 07:58 AKDT	0	0	**	Lgt Rain	3	59	58
PAFB	07/26/2019 08:58 AKDT	3	180	**	Lgt Rain	2	59	58
PAFB	07/26/2019 09:58 AKDT	0	0	**	31 (Mist)	4	59	58
PAFB	07/26/2019 10:58 AKDT	8	180	**	31 (Mist)	4	60	58
PAFB	07/26/2019 11:58 AKDT	6	190	**	31 (Mist)	5	58	56
PAFB	07/26/2019 12:58 AKDT	**	**	**	**	**	**	**
PAFB	07/26/2019 13:58 AKDT	7	190	**	6 (Haze)	5	59	55
PAFB	07/26/2019 14:58 AKDT	5	220	**	**	10	59	54
PAFB	07/26/2019 15:58 AKDT	6	170	**	**	8	59	55
PAFB	07/26/2019 16:58 AKDT	**	**	**	**	**	**	**
PAFB	07/26/2019 17:58 AKDT	0	0	**	**	9	60	55
PAFB	07/26/2019 18:58 AKDT	3	70	**	**	10	60	57
PAFB	07/26/2019 19:58 AKDT	0	0	**	**	10	61	55
PAFB	07/26/2019 20:58 AKDT	0	0	**	**	10	61	55
PAFB	07/26/2019 21:58 AKDT	0	0	**	**	10	58	57
PAFB	07/26/2019 22:58 AKDT	0	0	**	**	10	57	56
PAFB	07/26/2019 23:58 AKDT	0	0	**	**	9	57	56

Surface observations: Tables 64 and 65 show a wind shift, from a westerly direction to a more northeasterly, during the late morning hours associated with the passing of the frontal system. The precipitation associated with the frontal systems cleaned out the remaining smoke in FNSB.

Summary of the June/July/August Event Period

The late June/July, early August event can be best summarized as sustained westerly wind flow and the large complex of fires in the interior of Alaska. The predominantly west-southwest wind flow was the primary cause of smoke advecting into the FNSB throughout the summer fire season. The smoke, and therefore the PM_{2.5} concentrations, during this period also varied due to the increases and decreases in fire spread, suppression efforts, and shallow, surface-based inversions. Smoke persisted in the area through the period and resulted in multiple 24-hour and annual PM_{2.5} NAAQS exceedances.

Reasonable Controls

The DEC continues to work closely with the AFS, the AICC, and the Fire Weather Forecasters to ensure Air Quality Advisory Notifications are sent to the public as rapidly as possible. In-place procedures allow DEC to send Air Quality Advisories via Twitter and email, greatly reducing the time required to contact government agencies and the public (see Appendix B, Advisories).

The DEC, federal land management agencies, and Alaska Native organizations have developed an interagency plan, AIWFMP, to address controlling wildland fires. The AIWFMP requires land manager(s)/owner(s) to annually review the fire protection needs on lands under their management authority during the fire pre-season. In addition, responsibilities and actions taken to mitigate impacts of wildland fire smoke are outlined in the “Alaska’s Enhanced Smoke Management Plan for Prescribed Fire, Procedures Manual June 3, 2015”, <https://dec.alaska.gov/air/anpms/wildfire-smoke/Appendix-III.K.8.pdf>. The purpose of the Enhanced Smoke Management Plan (ESMP) is to provide a clear and equitable regulatory basis for smoke management in Alaska. The ESMP also outlines procedures for monitoring ambient air quality in the event of a wildland fire.

Procedural Requirements

In accordance with the exceptional events rule 40 CFR §50.14, 29 data points in 2019 (June 18-29, July 1-9, July 14, July 24-29, July 31, and August 8) were flagged in the state’s AQS data submission. The DEC requests that EPA exclude these flagged data points when determining compliance with the PM_{2.5} NAAQS for the SOB, NCORE, and Hurst Rd sites. In accordance with the mitigation requirement 40 CFR 51.930(a)(1), DEC posted the EEWPR public notice draft for comment, XXXX, 20XX. Public comment period closed XXXX, 20XX with no comments received.

Conclusions

This document describes the wildland fires in Alaska in the summer of 2019 by location and acreage burned. The cause of the major fires was lightning ignition of very dry fuels caused by

drought conditions. Large fires do not occur unless meteorological and fuel conditions are favorable, which occurs frequently during summer months in Interior Alaska.

The smoke from these fires impacted the FNSB and resulted in multiple days of increased smoke and PM_{2.5} concentrations. This smoke impacted natural event data and should not be used in the determination of compliance with the NAAQS for FNSB in 2019. Without the wildland fires, the PM_{2.5} concentrations at Fairbanks NCORE, SOB and North Pole's Hurst Rd sites would have been much lower. Data from low fire years provide an estimate of background summertime PM_{2.5} concentrations in the range of 0.7-19.9 µg/m³, with the 95th percentile at 26µg/m³.

Alaska wildland fires will reoccur and are not controllable. The State of Alaska ESMP and Air Quality Advisory procedures adequately cover actions to be taken when these events occur.

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Abbreviations

DEC	Alaska Department of Environmental Conservation
AFS	Alaska Fire Service
AICC	Alaska Interagency Coordination Center
AIWFMP	Alaska Interagency Wildland Fire Management Plan
AQI	Air Quality Index
AQS	Air Quality System
BAM	Beta-wave Attenuation Monitors
EEWR	Exceptional Event Waiver Request
EPA	Environmental Protection Agency
ESMP	Enhanced Smoke Management Plan
FEM	Federal Equivalent Method
FNSB	Fairbanks North Star Borough
FRM	Federal Reference Method
GDAS	Global Data Assimilation System
GFS	Global Forecast System
HF	Historical Fluctuations
HURST	Hurst Road
HYSPLIT	Hybrid Single-Particle Lagrangian Integrated Trajectory
MODIS	Moderate Resolution Imaging Spectroradiometer
NAAQS	National Ambient Air Quality Standard
NCEI	National Climate Environmental Information
NCEP	National Centers for Environmental Prediction
NCORE	National Core Multi-pollutant Monitoring Station
SOB	State Office Building
WD	Wind Direction
WS	Wind Speed