# Juneau

Several categories of information assembled by EPA to designate the area of Juneau that violates the ambient $PM_{2.5}$ standard do not represent local conditions. This flawed information appears to have biased the selection of the nonattainment boundary. The one area of Juneau where monitoring data indicates that $PM_{2.5}$ concentrations approach the ambient standard is the Mendenhall Valley. EPA's proposed boundary includes large areas that do not exceed or contribute to exceedances of the ambient $PM_{2.5}$ standard in the Mendenhall Valley. Presented below is a summary of local data that add to and correct EPA's Technical Analysis for Juneau, Alaska Nonattainment Area. In its entirety, this information supports use of the existing $PM_{10}$ nonattainment boundary as the $PM_{2.5}$ nonattainment area, should one be warranted.

## Factor 1: Pollutant Emissions

The estimated annual emissions for the City and Borough of Juneau, Alaska for calendar year 2005 are presented below in Table 1. Emission sources are focused primarily in the populated areas of the borough. Because of Southeast Alaska's complex terrain and the fact that Juneau can be accessed from outlying areas only by boat or plane, emissions from sparsely populated neighboring areas are not contributing factors to emissions in Juneau. With the exception of wildfire smoke transporting into Juneau during the summer fire season, the emissions contributing to pollution in Juneau are the result of local activities. Wintertime area source particulate matter emissions are dominated by wood smoke from residential wood burning. Dust from paved and unpaved roads dominates the particulate matter emissions in the non-road mobile source category. This is generally a seasonal source, which is observed primarily on dry days in the springtime just following winter break-up.

**Table 1**
**Summary of City & Borough of Juneau Emissions in 2005**
**(tons/year, TPY)**

| Source Category | VOC | NOx | $SO_2$ | $PM_{10}$_PRI | $PM_{2.5}$_PRI | $NH_3$ | CO |
|---|---|---|---|---|---|---|---|
| Point | 68 | 1,275 | 744 | 162 | NA | NA | 176 |
| Area | 420 | 74 | 7 | 104 | 64 | 0 | 448 |
| Mobile - Onroad | 817 | 716 | 17 | 19 | 15 | 27 | 8,794 |
| Mobile – Nonroad[a] | 266 | 156 | 16 | 2,791 | 673 | 0 | 2,504 |
| **Total Emissions** | **1,571** | **2,221** | **784** | **3,076** | **752** | **27** | **11,922** |

[a] Please note that emissions from cruise ships and other large ocean going vessels are not included in this inventory summary. These emissions occur seasonally during the summer months in downtown Juneau and do not impact the wintertime particulate matter concentrations in the Mendenhall Valley.

Tables summarizing the detailed data for each source category are included as Attachment A.

Table 2 provides a summary of the permitted major facilities that are actually located and operating within the City & Borough of Juneau and their reported actual emissions for calendar year 2005. The two mines, Kensington and Greens Creek, are remote. Both facilities are off the road system with Greens Creek over 20 miles to the southwest on Admiralty Island and Kensington 35 miles to the northwest across Berner's Bay from the terminus of Glacier Highway. As shown in Figure 1, neither mine is in proximity to the populated areas of town or the proposed nonattainment area. The Kensington mine is not fully permitted or operational at this time and recently scaled back its development operations pending the outcome of on-going litigation. Given the location of the mines in relation to the Mendenhall Valley and based on the meteorological information provided later in this document, transport of emissions from these facilities cannot be directly impacting the valley or the other populated areas of Juneau through either primary emissions or secondary formation.

**Table 2**
**Annual Emissions from Permitted Major Facilities in the City and Borough of Juneau**

| Facility | 2005 Emissions, TPY | | | | |
|---|---|---|---|---|---|
| | VOC | NOx | $SO_2$ | $PM_{10}$_PRI | CO |
| Alaska Electric Light & Power Auke Bay Standby Generation Station | 0 | 3 | 1 | 0 | 0 |
| Alaska Electric Light & Power Lemon Creek Standby Generation Station | 0 | 9 | 2 | 1 | 4 |
| Coeur Alaska Inc. Kensington Mine Project | 3 | 49 | 3 | 3 | 12 |
| Kennecott Greens Creek Mining Company Kennecott Greens Creek Mine | 65 | 1,214 | 738 | 158 | 160 |
| **Total Emissions** | 68 | 1,275 | 744 | 162 | 176 |

In general, there is limited industrial activity and few permitted stationary sources within the populated areas of Juneau. Juneau is not on a power grid and electricity is generated at a hydroelectric project southeast of town. The local power company, Alaska Electric Light & Power (AEL&P), has two facilities that provide standby or backup power in the event that the community's hydroelectric power is compromised or cannot meet demands. The two backup power generating facilities are located in the Lemon Creek Valley and at Auke Bay; their locations are shown in Figure 2. In addition, there is a permitted asphalt plant located at the southern end of the Mendenhall Valley, but this facility is a minor source and does not operate during the winter months when $PM_{2.5}$ concentrations are of concern in the Mendenhall Valley.

**Figure 1**
**Location of Kensington and Kings Creek Mines**

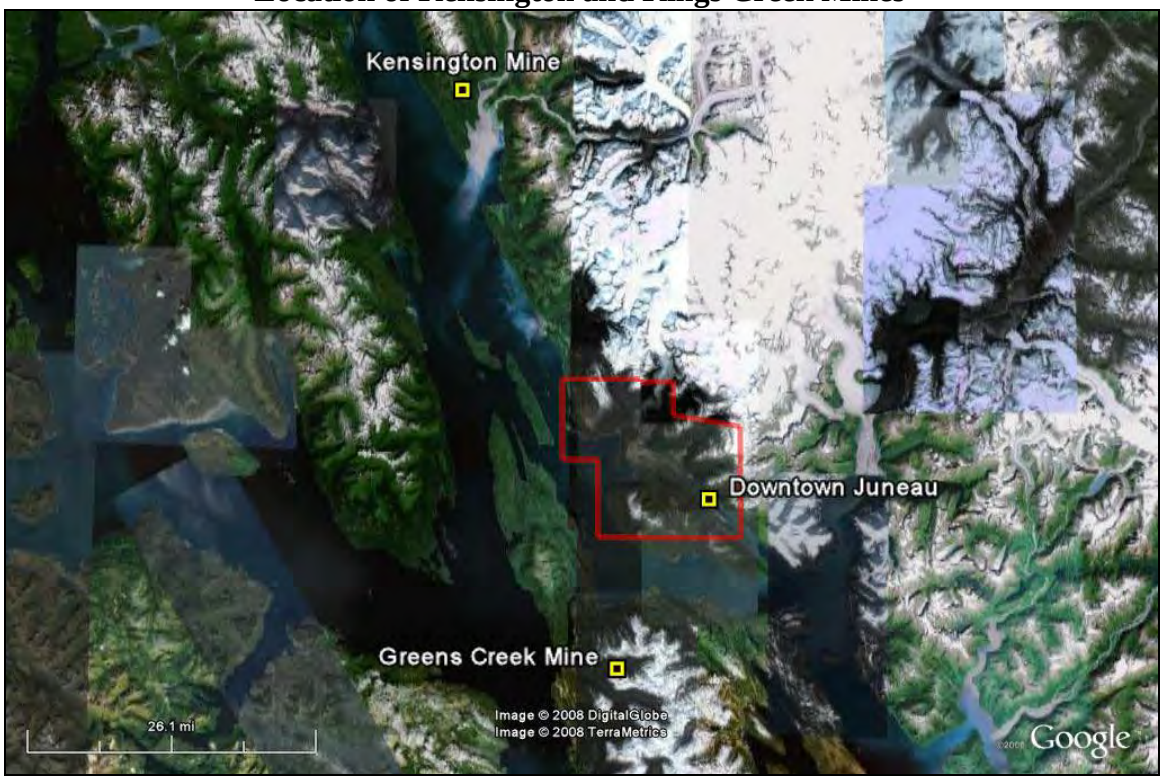



**Figure 2**
**Location of Standby Generators in Juneau**

The AEL&P Auke Bay Standby Generating Station has three units: one diesel generator and two gas turbines. The permit (AQ0202TVP02) shows an annual potential to emit as follows:

Potential Emissions (TPY):

| | |
|---|---|
| NOx | 249.9 |
| $SO_2$ | 214.0 |
| $PM_{10}$ | 32.0 |
| VOC | 8.9 |
| CO | 68.0 |
| Total | 572.8 |

Potential to Emit (PTE) means the maximum quantity of a release of an air contaminant, considering a stationary source's physical or operational design, based on continual operation of all emission units within the stationary source for 24 hours a day, 365 days a year, reduced by the effect of pollution control equipment and approved state or federal limitations on the capacity of the stationary source's emission units or the stationary source to emit an air contaminant, including limitations such as restrictions on hours or rates of operation and type or amount of material combusted, stored, or processed as defined in AS 46.14.990(21), effective January 18, 1997. Because these are backup generators, the units do not typically approach their annual PTE. In fact, these units typically show a combined annual emission total of less than 10 TPY for all reported pollutants (NOx, $SO_2$, $PM_{10}$, and CO). The annual $PM_{10}$ emissions for 2007 were 0.3 TPY. These units are simply not contributing in any meaningful way to concentrations at the Floyd Dryden Monitoring site. In fact, during each of the wintertime episodes during 2005, 2006, and 2007 presented in this document, the Auke Bay Standby Generating Station was not operating and could not have contributed to the concentrations observed at the Floyd Dryden monitoring site in the Mendenhall Valley.

The AEL&P Lemon Creek Standby Generating Station has eleven units: nine diesel generators and two gas turbines. The permit (AQ0209TVP02) shows an annual potential to emit as follows:

Potential Emissions (TPY):

| | |
|---|---|
| NOx | 1,446 |
| $SO_2$ | 419 |
| $PM_{10}$ | 66 |
| VOC | 42 |
| CO | 347 |
| Total | 2,320 |

Because these are backup generators, the units do not typically approach their annual PTE. In fact, in 2007 the following actual emissions were reported for this facility for their annual emission fees:

2007 Actual Emissions (TPY):

| | |
|---|---|
| NOx | 71.50 |
| $SO_2$ | 7.70 |
| $PM_{10}$ | 2.30 |
| CO | 18.40 |
| Total | 99.90 |

In 2005, the actual emissions were even less than in 2007. Given the local complex terrain and meteorology, coupled with infrequent operations, these units are not contributing in any meaningful way to concentrations at the Floyd Dryden Monitoring site.

On April 16, 2008, a massive avalanche severed the power lines from the hydroelectric project to Juneau. AEL&P was able to complete repairs to the line by early June, but during the intervening period, the AEL&P standby generating systems were operating 24/7 to provide power to the community. However, during this time of maximum daily emissions from the power stations, there were no elevated concentrations of fine particulate matter noted at the Floyd Dryden monitoring site. The maximum concentration observed during this period was 13.1 $\mu g/m^3$ on April 24, 2008.

Summary –There are a limited number of point sources located within Juneau that appear to be responsible for a significant portion of precursor emissions to $PM_{2.5}$ (primarily NOx and $SO_2$). Two of the sources—the Kensington and Greens Creek mines—are remote, off the road system, and separated from populated areas of the community by bodies of water and mountains. They do not contribute emissions within Juneau and their contribution to the NOx and $SO_2$ inventory should be eliminated from further consideration. Actual emissions from the two remaining standby generating stations, located in Auke Bay and Lemon Creek, are significantly lower than their PTE values. When the actual values are used, these two sources account for 1% of the aggregate NOx and 7% of the $SO_2$ emitted in Juneau in 2005.

## Factor 2: Air Quality Data

The Alaska Department of Environmental Conservation has concerns about the calculation of the $PM_{2.5}$ 24-hour design value for the Mendenhall Valley monitoring site in Juneau, Alaska. The State acknowledges that this monitoring site can approach the levels of the ambient air quality standard during wintertime inversion episodes; however, the calculation of the design value for this site has been biased to a higher value as a result of Region 10's inclusion of additional sample days.

During 2005–2007, the Floyd Dryden monitor was typically operated on a standard 1-in-3- or 1-in-6-day sampling schedule. However, State monitoring staff sampled additional days (1/10-1/11/2005, 11/27/2006, 11/30-12/1/07, 12/3-12/4/2007, 12/6/2007, and 12/11/2007) during inversion episodes in order to better calibrate continuous monitors to the Federal Reference Method (FRM) samplers. All data were reported to the EPA AQS database, and subsequently State staff discussed the design value calculation with EPA Region 10 staff. The regional office staff directed the State to include the additional samples in the design value calculation, a process that biases the 98$^{th}$ percentile to a higher value. Region 10 staff believed that all data, even data that were not substituted for missing data but instead represented additional consecutive sampling days, should be ranked according to value and included in the 98$^{th}$ percentile calculation (without adjustment to the 98$^{th}$ percentile level). The State requests that EPA revisit the Juneau design value to ensure that it has been properly calculated with respect to the national ambient air quality standard. Presented below is a detailed description of Juneau sampling data, why additional data were collected, and why some of the data need to be omitted from the design value calculations.

$PM_{2.5}$ design values are calculated using the 98th percentile assuming an every third or sixth day sampling schedule. The creditable number of days determines which ranking value will be the design value. In the case of 1-in-6-day sampling with 85% data capture, the 98$^{th}$ percentile value would be the 2$^{nd}$ highest value. This is also the case with 1-in-3-day sampling having minimum data capture (75% to 82%). For 1-in-3-day sampling with data capture greater than 82%, the design value equals the 3$^{rd}$ highest value for the year. Adding additional data does not alter the creditable number of days, as this number is based on a sampling frequency. However, by counting all values—especially elevated values collected on consecutive days during an inversion episode—the annual design values no longer accurately represent the 98$^{th}$ percentile.

The FRM at the Floyd Dryden site in the Mendenhall Valley of Juneau (AQS ID: 02-110-0004-88101-1) typically measures very low $PM_{2.5}$ concentrations. The average 24-hour concentration for the years from 2004 to 2007 was 7.2 µg/m$^3$. From January 2004 through January 2006, the site housed a Met One BAM. The BAM was de-installed to help with monitoring the eruptions of St Augustine January through March 2006. In September 2006, a Thermo Fischer Scientific TEOM was installed at Floyd Dryden. Between October and December of 2007, a BAM was operating as part of a two-month inter-sampler comparative study. To effectively establish a correlation between the FRM and the continuous analyzers, the operator was directed to collect samples over the full range of the measurement scale, if possible. This effort emphasized days when concentrations were expected to be higher than normal. During the majority of the year, the low values bias correlations between the FRM and the continuous sampler. For a meaningful comparison between the sampling methods, sample values over the full range of the instrument scales are needed. Due to the lack of a State-owned data acquisition system, the DEC has used the AQS database as the main data repository. All valid data are recorded to AQS.

Empirically, $PM_{2.5}$ levels increase at the Floyd Dryden site during cold windless winter conditions when inversions set up and stagnant air is trapped in the Valley. The majority

of the increase in $PM_{2.5}$ levels is due to the use of wood stoves to augment heating by a small number of Valley residents. (In the past, Juneau was designated nonattainment for $PM_{10}$ due to wood smoke, and a wood stove ban in the Mendenhall Valley has been effective in controlling the problem.) In 2005, weather conditions indicated the occurrence of an inversion event with potential for elevated PM levels. On January 10, 2005, the FRM sampler was set up to run on the 1-in-3-day national monitoring schedule. The operator **sampled daily for the next three consecutive days** and recorded an exceedance on January 12, 2005. On the next scheduled run day, January 13, 2005, the concentrations had decreased to 20.7 $\mu g/m^3$. Table 3 summarizes this sampling schedule and recorded values. Without the additional sampling, the exceedance on January 12, 2005, would have been missed. ADEC contends that although five consecutive days were sampled, only the two run days, as defined by the national monitoring schedule, should count in calculating the annual design value.

**Table 3**
**2005 Juneau Sampling Schedule**

| Date | $PM_{2.5}$ Concentration ($\mu g/m^3$) | Comment |
|---|---|---|
| 20050107 | 23.5 | **scheduled run** |
| 20050110 | 8.7 | **scheduled run** |
| 20050111 | 15 | additional sample |
| 20050112 | 45.1 | additional sample |
| 20050113 | 20.7 | **scheduled run** |
| 20050116 | 28.2 | **scheduled run** |
| 20050119 | 6.1 | **scheduled run** |

In 2006, the sampling schedule switched to 1-in-6-days during the winter. As listed in Table 4, the scheduled run days were Nov 13, 19, and 25 and December 1 and 7. Due to instrument problems, no sample was collected on November 19, 2006. As the weather conditions set up for a winter-time inversion, the site operator collected additional samples on November 23 and November 27, 2006, along with the scheduled run days on November 25, and December 1, 2006. As the sample on November 23, 2006, can be considered a make-up sample for the missed scheduled day on November 19, 2006, the State does not contest the 2006 design value.

| Table 4<br>2006 Juneau Sampling Schedule | | |
|---|---|---|
| Date | $PM_{2.5}$ concentration ($\mu g/m^3$) | Comment |
| 20061113 | 5.0 | **scheduled run** |
| 20061119 | not sampled | **scheduled run** |
| 20061123 | 36.7 | make-up run for 11/19/08 |
| 20061125 | 27.9 | **scheduled run** |
| 20061127 | 48.5 | additional sample |
| 20061201 | 17.3 | **scheduled run** |
| 20061207 | 3.3 | **scheduled run** |

In 2007, eight consecutive days around an inversion event were again sampled, as listed in Table 5. Scheduled samples were collected on November 26 and 29, and December 2, 5, 8, and 11. Additional samples were collected on November 30, and December 1, 3, 4, and 6. The scheduled sample on December 8 was not collected. The samples from December 4-6 all show exceedances of the standard. The December 6 value will be used to substitute for the missed December 8 sample day, but the December 4 sample should not be counted towards the design value calculation.

| Table 5<br>2007 Juneau Sampling Schedule | | |
|---|---|---|
| Date | $PM_{2.5}$ concentration ($\mu g/m^3$) | Comment |
| 20071126 | 4.0 | **scheduled run** |
| 20071129 | 21.8 | **scheduled run** |
| 20071130 | 17.8 | additional sample |
| 20071201 | 20.0 | additional sample |
| 20071202 | 2.7 | **scheduled run** |
| 20071203 | 7 | additional sample |
| 20071204 | 39.6 | additional sample |
| 20071205 | 46.2 | **scheduled run** |
| 20071206 | 45.9 | additional sample, make-up run for 12/8/07 |
| 20071208 | not sampled | **scheduled run** |
| 20071211 | 4.7 | **scheduled run** |

The State suggests calculating the design values as follows. For 2005, based on the creditable number of days (for 1-in-6 sampling), use the 2$^{nd}$ highest value, after omitting

the extra sample on January 12, 2005. This would result in a 2005 design value of 34.5 $\mu g/m^3$. The 2006 value remains unchanged at 36.7$\mu g/m^3$. The new design value for 2007 would be the 3rd highest data point (1-in-3 sampling), which is 25.8 $\mu g/m^3$, after omitting the value from December 4, 2007. The average of 34.5$\mu g/m^3$, 36.7$\mu g/m^3$, and 25.8 $\mu g/m^3$ for the three years results in an overall design value of 32.3 $\mu g/m^3$.

In a conversation with Neil Frank (Senior Advisor EPA/OAR/OAQPS/AQAD) during the recent AQS conference in Milwaukee (August 2008), Barbara Trost (Acting Air Monitoring Program Manager, DEC/AQ) explained the State's concern and objection to how the design values for the Floyd Dryden site in Juneau had been calculated. Mr. Frank indicated that consecutive sampling days should not be included in the design value calculation. Given that Mr. Frank believed that the calculation of the Juneau design value may be flawed and considering the information provided above, the State respectfully requests that EPA review and revisit the Juneau design value to ensure that it has been properly calculated with respect to the national ambient air quality standard.

In addition to the re-verification of the 2005–2007 24-hour $PM_{2.5}$ design value, the State also requests that EPA calculate the 2006–2008 design value prior to finalizing Juneau as a nonattainment area. The 2008 monitoring data will be available by February 2009. With recent changes to the enforceable wood smoke control program in the Mendenhall Valley, it is likely that the monitoring data from the 2006–2008 period will have a design value lower than the 24-hour ambient health standard.

Other Juneau $PM_{2.5}$ Monitoring Sites – In the past, $PM_{2.5}$ FRM monitoring was conducted at two sites within the Lemon Creek Valley area of Juneau. One site was located on the Lemon Creek valley floor and the other site was located in the Mountainside Estates subdivision along the hillside. The intent was to investigate if the valley adjacent to the Mendenhall Valley exhibited a similar pattern with regards to fine particulate pollution. These two sites were in operation for periods between 1999 and 2003. The hillside site at Mountainside Estates never saw any concentrations approaching the 24-hour $PM_{2.5}$ standard. The other site, located on the valley floor, did see increased concentrations on an episodic basis. However, in the three years of monitoring at the site on the valley floor, the data did not show a design value in violation of the 24-hour $PM_{2.5}$ ambient air quality standard. The monitoring data from these sites are stored and available in the EPA AQS database.

Mendenhall Valley $PM_{10}$ to $PM_{2.5}$ Comparison – The Mendenhall Valley was found to be in nonattainment of the 24-hour $PM_{10}$ health standard during the 1980s. The primary pollution source of concern during winter months was wood smoke from residential heating. Table 6 compares $PM_{10}$ concentrations to $PM_{2.5}$ concentrations during the winter months. It clearly shows that most of the $PM_{10}$ measured is actually the fine fraction of $PM_{2.5}$. Combustion sources have been and continue to be the sources causing particulate pollution during Juneau winter months. This correlation does not hold true in the spring months (March–June) when dust from road sanding can be lifted into the air, increasing concentrations of $PM_{10}$.

Summary – Monitoring data were presented for two areas: the Mendenhall Valley, the largest residential area of Juneau; and the Lemon Creek Valley, a smaller area with a mixture of commercial and residential facilities. Between 2005–2007, the State expanded the sampling schedule of the Mendenhall Valley's Floyd Dryden $PM_{2.5}$ monitor to obtain data during high concentration episodes for use in calibrating continuous monitors to FRM samplers. All of the additional data were reported to the EPA AQS database. The inclusion of the additional data biased the calculation of the design value for Juneau. Since some of the additional data are needed to fill gaps on days when normal sampling did not occur, the State has documented which data should be removed from the AQS database. It appears to the State that the removal of these data produces a design value that does not exceed the ambient $PM_{2.5}$ standard. Therefore, the State respectfully requests that EPA verify which data should be removed from the AQS database and confirm the impact on the design value calculation. A comparison of $PM_{2.5}$ and $PM_{10}$ monitoring data collected in the Mendenhall Valley shows little difference during winter months, which indicates that there is little or no fugitive dust contribution and that combustion is the dominant source of particulate. A review of $PM_{2.5}$ monitoring data collected in Lemon Creek between 1999–2003 showed the resulting design value did not exceed the 24-hour $PM_{2.5}$ standard.

| Table 6<br>$PM_{10}$ and $PM_{2.5}$ Concentrations at Floyd Dryden Monitoring Site | | | |
|---|---|---|---|
| Date | $PM_{10}$ High-Vol Actual ($\mu g/m^3$) | Partisol $PM_{2.5}$ ($\mu g/m^3$) | Difference |
| 1st Quarter 2008 – Floyd Dryden Monitoring Site | | | |
| 1/1/2008 | 8.7 | 7.8 | 0.9 |
| 1/7/2008 | 9.0 | 8.3 | 0.7 |
| 1/13/2008 | 4.1 | 2.4 | 1.7 |
| 1/19/2008 | 13.6 | 11.6 | 2.0 |
| 1/25/2008 | 4.4 | 4.1 | 0.3 |
| 1/31/2008 | 30.9 | 30.2 | 0.7 |
| 2/6/2008 | 7.3 | 5.9 | 1.4 |
| 2/8/2008 | 26.3 | 21.4 | 4.9 |
| 2/12/2008 | 6.5 | 5.7 | 0.8 |
| 2/18/2008 | | | |
| 2/24/2008 | 10.9 | 10.3 | 0.6 |
| 3/1/2008 | | | 0.0 |
| 3/7/2008 | 0.9 | 0.9 | 0.0 |
| 3/13/2008 | 4.0 | 4.6 | -0.6 |
| 3/19/2008 | | 1.5 | |
| 3/21/2008 | 2.0 | 10.1 | 0.5 |
| 3/25/2008 | 17.4 | 7.0 | 7.3 |
| 3/31/2008 | 7.2 | | 0.2 |
| 2nd Quarter2008 – Floyd Dryden Monitoring Site | | | |
| 4/19/2008 | 19.6 | 12.0 | 7.6 |
| 4/24/2008 | 19.7 | 13.1 | 6.6 |
| 4/27/2008 | 1.8 | 1.8 | 0.0 |
| 4/30/2008 | 4.8 | | |
| 5/6/2008 | | | |
| 5/7/2008 | 8.9 | 6.3 | 2.6 |
| 5/12/2008 | 1.2 | 1.3 | -0.1 |
| 5/18/2008 | | | |
| 5/19/2008 | 7.2 | 4.9 | 2.3 |
| 5/24/2008 | | | |
| 5/25/2008 | 16.0 | 10.4 | 5.6 |
| 5/30/2008 | 13.7 | 7.3 | 6.4 |
| 6/5/2008 | 3.0 | 1.7 | 1.3 |
| 6/11/2008 | 7.1 | 6.5 | 0.6 |
| 6/17/2008 | 6.8 | | |
| 6/23/2008 | | | |
| 6/26/2008 | 3.6 | 0.0 | 3.6 |

## Factor 3: Population Density and Degree of Urbanization

According to the U.S. Census, the borough covers an area of 3,255 square miles (2,716.7 on land and 538.3 on water), which is larger than Rhode Island or Delaware. Large portions of the land area, however, are unpopulated because they are made up of steep mountains and glaciers. The result is that the populated area is confined to a narrow range of coastal land that is of low density relative to other areas of the country. Figures 3-7 present a detailed display of population density, based on data collected in the 2000 Census, for Juneau and its communities. As can be seen in the summary chart, Juneau is divided into four areas:

- *Lena Cove to Eagle Beach* – This is a low density area in the northwest that is largely isolated from the rest of Juneau by terrain and water. The number of people per acre ranges from 0.01 to 5, the lowest reported in Juneau.

- *Mendenhall Valley & North Douglas* – The Mendenhall Valley, located nine miles to the northwest from downtown Juneau, is the largest residential area in the Juneau. A portion of North Douglas Island located directly across the Gastineau Channel is also included. When combined with North Douglas Island, this area accounts for more than 50% of Juneau's population.[1] The population density for this area never exceeds more than 100 people per acre.

- *Lemon Creek & North Douglas* – Lemon Creek is a smaller valley located to the southeast of the Mendenhall Valley which includes a mixture of residential and commercial facilities. A portion of North Douglas Island is also included. While the population density for this area is predominantly less than 5 people per acre, there are several sites with population density exceeding more than 100 people per acre.

- *Downtown Juneau & Douglas* – Downtown Juneau is located at the base of Mount Juneau directly across the Gastineau Channel from Douglas Island. This area contains the second largest share of Juneau's population and is relatively densely populated, with many areas ranging between 5 and 100 people per acre.

Summary – Despite Juneau's enormous size, the populated areas are limited to four well-defined coastal areas. Three of these areas account for the bulk of Juneau's population. While a few isolated locations exceed a population density of 100 people per acre, most locations have a population density of less than 5 people per acre.

[1] http://www.juneau.org/cddftp/demographics/2001_CBJ_Pop_map.pdf

**Figure 3**

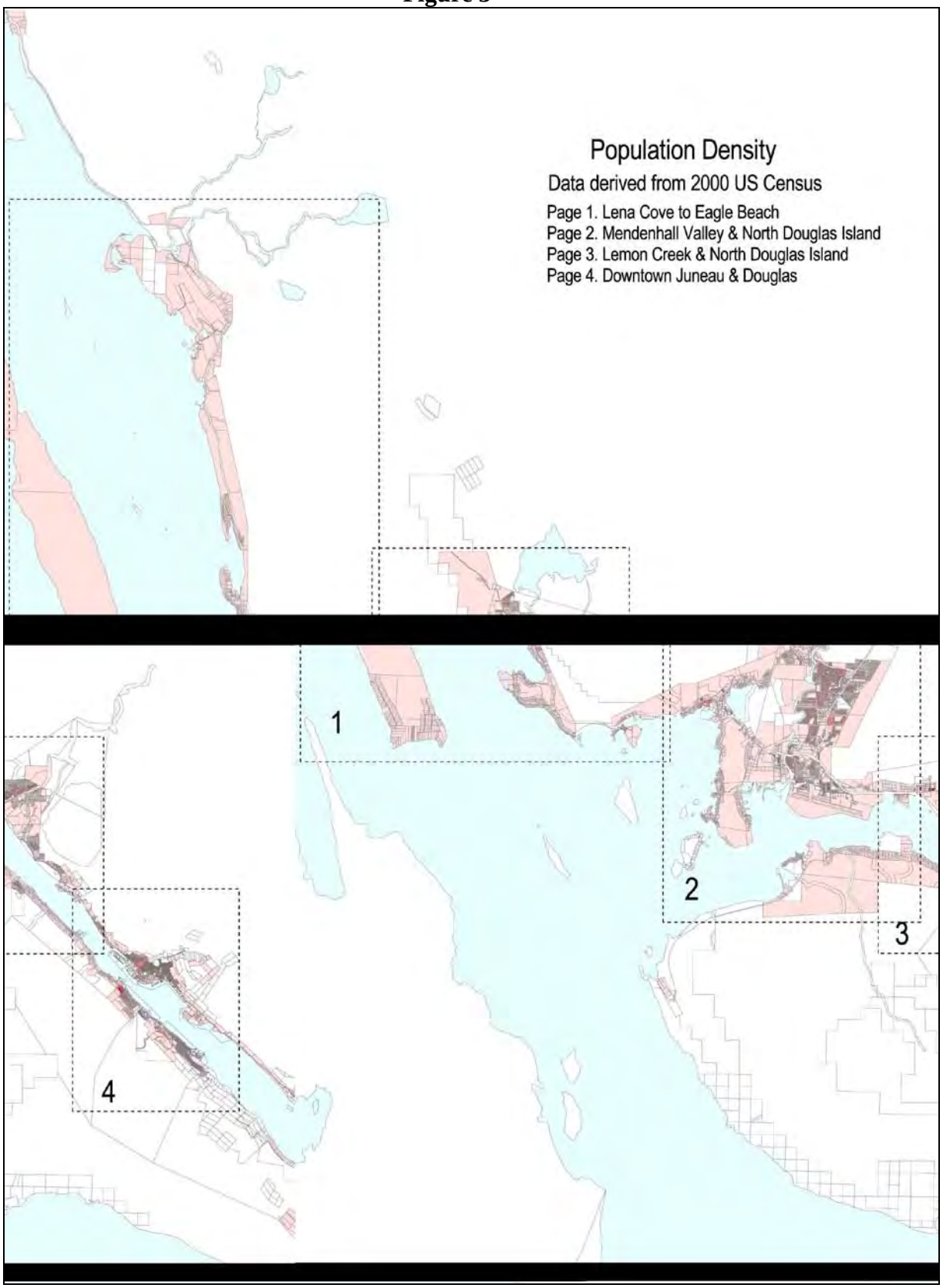

Population Density
Data derived from 2000 US Census
Page 1. Lena Cove to Eagle Beach
Page 2. Mendenhall Valley & North Douglas Island
Page 3. Lemon Creek & North Douglas Island
Page 4. Downtown Juneau & Douglas
1
2
3
4

**Figure 4**


Lena Cove to Eagle Beach
Eagle Beach
Tee Harbor
Shelter Island
Lena Cove
Population Density
Persons per acre
0.01 - 5
5.01 - 15
15.01 - 40
40.01 - 100
> 100

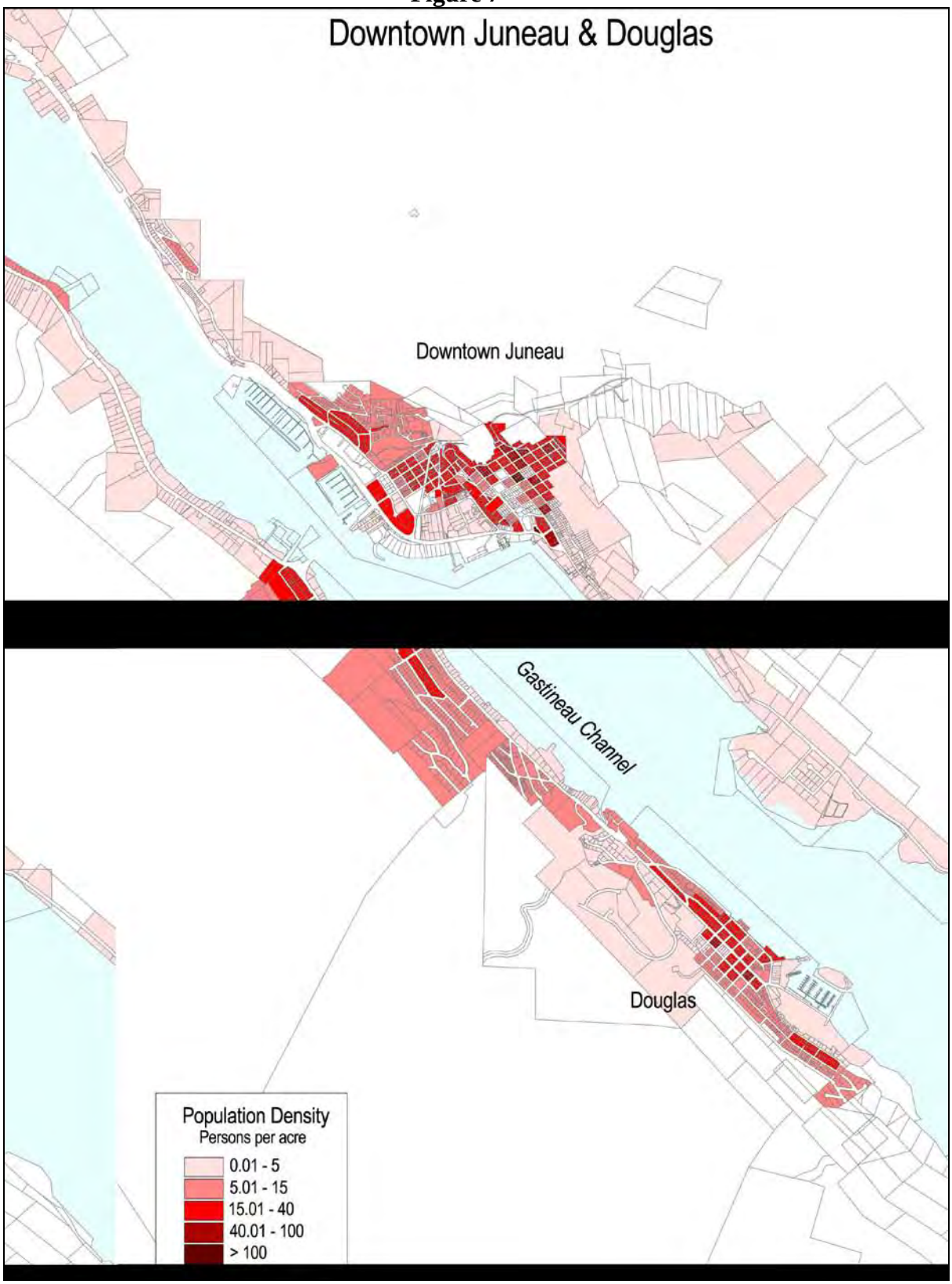
**Figure 5**


Mendenhall Valley & North Douglas
Auke Lake
Auke Bay
Mendenhall Valley
Juneau International Airport
Population Density
Persons per acre
0.01 - 5
5.01 - 15
15.01 - 40
40.01 - 100
> 100

**Figure 6**


Lemon Creek & North Douglas
Lemon Creek
Gastineau Channel
Douglas Island
Population Density
Persons per acre
0.01 - 5
5.01 - 15
15.01 - 40
40.01 - 100
> 100

**Figure 7**


Downtown Juneau & Douglas
Downtown Juneau
Gastineau Channel
Douglas
Population Density
Persons per acre
0.01 - 5
5.01 - 15
15.01 - 40
40.01 - 100
> 100

## Factor 4: Traffic and Commuting Patterns

As shown in the above figures and discussed further in the section addressing geography/topography, the populated areas of Juneau are located on a narrow coastal plane that is surrounded by water, tall mountains, and glaciers. The result is that Juneau is land-locked—the only access from the outside is by ship or plane. To facilitate access, Juneau is connected to the Alaska Marine Highway System, which means that it has scheduled ferry service. Travel times on the ferry range from roughly one to four hours, although longer trips are available. Practically, this means that Juneau travel activity is not impacted by commutes from outside areas. Further evidence of this conclusion can be seen in the counts of vehicles disembarking from the ferries serving Juneau.[2] Using Alaska Marine Highway Statistics, a total of 17,281 vehicles entered and 17,486 vehicles left Juneau in 2005. This translates to fewer than 100 vehicles per day entering and leaving Juneau on average. During the winter months, this value can be reduced by more than 50%. Clearly, vehicles commuting into or out of Juneau are not having a significant impact on local air quality.

Within Juneau, the principal commute patterns are between Auke Bay, Mendenhall Valley, Lemon Creek, and downtown along Egan Drive; and between Douglas Island and downtown. Since the Mendenhall Valley is approximately 9 miles from downtown Juneau and it has the largest share of population, the commute along Egan Drive is responsible for a large portion of the travel generated within the community. As noted in the meteorology discussion, emissions produced along Egan Drive, which parallels the Gastineau Channel, are not transported into the Mendenhall Valley prior to or during exceedance conditions.

Summary – Juneau is isolated from outside communities, the only access is by ship or plane. Vehicle counts show that fewer than 100 vehicles entered and left Juneau on an average day in 2005. During winter months, when $PM_{2.5}$ exceedances are a concern, this number can be reduced by more than 50%. Emissions from external commutes are not contributing to $PM_{2.5}$ violations in Juneau. In contrast, a significant share of travel is produced by commutes between the Mendenhall Valley and downtown Juneau. Emissions from that travel, however, occur primarily outside of the Mendenhall Valley airshed and do not impact concentrations recorded there.

## Factor 5: Growth

EPA's technical analysis for Juneau presented information indicating that while the population within the Juneau area had been stable for a period of five years, vehicle miles traveled (VMT) had increased by 62% between 1996 and 2005. Since this information appears contradictory and the VMT estimates presented are undocumented, data were obtained to assess whether the claimed growth in VMT could be correct. Estimates of VMT for Juneau are not readily available because the community is too small to qualify as a metropolitan planning organization (MPO) and therefore does not maintain a travel

[2] http://www.dot.state.ak.us/amhs/info/general/stats/05tvr/ATVR2005.pdf

demand model. The principal insight into travel activity in Juneau comes from traffic count data. The Alaska Department of Transportation and Public Facilities (ADOT&PF) maintains a network of traffic counting stations within Juneau and provided a summary of counts (average annual daily traffic [AADT] counts) for a mixture of high-volume roads in Juneau for the period between 1996 and 2005. The data, summarized in Table 7, show that, contrary to the 62% growth in VMT claimed by EPA, Juneau experienced no growth at all—instead, all roads showed a decline in traffic. Outlined below are the reasons why the stations included within Table 7 are relevant.

- *Egan Drive* – Provides the only link between downtown Juneau and populated areas to the northwest (i.e., Mendenhall Valley, Lemon Creek, etc.). Since there is no other route from downtown to these areas, it captures changes in both commute and work trips and should be highly representative of activity within Juneau.

- *Glacier Highway* – Is a continuation of Egan Drive to the west of the Mendenhall Valley into Auke Bay, Eagle Beach, and Lena Cove. Thus, it captures commute and work trips between these communities and downtown.

- *Douglas Highway* – Runs along the northern edge of Douglas Island. It captures both commute and work trips between Douglas Island and downtown Juneau.

- *Riverside Drive* – Runs the entire length of the populated portion of the Mendenhall Valley with a north-south orientation. It captures traffic activity within the largest populated area within Juneau. It also provides insight into vehicle activity impacting concentrations recorded at the Floyd Dryden monitoring site.

**Table 7**
**Juneau Annual Average Daily Traffic Counts 1996–2005**

| Station # | Station Description | RU/FC[a] | CDS Route | Mile Post | AADT by Year | | | | | | | | | | AADT % change (1996 to 2005) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 | 1996 | |
| 60333000 | Egan Drive | U/OPA | 296000 | 2.579 | 23,341 | 23,863 | 23,902 | 23,637 | 23,514 | 23,681 | 23,785 | 24,433 | 23,992 | 23,947 | -2.531 |
| 60311000 | Glacier Highway | U/MART | 296000 | 14.072 | 2,028 | 2,089 | 2,015 | 2,019 | 2,007 | 2,005 | 2,333 | 2,487 | 2,419 | 2,454 | -17.359 |
| 60348000 | Douglas Highway | U/MART | 296110 | 1.036 | 8,528 | 8,638 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | -1.273 |
| 60500370 | Riverside Drive | U/COL | 296500 | 1.471 | 4,522 | 4,613 | 4,563 | 4,615 | 4,617 | 4,641 | 4,630 | 4,727 | 4,914 | 5,036 | -10.207 |

[a] U=Urban (in Juneau's case "small"); OPA = Other Principle Arterial – Other; MART = Minor, Arterial; COL = Collector

To place EPA's estimate of travel growth in perspective, several calculations were performed. First, the 2005 estimate of 207,000 miles was adjusted to represent baseline travel in 1996, which, after correcting for errors[3] and the projected 62% increase, is 127.8 million miles/year (350,076 miles per day). Next, the station-specific % change values presented in Table 7 were weighted in proportion to the miles of roadway represented by each count station. A summary of that calculation is presented in Table 8. Combining the weighted average 9.7% reduction in traffic activity with the 1996 estimate of travel produces an annual estimate of 115.4 million miles per year in 2005 (316,254 miles per day).

**Table 8**
**Weighted Average Juneau AADT Growth 1996 – 2005**
**(% change)**

| Facility Type | Length in Miles[a] | % Share | % Change in AADT |
|---|---|---|---|
| Collector | 62.4 | 19.7 | -10.207 |
| Minor Arterial | 38.2 | 12.1 | -9.316 |
| Principal Arterial | 17.3 | 5.5 | -2.531 |
| Local | 198.2 | 62.7 | -10.207[b] |
| Total | 316.1 | 100.0 | -9.677 |

[a] http://www.dec.state.ak.us/air/anpms/as/doc/JAN06_Draft_Juneau_EI_&_Apps.pdf
[b] Since no values were collected for local roads, they were assumed to be represented by measurements on the nearest road category (i.e., collectors).

The local traffic count data demonstrate that, contrary to EPA's estimated 62% increase in travel between 1996–2005, travel activity within Juneau actually declined by almost 10% over the same timeframe. This in turn demonstrates that motor vehicle emissions in Juneau have declined over the past decade because of reductions in VMT and the benefits of a cleaner vehicle fleet (due to the replacement of older dirtier vehicles with newer vehicles meeting more stringent emissions standards).

Another insight into growth in Juneau comes from a review of population changes over the past decade. The stability of Juneau's population is illustrated below in Table 9. It shows that between 1996 and 2007, the population had increased by a total of 3.7% (an annualized rate of growth of 0.3%/year). The annual change is quite volatile, with year-to-year changes frequently changing from positive to negative. These data support the finding that travel activity has not grown by 62%, but instead actually declined between 1996 and 2005.

[3] The VMT estimate of 207,000 presented in Table 5 of the Juneau analysis in Attachment 1 of EPA's August 18, 2008 letter to Gov. Palin, is an annual estimate of travel. Using this value, the daily estimate of travel in Juneau would be 567 miles per day. Discussions with Region 10 staff confirmed the error and determined that it was off by a factor of 1,000. The adjusted value of 207 million miles was used in calculating the baseline 1996 value.

| Table 9<br>Trends in Juneau Population between 1996 and 2007 | | |
|---|---|---|
| Year[a] | Population | Year-to-Year Change Relative to 1996 |
| 1996 | 29,230 | - |
| 1997 | 29,713 | 1.7% |
| 1998 | 30,021 | 1.1% |
| 1999 | 30,189 | 0.6% |
| 2000[b] | 30,711 | 1.8% |
| 2001 | 30,453 | -0.9% |
| 2002 | 30,997 | 1.9% |
| 2003 | 30,294 | -2.4% |
| 2004 | 31,122 | 2.8% |
| 2005 | 31,225 | 0.4% |
| 2006 | 30,811 | -1.4% |
| 2007 | 30,305 | -1.7% |

[a] Alaska Department of Labor and Workforce Development
[b] U.S. Census Bureau

Summary – The data presented above show that EPA's estimate of travel growth is incorrect. Instead of growing, the traffic count data indicate that travel activity in Juneau declined by almost 10% over the past decade. Population data show that growth is almost non-existent and support this finding. Since emissions changes over time are proportional to the combination of growth and control factors, this means that emissions in Juneau attributable to vehicles have been declining over time and that new controls on mobile sources will not be required to bring Juneau into attainment. This also means the nonattainment area does not have to be expanded to capture mobiles sources as these emissions are already in decline. The lack of growth suggests that trends observed in $PM_{2.5}$ concentrations over time in Juneau are valid (i.e., the standard has not been exceeded) and are unlikely to escalate over time.

## Factor 6: Meteorology

The Federal Reference Method (FRM) $PM_{2.5}$ monitor located at the Floyd Dryden Middle School in Juneau, Alaska (Figure 8) measured exceedances of the current daily $PM_{2.5}$ standard (35 µg/m$^3$) on at least one day during three periods between January 2005 and December 2007:

- January 10, 2005 – January 19, 2005;
- November 20 – December 2, 2006; and
- December 2 – December 9, 2007.

The concentrations recorded at the Floyd Dryden Middle School are not representative of conditions throughout Juneau—instead, they represent conditions within an isolated airshed located nine miles from downtown Juneau in the Mendenhall Valley. That airshed is the largest residential area in Juneau and is bounded by sharply rising mountains on the east and west and the Mendenhall Glacier to the north. This topography, combined with a low winter sun angle that limits solar heating, supports the development of relatively severe temperature inversions. These inversions trap emissions close to the Valley floor and in the past led to severe concentrations of airborne particulate matter that exceeded state and federal standards for $PM_{10.}$

To assess whether emissions can be transported from any of the other populated areas within Juneau into the Mendenhall Valley, surface meteorological data were obtained from four sites distributed through the region during the periods when exceedances occurred. The location of each site is displayed in Figure 8; a brief description of each follows.

- *Juneau Forecast Office* – Operated by the local National Weather Service (NWS); the data record began in 1999. This site is located in the northern portion of the Mendenhall Valley and documents meteorology within the area adjacent to the $PM_{2.5}$ monitor.

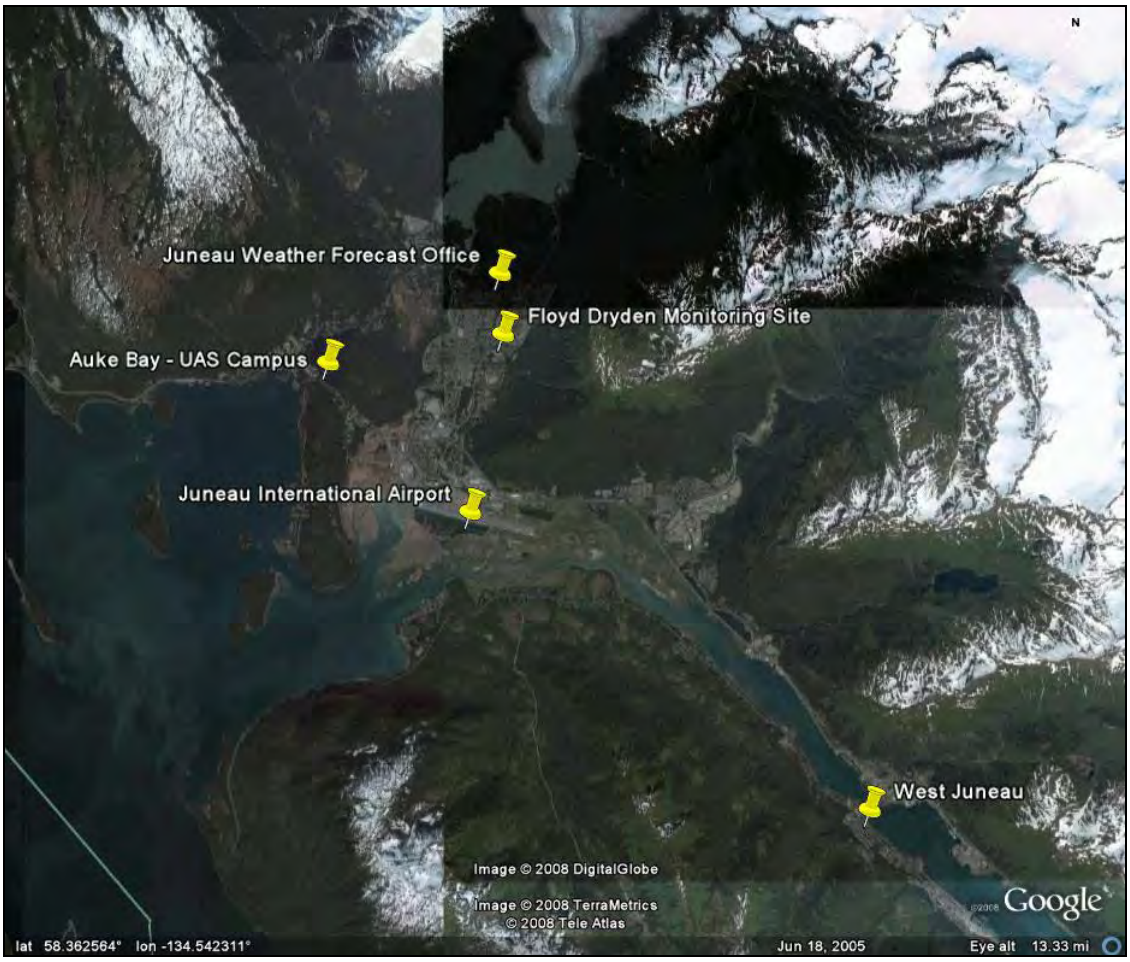
- *Juneau International Airport* – Operated by the NWS/Federal Aviation Administration (FAA); the data record began in 1943. This site is located at the mouth of the Mendenhall Valley and documents whether the transport of any emissions from North Douglas Island, Lemon Creek, or downtown Juneau into the Valley occurred.

- *Auke Bay – UAS Campus* – Operated by the University of Alaska Southeast; the data record began in 1963. This site is located to the west of the Mendenhall Valley and documents whether emissions from Auke Bay, the location of standby generators and a populated area, impacted the $PM_{2.5}$ monitor on days preceding and during periods when exceedances occurred.

- *West Juneau* – Operated by a local resident; the data record began in 2003. This site documents meteorology within the Gastineau Channel, a waterway oriented from the southeast to the northwest that is bounded by sharply rising mountains and populated areas, including downtown Juneau. Data from this site document the direction and speed of surface winds prior to and during exceedances.

Prior to the highest $PM_{2.5}$ day during each period, winds at the Juneau International Airport (Airport), located at the mouth of the Mendenhall Valley, and the Juneau Weather Forecast Office (WFO), located deep within the Mendenhall Valley, showed predominantly easterly winds, resulting in wind flow along the Gastineau Channel and over a very steep mountain ridge, respectively, for the two locations. This flow regime could not have produced transport of particulate matter from one area to another due to the low $PM_{2.5}$ concentrations observed during the easterly wind periods and the

**Figure 8**
**Map of Meteorological and $PM_{2.5}$ Monitoring Sites**




dispersion of pollutants by the winds. In addition, only a couple of isolated measurements at either the Airport or the WFO prior to or during a high $PM_{2.5}$ pollution event had winds out of the south, which is the only way for air within the Gastineau Channel to flow into the Mendenhall Valley; however, there were just as many measurements with wind from the north, canceling any effect of the southerly air flow and further proving that the Mendenhall Valley did not receive air from neighboring communities. On the high pollution event days, winds at the WFO, approximately 0.75 miles from the $PM_{2.5}$ monitoring site, were northwesterly, northeasterly, or calm, confirming that no pollution transport from the south occurred. As a result, during all three $PM_{2.5}$ events, the pollution measured in the Mendenhall Valley appeared to be completely generated from local emissions within the Valley and the extent of the nonattainment area should be limited to the Mendenhall Valley itself.

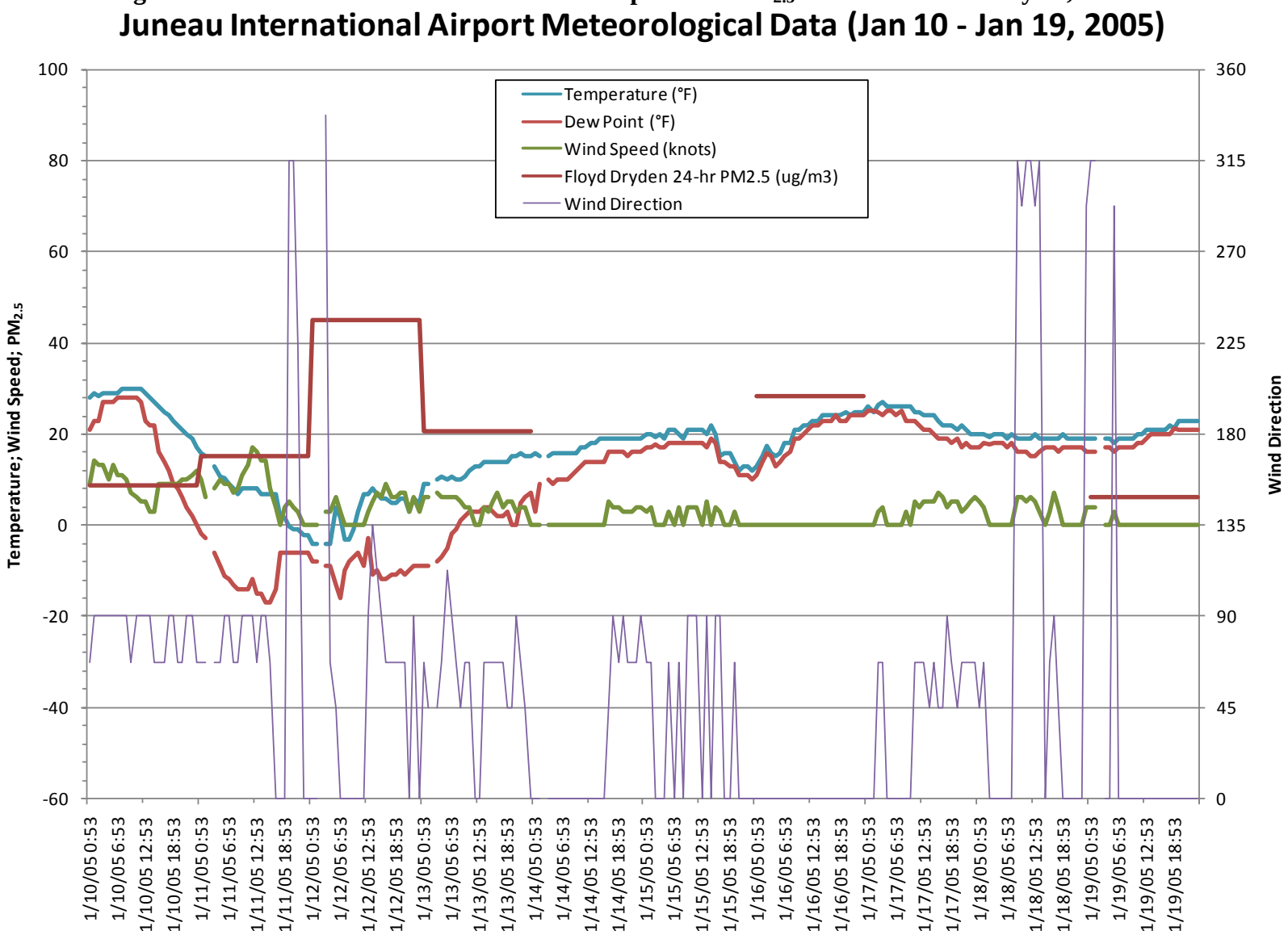
A description of the meteorology during each of the three high $PM_{2.5}$ periods follows.

Event 1: January 12, 2005 – The 24-hour average $PM_{2.5}$ concentration in the Mendenhall Valley increased from 15 µg/$m^3$ on January 10 to 45.1 µg/$m^3$ on January 12, and then it decreased to 20.7 µg/$m^3$ on January 13. The 10th and 11th were characterized by gradually decreasing surface temperatures at all meteorological stations and east-northeasterly winds around 10 miles per hour (mph), with higher gusts, at the Airport and WFO; calm winds at Auke Bay; and variable winds around 5-10 mph at West Juneau. However, by the evening of the 11th, the winds subsided to less than 5 mph at all locations and the temperatures dropped from around 25° Fahrenheit (F) on the 10th to below 0°F on the morning of January 12. The drop in temperatures resulted in an increased use of heating by residents and allowed a shallow temperature inversion to form, trapping emissions near the surface and allowing $PM_{2.5}$ concentrations to rapidly rise from January 11 to January 12.

On January 12, winds at the WFO, the Airport, and Auke Bay were mostly calm to light out of the northwest-to-north-to-northeast. No directions were conducive to the transport of air into the Mendenhall Valley from any outside areas; therefore, the emissions that led to the high daily $PM_{2.5}$ concentration were locally generated. At the same time, winds in West Juneau, across the Gastineau Channel from downtown Juneau, were variable, with a tendency to be from the southwest, likely due to local terrain flow on Douglas Island. This flow kept emissions from downtown Juneau within the city due to steep terrain on its northern, northeastern, and eastern sides, further supporting the conclusion that pollution within the Mendenhall Valley did not come from external sources, namely those in downtown Juneau.

A summary of the meteorological data at the Airport and $PM_{2.5}$ values from Floyd Dryden is shown in Figure 9. Figure 10 provides a similar summary from the Juneau Forecast Office, located in the Mendenhall Valley, during the same time period. Figure 11 shows data for the Auke Bay – UAS Campus site, also during the same period.

**Figure 9**
**Meteorological Data from the Juneau International Airport and $PM_{2.5}$ Data for the January 12, 2005 Exceedance**




.

**Figure 10**
**Meteorological Data from the Juneau WFO and $PM_{2.5}$ Data for the January 12, 2005 Exceedance**

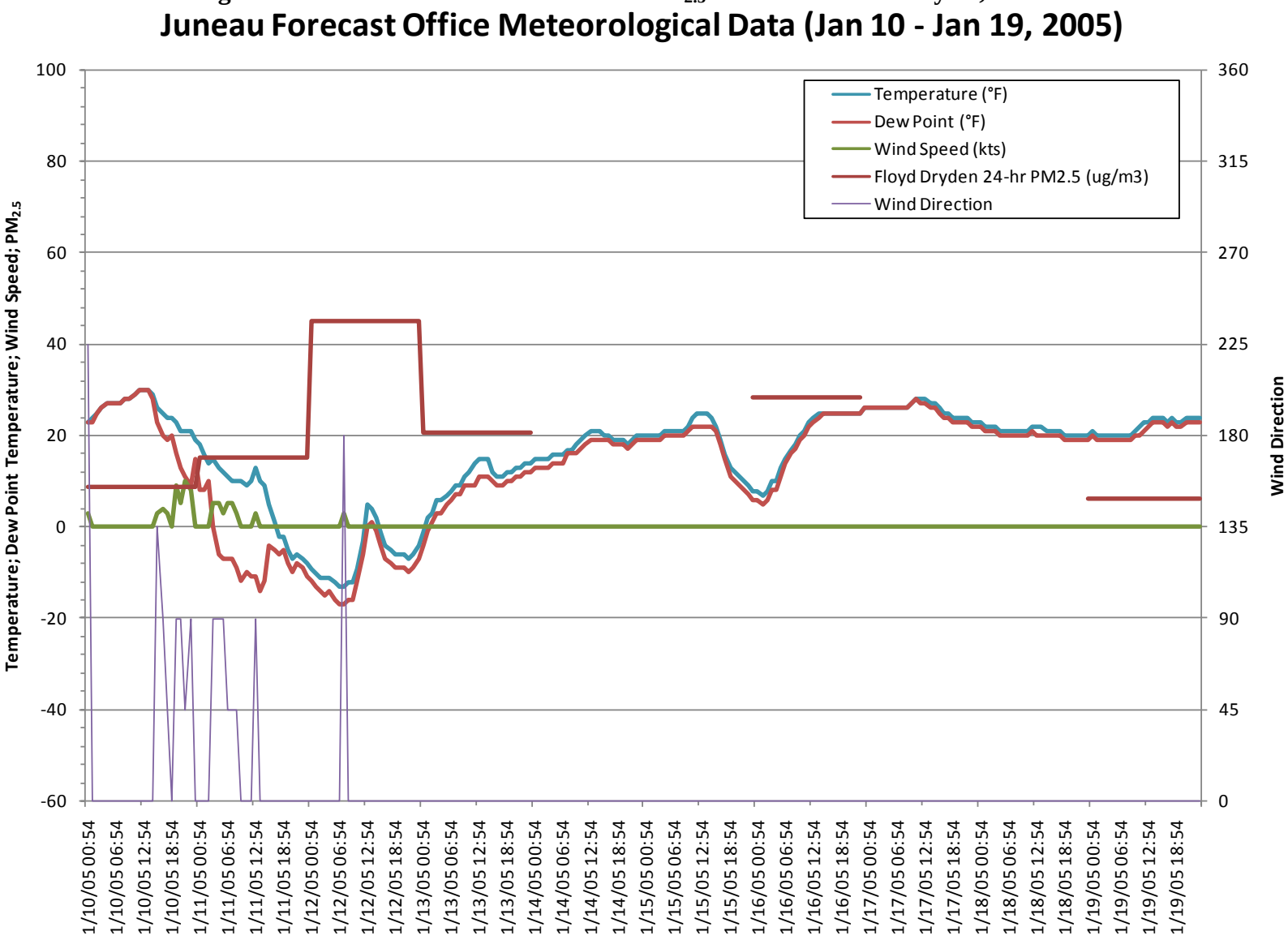
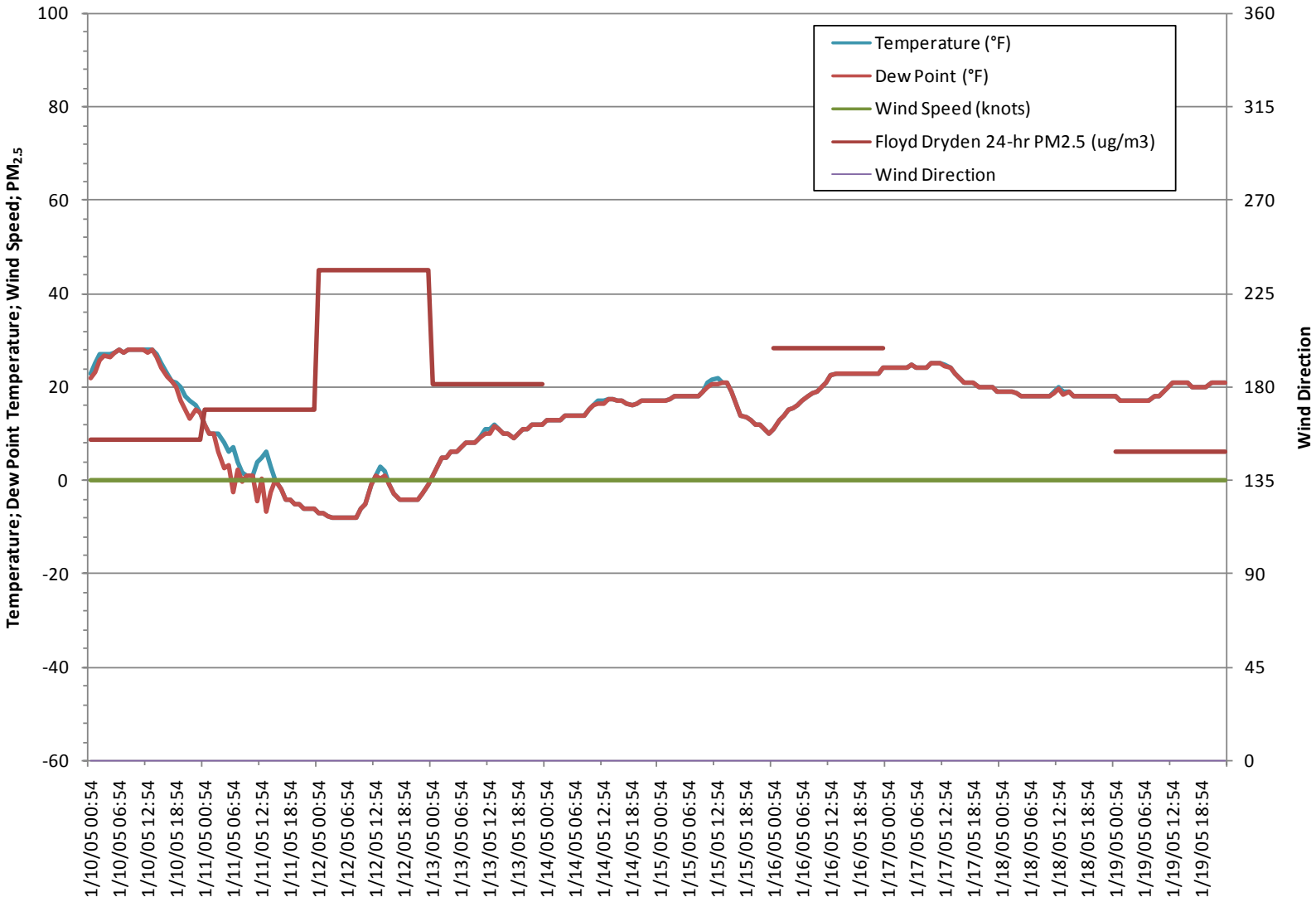


**Figure 11**
**Meteorological Data from Auke Bay – UAS Campus and $PM_{2.5}$ Data for the January 12, 2005 Exceedance**



Event 2: November 23 & 27, 2006 – The 24-hour average $PM_{2.5}$ concentration in the Mendenhall Valley rapidly rose on November 23 to 36.7 $\mu g/m^3$, then decreased to 27.9 $\mu g/m^3$ by November 25, and increased again to 48.5 $\mu g/m^3$ by November 27 before dropping to 17.3 $\mu g/m^3$ on December 1. The few days prior to the 23rd were characterized by gradually decreasing daytime maximum and nighttime minimum surface temperatures and light to calm winds at all meteorological stations. However, on the afternoon of November 22, the Airport and West Juneau sites reported east-northeasterly winds around 10 miles per hour (mph), with higher gusts, while winds at the WFO and Auke Bay remained calm. The stark contrast in winds between the Gastineau Channel and the Mendenhall Valley confirms that the two areas can experience vastly different wind flow patterns at the same time. By the morning of November 23, the winds subsided to less than 5 mph at all locations and the temperatures dropped from about 20°F on the 22nd to below 0°F. The drop in temperatures resulted in an increased use of heating by residents and allowed a shallow temperature inversion to form, trapping emissions near the surface.

On November 23, winds at the WFO, the Airport, and Auke Bay were calm to light out of the northwest-to-north-to-northeast, all directions that would prevent air flow into the Mendenhall Valley from any outside areas; therefore, the emissions that led to the high daily $PM_{2.5}$ concentration were locally generated. At the same time, winds in West Juneau, just across the Gastineau Channel from downtown Juneau, were variable, with a slight tendency out of the southwest, likely due to local terrain flow on Douglas Island. This flow kept emissions from downtown Juneau within the city due to steep terrain on its northern, northeastern, and eastern sides, further supporting the conclusion that pollution within the Mendenhall Valley did not come from external sources, namely those in downtown Juneau.

During the following three days, November 24–26, temperatures warmed into the teens and winds at the Airport, WFO, and West Juneau sites increased to 5-10 knots, with slightly weaker winds during the late evening each day, while the winds at Auke Bay remained calm. However, the $PM_{2.5}$ concentration only dropped to 27.9 $\mu g/m^3$, which was quite surprising given the strength and duration of the wind. As a result, once the temperature decreased to near 0°F and the winds slowed to around 5 knots out of the east-northeast at the Airport and calm at the WFO on the November 27, the $PM_{2.5}$ concentration rapidly rose again.

Figure 12 summarizes the meteorological data at the Airport and $PM_{2.5}$ values from Floyd Dryden. Figure 13 provides a similar summary from the Juneau Forecast Office, located in the Mendenhall Valley, during the same time period. A graph for Auke Bay during this event was not produced, because, like the January 2005 event, the winds were calm through the entire period.

**Figure 12**
**Meteorological Data from the Juneau International Airport and $PM_{2.5}$ Data for the November 23 & 27, 2006 Exceedances**

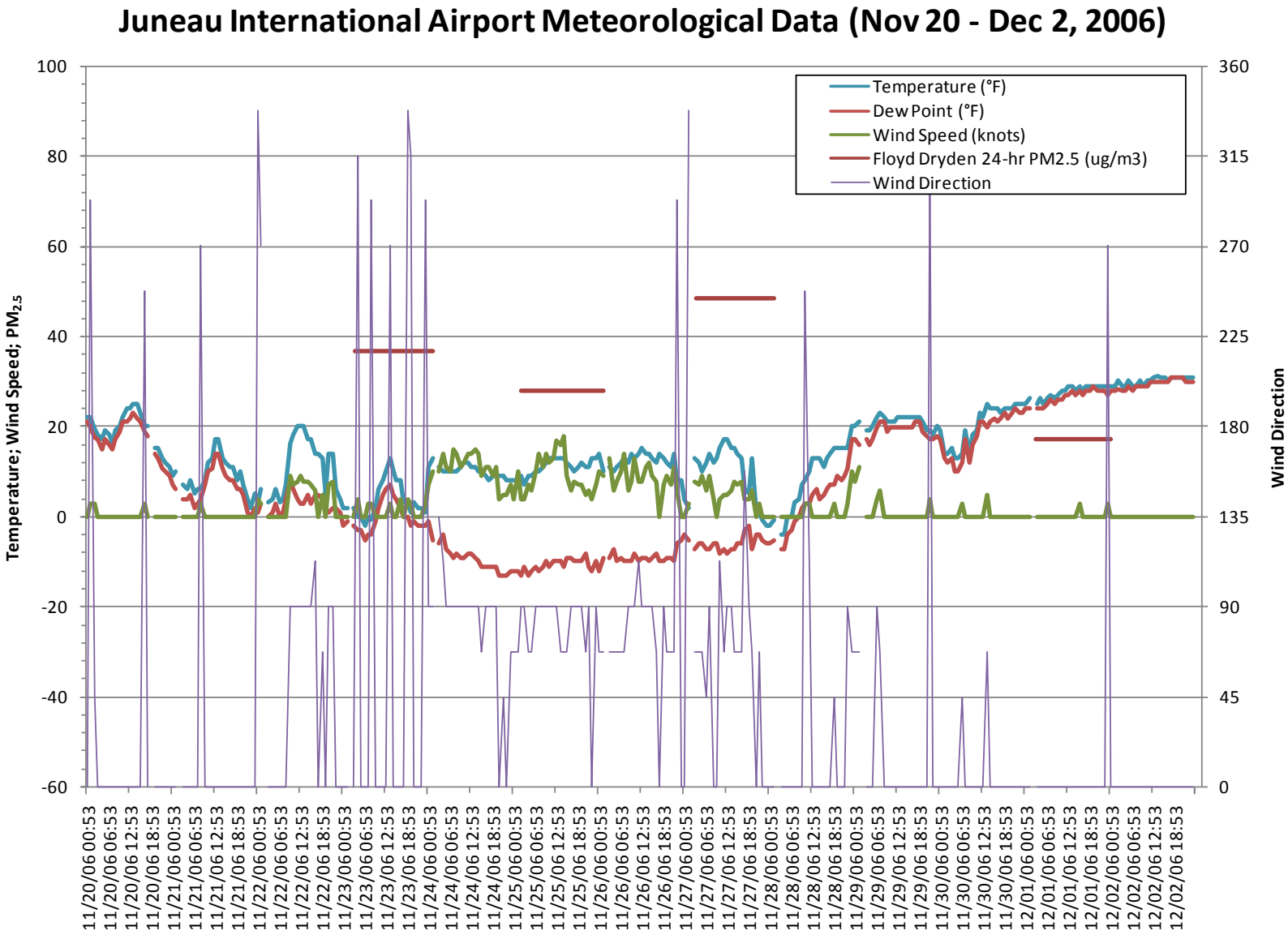
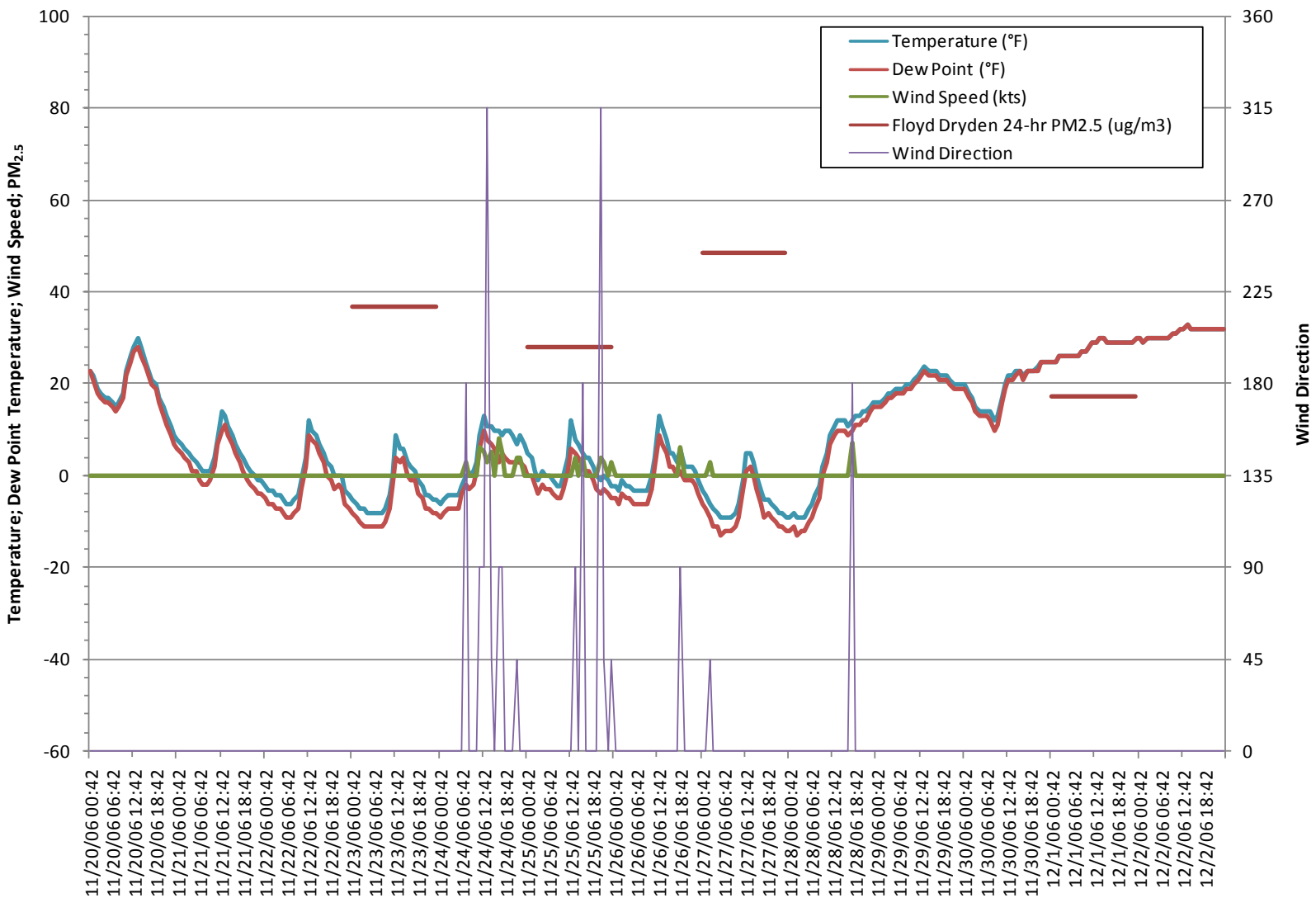


**Figure 13**
**Meteorological Data from the Juneau WFO and $PM_{2.5}$ Data for the November 23 & 27, 2006 Exceedances**



Event 3: December 4–6, 2007 – The longest high $PM_{2.5}$ event captured during the past three winters occurred in early December 2007. The 24-hour average $PM_{2.5}$ concentration in the Mendenhall Valley rapidly rose from 7 $\mu g/m^3$ on December 3 to 39.6 $\mu g/m^3$ on December 4, and then it increased further to 46.2 $\mu g/m^3$ on December 5 and remained high at 45.9 $\mu g/m^3$ on December 6, before dropping to 4.7 $\mu g/m^3$ by December 11.

Meteorological conditions leading up to the episode were similar to the other events in 2005 and 2006, in that there were east-northeasterly winds around 10-15 mph at all four meteorological sites for the two days prior to the spike in the $PM_{2.5}$ concentration. The only difference is that Auke Bay also showed only one hour of southwesterly winds, which could have allowed an exchange of air between Auke Bay and the Mendenhall Valley. That hour occurred on the day prior to when the exceedance was recorded. In conjunction with the winds, temperatures decreased from around 25°F on December 2 to within a few degrees above and below 0°F between the four meteorological stations by the morning of December 4. The combination of the subsiding winds and the decreasing temperatures during the night of December 3 resulted in an increase in residential heat use and the formation of a strong, low-level temperature inversion, causing emissions to be trapped near the surface and $PM_{2.5}$ concentrations to quickly rise on December 4. As a result, the $PM_{2.5}$ standard was exceeded. However, unlike the other episodes, winds remained calm in all locations for the next three days and the only factor that caused the pollution to disperse was a gradual rise in temperatures, which eventually broke down the temperature inversion and allowed the atmosphere to mix vertically.

Figure 14 summarizes the meteorological data at the Airport and $PM_{2.5}$ values from Floyd Dryden. Figure 15 provides a similar summary from the Juneau Forecast Office, located in the Mendenhall Valley, during the same time period. Figure 16 shows data for the Auke Bay – UAS Campus site, also during the same period.

Summary – Analysis of the monitoring data shows that transport of emissions from populated areas within Juneau into the Mendenhall Valley did not occur prior to or during episodes when the ambient $PM_{2.5}$ standard was exceeded. The reasons for this finding vary. Generally, it was found that prior to each episode winds were predominantly from the east-northeast, a direction that prevented any transport of emissions into the Valley. It was also found that winds within the Mendenhall Valley were either calm or generally flowed toward the Airport during high $PM_{2.5}$ days, indicating that pollutant transport from areas outside of the Valley could not have occurred. Furthermore, during one episode, it was found that winds at the Airport remained above 5 knots, while those in the Valley were calm, indicating that air flow in the Gastineau Channel can be completely independent from air flow in the Valley.

**Figure 14**
**Meteorological Data from the Juneau International Airport and $PM_{2.5}$ Data for the December 4-6, 2007 Exceedances**

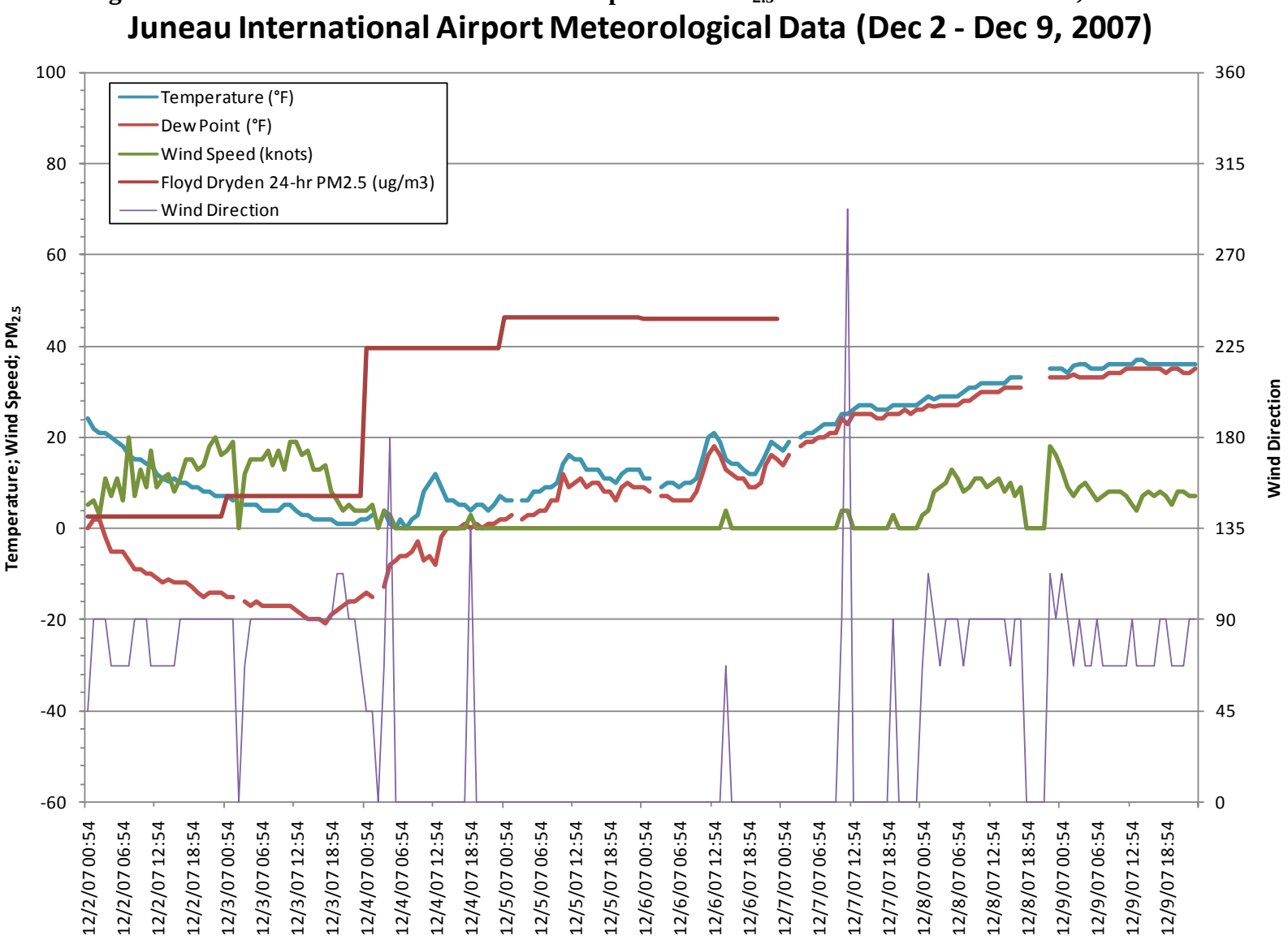


**Figure 15**
**Meteorological Data from the Juneau WFO and $PM_{2.5}$ Data for the December 4-6, 2007 Exceedances**

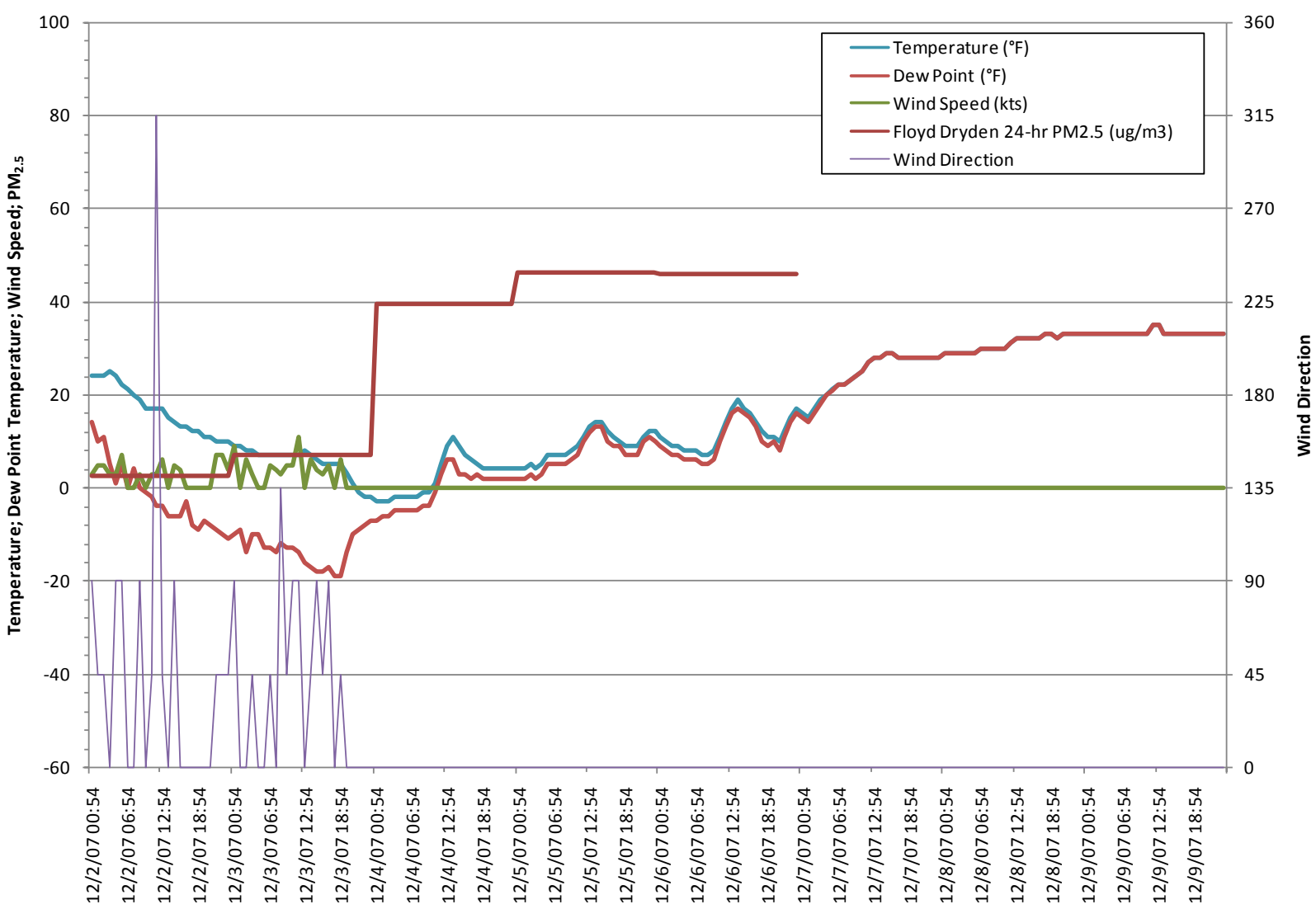
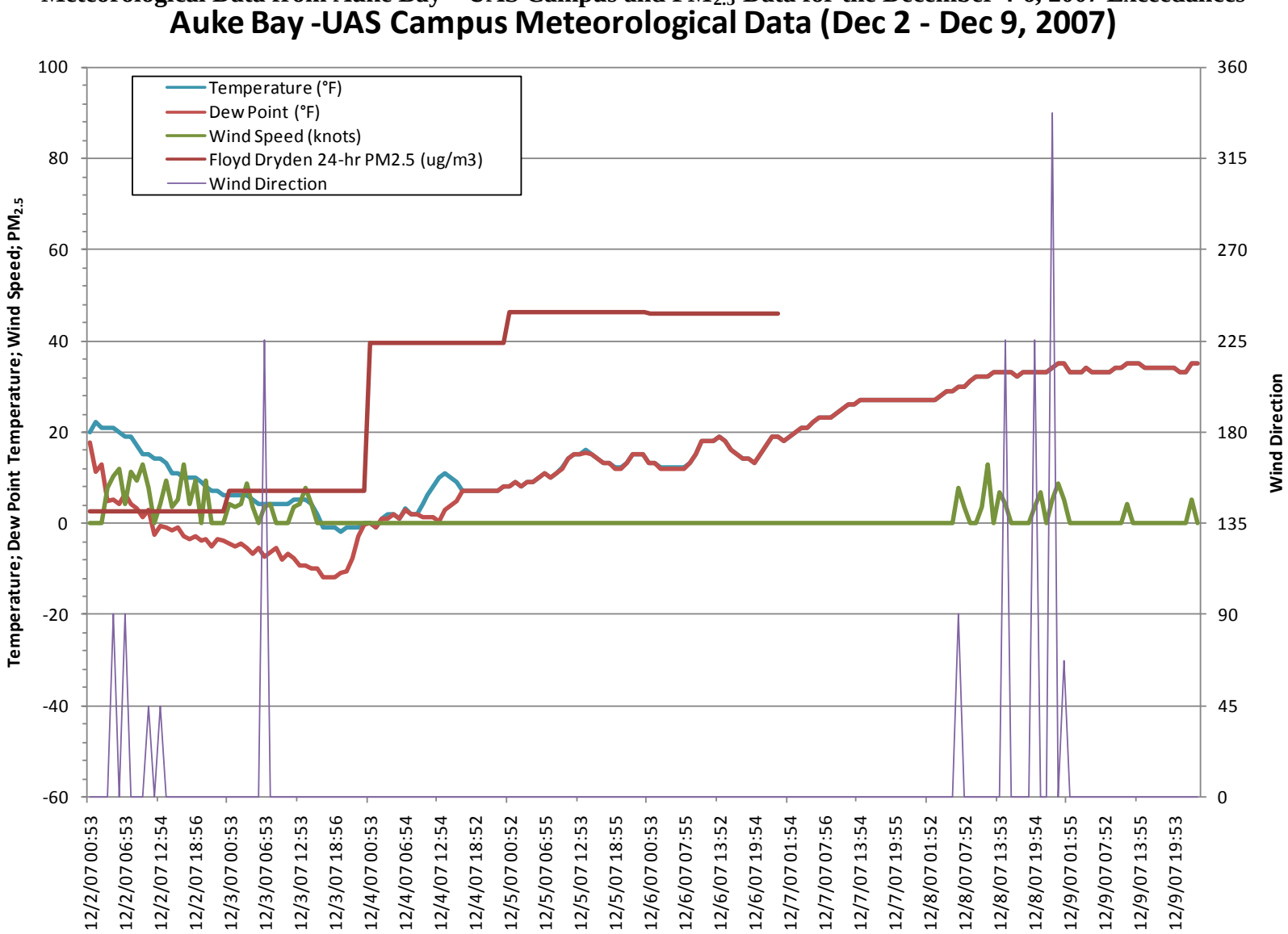


**Figure 16**
**Meteorological Data from Auke Bay – UAS Campus and $PM_{2.5}$ Data for the December 4-6, 2007 Exceedances**



## Factor 7: Geography and Topography

There are three primary areas of interest in Juneau in terms of impact on the $PM_{2.5}$ monitors. The interplay of local mountains, valleys, and water bodies define these three geographical areas. The Downtown and Douglas areas are distinct from the Lemon Creek Valley, which in turn is distinct from the Mendenhall Valley. Figure 17 shows that Downtown is separated from the Lemon Creek Valley by a mountain range that includes the 3,576 foot Mt. Juneau.

**Figure 17**
**Topography Separating Lemon Creek from Downtown and Douglas**

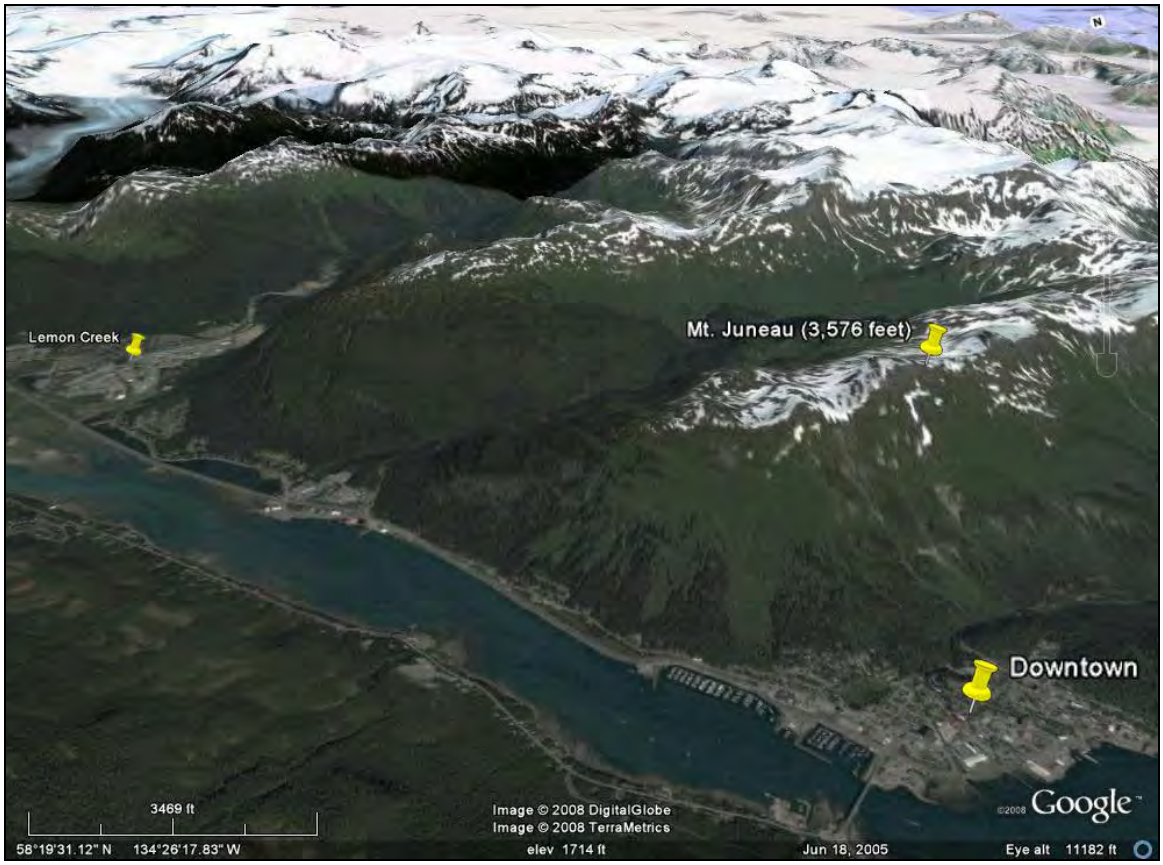
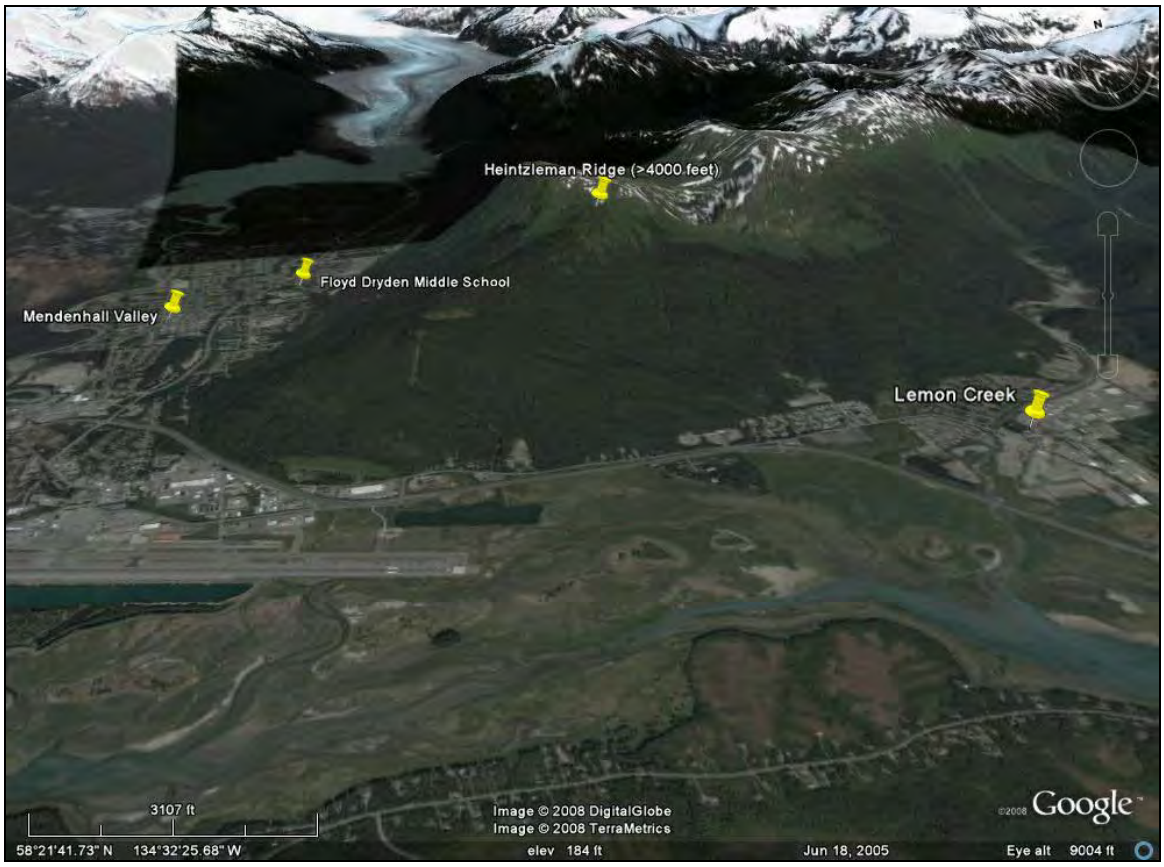



Figure 18 shows that Heintzleman Ridge, which includes Thunder Mountain and tops out at over 4,000 feet, separates Lemon Creek Valley from the Mendenhall Valley.

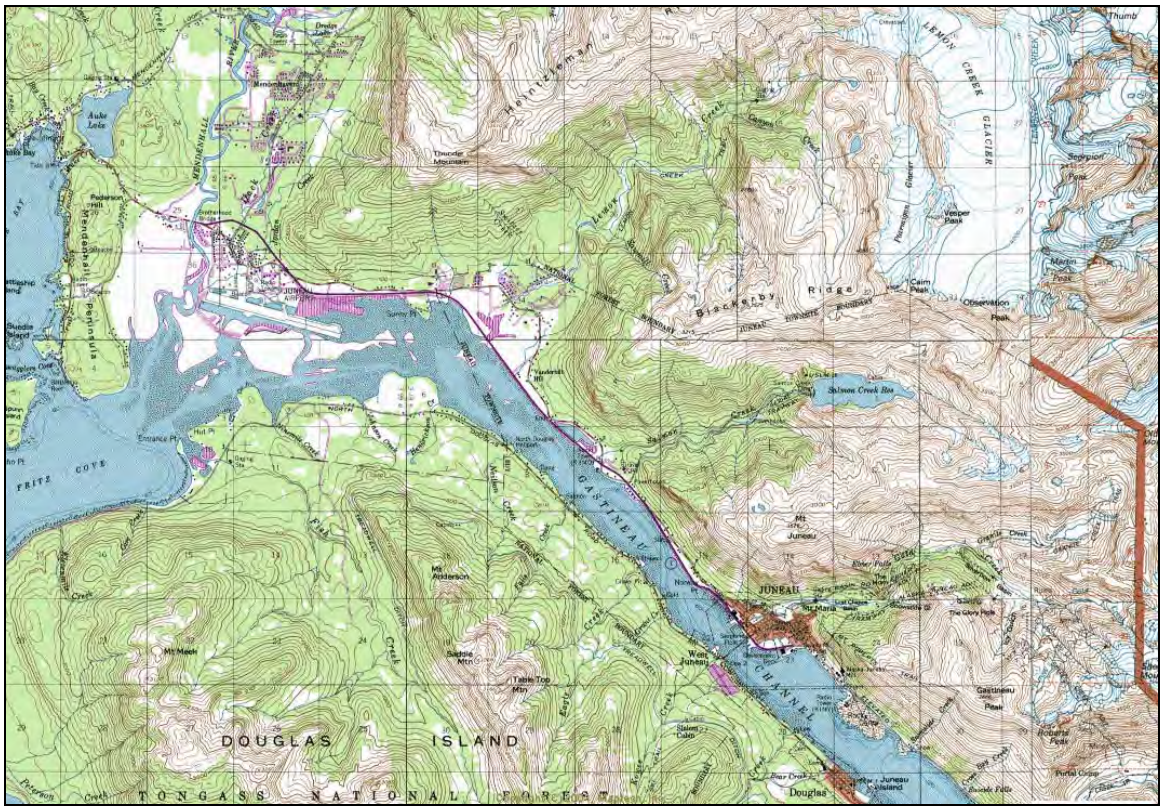
**Figure 18**
**Topography Separating Lemon Creek from Mendenhall Valley**




The Downtown and Douglas communities cling to the mountainsides on the tailings of historical mining operations. By contrast, populated areas in the Lemon Creek and Mendenhall Valley exist in valleys carved by glaciers now retreating into the ice field. Figure 19 presents a topographic map that illustrates the terrain surrounding each of these three areas.

The rugged terrain influences local temperatures and the distribution of precipitation and wind, creating considerable variation in weather within relatively short distances. The space between the mainland and Douglas Island mountains is narrow, squeezing rain from moisture-laden clouds from the ocean. Downtown and Douglas receive nearly 93 inches of rain annually. The Juneau Airport, only eight miles away at the mouth of the Mendenhall Valley, has a much wider space between mainland and Douglas Island mountains, and experiences 53 inches annually. Periods of severe cold usually start with strong northerly winds, and are often caused by a flow of cold air from northwestern Canada through nearby mountain passes and over the Juneau ice field. These winds are generally brief but strong and gusty and are known locally as Taku Winds. Again, due to the varied topography, these winds are often experienced in downtown Juneau, Douglas,

**Figure 19**
**Topographic Map of the Densely Populated Areas of Juneau**




and other local areas, but are generally not felt in the Mendenhall Valley according to the National Climate Data Center.

Summary – The three principal populated areas of Juneau (i.e., Downtown and Douglas, Lemon Creek, and the Mendenhall Valley) are geographically distinct from each other. Mountain ranges in excess of 3,000 feet and waterways isolate each area. The differences in terrain create large variations in local weather.

## Factor 8: Jurisdictional Boundaries

Juneau is currently designated nonattainment for $PM_{10}$. The Mendenhall Valley is the designated nonattainment area. The unique geography of the Valley is understood by residents to isolate and concentrate pollutants emitted within that airshed. The City and Borough of Juneau has implemented local ordinances that are focused on controlling sources that are known to contribute to higher concentrations in the Valley. Expanding the existing $PM_{10}$ boundaries to require a larger area of $PM_{2.5}$ control without data showing elevated $PM_{2.5}$ concentrations is not justified. The public within the expanded area will not understand. It contradicts local knowledge about which sources are impacting the Mendenhall Valley. The boundary expansion essentially undercuts support

for implementing existing controls and makes future controls infeasible. This will complicate planning efforts to demonstrate attainment, or more specifically, jeopardizes current and future controls protecting public health.

Summary – Increasing the size of the existing $PM_{10}$ boundary to require a larger area of $PM_{2.5}$ control without data demonstrating elevated concentrations within the expanded area will undercut public support for existing control measures.

## Factor 9: Level of Control of Emissions Sources

On September 8, 2008, the City and Borough of Juneau (CBJ) approved an ordinance amending the existing woodburning ordinance to declare burn bans at thresholds preceding exceedances of the ambient 24-hour $PM_{2.5}$ standard at 30 ug/$m^3$ instead of more lenient threshold of 75 ug/$m^3$ for $PM_{10.}$ A copy of the new Ordinance—Serial No. 2008-28, "An Ordinance Amending the Woodsmoke Control Program Regarding Solid Fuel Devices"—is provided in Attachment B. The ordinance is now effective. As woodburning has been the primary pollution source of concern in the Mendenhall Valley, this enforceable control program directly targets the emissions contributing to elevated levels of $PM_{2.5}$.

Summary – Juneau recently amended its woodburning ordinance to institute burn bans when concentrations approach the threshold of the 24-hour ambient $PM_{2.5}$ standard instead of the ambient $PM_{10}$ standard. The community has taken the action required to ensure continued attainment of the ambient $PM_{2.5}$ standard. The ordinance is now effective.

## Overall Summary and Recommendations

The local information used in the nine-factor analysis presented above contradicts much of the evidence EPA used to expand the boundary proposed by the State for the $PM_{2.5}$ nonattainment area in Juneau. Key differences between EPA's and the State's positions are summarized below.

1. Emissions Data

   EPA – Focused on the relative contribution of emissions between Juneau and adjacent counties with populated areas located several mountain ranges and 50+ miles away from the populated areas of Juneau and concluded "Further analysis is required to understand if emissions from adjacent counties may contribute to the $PM_{2.5}$ violations in the Mendenhall Valley."

   State – Provided source-specific emissions information for Juneau showing that nonroad sources are responsible for the bulk of $PM_{2.5}$ emitted and the only point sources with the potential to emit $PM_{2.5}$ precursor emissions during winter months are

standby generators located outside of the Mendenhall Valley in Auke Bay and Lemon Creek.

2. Air Quality Data

   EPA – Presented design values for 2004–2006 and 2005–2007 in Juneau and concluded no monitoring data were available for adjacent counties.

   State – Raised concerns about the validity of the design value calculations that suggest Juneau may not be out of attainment for $PM_{2.5}$ and requested that EPA revisit those calculations. Monitoring data for 1999–2003 were presented for Lemon Creek showing that the resulting design value did not exceed the 24-hour $PM_{2.5}$ standard. A comparison between $PM_{2.5}$ and $PM_{10}$ monitoring data for the Mendenhall Valley showed there is essentially no fugitive dust contribution during winter months and combustion is the dominant source of particulate.

3. Population Density and Degree of Urbanization

   EPA – Presented population density information for Juneau and adjacent counties and determined that the information supports excluding other counties from the proposed nonattainment boundary. With regard to Juneau the following conclusion was presented: "Population based emissions are likely to be very limited from areas of Juneau Borough other than the cities of Juneau and Douglas."

   State – Provided detailed charts documenting the location of populated areas within Juneau. The charts showed that three areas account for the bulk of Juneau's population: Mendenhall Valley/North Douglas, Lemon Creek/North Douglas, and Downtown Juneau/Douglas. This information showed that Juneau has distinct population centers that are different from those presented by EPA.

4. Traffic Commuting Patterns

   EPA – Provided estimates of travel (i.e., VMT), number of commuters driving to another county, and related percentages of commutes into Juneau and adjacent counties. Using these data, the following conclusion was reached: "All the preceding factors indicate that the surrounding boroughs are not contributors to the $PM_{2.5}$ violations in the Juneau monitor but that a larger part of the Juneau Borough than what the state has suggested may be appropriate."

   State – Noted that Juneau is isolated from other counties and that access is only by ship or plane. Statistics from the Alaska Marine Highway System documented that scheduled ferry service transported fewer than 100 vehicles per day on average into and out of Juneau, and that during the winter this value could be reduced by more than 50%. The data contradicted EPA's finding that the boundary proposed by the State should be expanded.

5. Growth Rates and Patterns

EPA – Presented statistics showing that while population growth in Juneau was stable between the years 2000–2005, travel had increased by 62% between the years 1996–2005. These data supported the following conclusion: "It can be expected that vehicular emissions of direct $PM_{2.5}$ and NOx may be higher than it was a few years ago."

State – Noted that EPA's estimate of travel was off by a factor of 1,000 and provided traffic counts demonstrating that travel had not increased between the years 1996–2005 but, in fact, had decreased. Population data presented for the same time period showed that growth is almost nonexistent and supported this finding. These data supported a finding that vehicle emissions were declining not increasing as claimed by EPA.

6. Meteorology

EPA – Used data from the Yakutat State Airport, located over 200 miles away, to characterize meteorology in Juneau and noted that it was not representative of conditions in Juneau.

State – Presented meteorological data from four separate sites in Juneau that demonstrated that transport of emissions from populated areas into the Mendenhall Valley did not occur prior to or during episodes when the ambient $PM_{2.5}$ standard was exceeded.

7. Geography and Topography

EPA – Presented topographical information for the City of Juneau.

State – Presented topographical information showing that the three principal populated areas within Juneau (i.e., downtown/Douglas, Lemon Creek and Mendenhall Valley) are geographically distinct from each other. Mountain ranges in excess of 3,000 feet and waterways isolate each area.

8. Jurisdictional Boundaries

EPA – Noted that contrary to the State's recommendation, EPA's analysis demonstrated that a larger boundary would be required to include all sources that could potentially contribute to the violations in the Mendenhall Valley monitor.

State – Noted there are no data supporting the expansion of the existing $PM_{10}$ boundaries to require a larger area of $PM_{2.5}$ control. Concern was expressed that the proposed expansion would contradict local knowledge about which sources are impacting the Mendenhall Valley, undercut support for existing control measures, and complicate planning efforts to maintain the ambient standards.

9. Level of Control of Emission Sources

EPA – Noted that emission estimates presented for Juneau were based on control strategies implemented prior to 2005 and that the area is successfully maintaining the ambient $PM_{10}$ standard.

State – Presented a copy of a recently amended ordinance to institute burn bans when concentrations approach the threshold of the ambient $PM_{2.5}$ standard.

In summary, EPA has presented no data demonstrating a need to expand the State's proposed $PM_{2.5}$ nonattainment boundary. A combination of population density and topographical data shows there are several distinct airsheds within Juneau. The meteorology data show there was no transport from any of those airsheds into the Mendenhall Valley prior to or during high concentration episodes. Vehicle travel into Juneau from outside areas during the winter is essentially nonexistent and traffic count data demonstrate that travel within Juneau declined over the past decade. The available monitoring data show that concentrations within the Mendenhall Valley are largely the result of combustion emissions during the winter and that design values for Lemon Creek did not exceed the 24-hour $PM_{2.5}$ standard. To address the concern about elevated $PM_{2.5}$ concentrations recorded within the Mendenhall Valley, a new ordinance was implemented to call for burn bans when concentrations approached the standard. Finally, an analysis of monitoring data recorded in the Mendenhall Valley suggests that the 2005–2007 design value does not exceed the 24-hour $PM_{2.5}$ standard.

The State requests that EPA revisit the design value calculation to determine if, in fact, there is a $PM_{2.5}$ nonattainment area in Juneau. Second, the State requests EPA consider all 2008 data and recalculate the design value for the 2006-2008 period to insure that the area is clearly nonattainment. Finally, if it is determined that there is justification for a nonattainment area, the State recommends that EPA adopt the existing $PM_{10}$ nonattainment area for the Mendenhall Valley.

Attachment A

| Emission Category | City & Borough of Juneau 2005 Emissions, TPY | | | | | | |
|---|---|---|---|---|---|---|---|
| | **VOC** | **NOX** | **SO2** | **PM10_PRI** | **PM25_PRI** | **NH3** | **CO** |
| Point | 68 | 1275 | 744 | 162 | NA | NA | 176 |
| Area | 420 | 74 | 7 | 104 | 64 | 0 | 448 |
| Mobile - Onroad | 817 | 716 | 17 | 19 | 15 | 27 | 8794 |
| Mobile - Nonroad | 266 | 156 | 16 | 2791 | 673 | 0 | 2504 |
| **Total Emissions** | **1571** | **2221** | **784** | **3076** | **752** | **27** | **11922** |

**City & Borough of Juneau - Proposed Nonattainment Area**

| Facility | 2005 Emissions, TPY | | | | |
|---|---|---|---|---|---|
| | **VOC** | **NOX** | **SO2** | **PM10_PRI** | **CO** |
| Alaska Electric Light & Power Auke Bay Standby Generation Station | 0 | 3 | 1 | 0 | 0 |
| Alaska Electric Light & Power Lemon Creek Standby Generation Station | 0 | 9 | 2 | 1 | 4 |
| Total Emissions | 0 | 12 | 3 | 1 | 4 |

**City & Borough of Juneau - All Reported Facilities**

| Facility | 2005 Emissions, TPY | | | | |
|---|---|---|---|---|---|
| | **VOC** | **NOX** | **SO2** | **PM10_PRI** | **CO** |
| Alaska Electric Light & Power Auke Bay Standby Generation Station | 0 | 3 | 1 | 0 | 0 |
| Alaska Electric Light & Power Lemon Creek Standby Generation Station | 0 | 9 | 2 | 1 | 4 |
| Coeur Alaska Inc. Kensington Mine Project | 3 | 49 | 3 | 3 | 12 |
| Kennecott Greens Creek Mining Company Kennecott Greens Creek Mine | 65 | 1214 | 738 | 158 | 160 |
| Total Emissions | 68 | 1275 | 744 | 162 | 176 |

| City & Borough of Juneau - Area Sources | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Classification Code** | **2005 Emissions, TPY** | | | | | | |
| | **VOC** | **NOX** | **SO2** | **PM10_PRI** | **PM25_PRI** | **NH3** | **CO** |
| 2103006000 Stationary Source Fuel Combustion Commercial/Institutional Natural Gas Total: Boilers and IC Engines | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2104004000 Stationary Source Fuel Combustion Residential Distillate Oil Total: All Combustor Types | 2 | 61 | 2 | 1 | 1 | 0 | 17 |
| 2104005000 Stationary Source Fuel Combustion Residential Residual Oil Total: All Combustor Types | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| 2104006010 Stationary Source Fuel Combustion Residential Natural Gas Residential Furnaces | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2104007000 Stationary Source Fuel Combustion Residential Liquified Petroleum Gas (LPG) Total: All Combustor Types | 0 | 5 | 1 | 0 | 0 | 0 | 1 |
| 2104008000 Stationary Source Fuel Combustion Residential Wood Total: Woodstoves and Fireplaces | 266 | 6 | 1 | 61 | 61 | 0 | 410 |
| 2306010000 Industrial Processes Petroleum Refining: SIC 29 Asphalt Paving/Roofing Materials Total | 0 | 1 | 1 | 41 | 2 | 0 | 4 |
| 2401001000 Solvent Utilization Surface Coating Architectural Coatings Total: All Solvent Types | 85 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2461020000 Solvent Utilization Miscellaneous Non-industrial: Commercial Asphalt Application: All Processes Total: All Solvent Types | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2501000120 Storage and Transport Petroleum and Petroleum Product Storage All Storage Types: Breathing Loss Gasoline | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2501060102 Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations Stage 2: Displacement Loss/Controlled | 49 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2501060103 Storage and Transport Petroleum and Petroleum Product Storage Gasoline Service Stations Stage 2: Spillage | 14 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2501995120 Storage and Transport Petroleum and Petroleum Product Storage All Storage Types: Working Loss Gasoline | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2810001000 Miscellaneous Area Sources Other Combustion Forest Wildfires Total | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2810030000 Miscellaneous Area Sources Other Combustion Structure Fires Total | 1 | 0 | 0 | 1 | 0 | 0 | 15 |
| 2810035000 Miscellaneous Area Sources Other Combustion Firefighting Training Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Area Source Emissions | 420 | 74 | 7 | 104 | 64 | 0 | 448 |

| City & Borough of Juneau - OnRoad Mobile Sources | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Classification Code** | **2005 Emissions, TPY** | | | | | | |
| | VOC | NOX | SO2 | PM10_PRI | PM25_PRI | NH3 | CO |
| 2201001000 Mobile Sources Highway Vehicles - Gasoline Light Duty Gasoline Vehicles (LDGV) Total: All Road Types | 351 | 159 | 3 | 3 | 2 | 13 | 3923 |
| 2201020000 Mobile Sources Highway Vehicles - Gasoline Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5) Total: All Road Types | 295 | 133 | 2 | 3 | 1 | 9 | 3254 |
| 2201040000 Mobile Sources Highway Vehicles - Gasoline Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5) Total: All Road Types | 125 | 61 | 1 | 1 | 1 | 3 | 1324 |
| 2201070000 Mobile Sources Highway Vehicles - Gasoline Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV) Total: All Road Types | 21 | 56 | 1 | 1 | 1 | 1 | 187 |
| 2201080000 Mobile Sources Highway Vehicles - Gasoline Motorcycles (MC) Total: All Road Types | 8 | 2 | 0 | 0 | 0 | 0 | 24 |
| 2230001000 Mobile Sources Highway Vehicles - Diesel Light Duty Diesel Vehicles (LDDV) Total: All Road Types | 1 | 2 | 0 | 0 | 0 | 0 | 2 |
| 2230060000 Mobile Sources Highway Vehicles - Diesel Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT) Total: All Road Types | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| 2230070000 Mobile Sources Highway Vehicles - Diesel All HDDV including Buses (use subdivisions -071 thru -075 if possible) Total: All Road Types | 15 | 302 | 10 | 11 | 10 | 1 | 78 |
| **Total Estimated Emissions** | 817 | 716 | 17 | 19 | 15 | 27 | 8794 |

| City & Borough of Juneau - NonRoad Mobile Emissions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Source Classification Code | 2005 Emissions, TPY | | | | | | |
| | VOC | NOX | SO2 | PM10_PRI | PM25_PRI | NH3 | CO |
| 2260001010 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Recreational Equipment Motorcycles: Off-road | 57 | 0 | 0 | 2 | 2 | 0 | 55 |
| 2260001020 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Recreational Equipment Snowmobiles | 11 | 0 | 0 | 0 | 0 | 0 | 28 |
| 2260001030 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Recreational Equipment All Terrain Vehicles | 72 | 0 | 0 | 3 | 2 | 0 | 68 |
| 2260001060 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Recreational Equipment Specialty Vehicles/Carts | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 2260002006 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Construction and Mining Equipment Tampers/Rammers | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 2260002009 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Construction and Mining Equipment Plate Compactors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260002021 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Construction and Mining Equipment Paving Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260002027 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Construction and Mining Equipment Signal Boards/Light Plants | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260002039 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Construction and Mining Equipment Concrete/Industrial Saws | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| 2260002054 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Construction and Mining Equipment Crushing/Processing Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260003030 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Industrial Equipment Sweepers/Scrubbers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260003040 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Industrial Equipment Other General Industrial Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260004015 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Lawn and Garden Equipment Rotary Tillers < 6 HP (Residential) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260004016 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Lawn and Garden Equipment Rotary Tillers < 6 HP (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260004020 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Lawn and Garden Equipment Chain Saws < 6 HP (Residential) | 2 | 0 | 0 | 0 | 0 | 0 | 5 |
| 2260004021 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Lawn and Garden Equipment Chain Saws < 6 HP (Commercial) | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| 2260004025 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Lawn and Garden Equipment Trimmers/Edgers/Brush Cutters (Residential) | 3 | 0 | 0 | 0 | 0 | 0 | 7 |
| 2260004026 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Lawn and Garden Equipment Trimmers/Edgers/Brush Cutters (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 2260004030 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Lawn and Garden Equipment Leafblowers/Vacuums (Residential) | 2 | 0 | 0 | 0 | 0 | 0 | 5 |
| 2260004031 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Lawn and Garden Equipment Leafblowers/Vacuums (Commercial) | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 2260004035 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Lawn and Garden Equipment Snowblowers (Residential) | 2 | 0 | 0 | 0 | 0 | 0 | 4 |
| 2260004036 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Lawn and Garden Equipment Snowblowers (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2260004071 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Lawn and Garden Equipment Turf Equipment (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260005035 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Agricultural Equipment Sprayers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260006005 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Commercial Equipment Generator Sets | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260006010 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Commercial Equipment Pumps | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| 2260006015 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Commercial Equipment Air Compressors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260006035 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Mobile Sources : Off-highway Vehicle Gasoline, 2-Stroke: Commercial Equipment Mobile Sources : Off-highway Vehicle Gasoline, 2-Stroke: Commercial Equipment : Hydro-power Units | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2260007005 Mobile Sources Off-highway Vehicle Gasoline, 2-Stroke Logging Equipment Chain Saws > 6 HP | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265001010 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Recreational Equipment Motorcycles: Off-road | 2 | 0 | 0 | 0 | 0 | 0 | 24 |
| 2265001030 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Recreational Equipment All Terrain Vehicles | 19 | 2 | 0 | 0 | 0 | 0 | 227 |
| 2265001050 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Recreational Equipment Golf Carts | 1 | 0 | 0 | 0 | 0 | 0 | 60 |

| City & Borough of Juneau - NonRoad Mobile Emissions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Source Classification Code | 2005 Emissions, TPY | | | | | | |
| | VOC | NOX | SO2 | PM10_PRI | PM25_PRI | NH3 | CO |
| 2265001060 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Recreational Equipment Specialty Vehicles/Carts | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 2265002003 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Pavers | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 2265002006 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Tampers/Rammers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265002009 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Plate Compactors | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 2265002015 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Rollers | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 2265002021 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Paving Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 2265002024 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Surfacing Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 2265002027 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Signal Boards/Light Plants | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265002030 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Trenchers | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 2265002033 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Bore/Drill Rigs | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2265002039 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Concrete/Industrial Saws | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 2265002042 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Cement and Mortar Mixers | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 2265002045 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Cranes | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265002054 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Crushing/Processing Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2265002057 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Rough Terrain Forklifts | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265002060 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Rubber Tire Loaders | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2265002066 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Tractors/Loaders/Backhoes | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 2265002072 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Skid Steer Loaders | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 2265002078 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Dumpers/Tenders | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2265002081 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Construction and Mining Equipment Other Construction Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265003010 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Industrial Equipment Aerial Lifts | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2265003020 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Industrial Equipment Forklifts | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 2265003030 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Industrial Equipment Sweepers/Scrubbers | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2265003040 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Industrial Equipment Other General Industrial Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 2265003050 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Industrial Equipment Other Material Handling Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265003060 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Industrial Equipment AC\Refrigeration | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265003070 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Industrial Equipment Terminal Tractors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265004010 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Lawn Mowers (Residential) | 6 | 1 | 0 | 0 | 0 | 0 | 95 |
| 2265004011 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Lawn Mowers (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 2265004015 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Rotary Tillers < 6 HP (Residential) | 1 | 0 | 0 | 0 | 0 | 0 | 8 |
| 2265004016 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Rotary Tillers < 6 HP (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 2265004025 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Trimmers/Edgers/Brush Cutters (Residential) | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2265004026 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Trimmers/Edgers/Brush Cutters (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265004030 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Leafblowers/Vacuums (Residential) | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2265004031 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Leafblowers/Vacuums (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 7 |

| City & Borough of Juneau - NonRoad Mobile Emissions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Source Classification Code | 2005 Emissions, TPY | | | | | | |
| | VOC | NOX | SO2 | PM10_PRI | PM25_PRI | NH3 | CO |
| 2265004035 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Snowblowers (Residential) | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 2265004036 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Snowblowers (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 2265004040 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Rear Engine Riding Mowers (Residential) | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| 2265004041 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Rear Engine Riding Mowers (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2265004046 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Front Mowers (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2265004051 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Shredders < 6 HP (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265004055 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Lawn and Garden Tractors (Residential) | 6 | 2 | 0 | 0 | 0 | 0 | 306 |
| 2265004056 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Lawn and Garden Tractors (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 2265004066 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Chippers/Stump Grinders (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 2265004071 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Turf Equipment (Commercial) | 1 | 0 | 0 | 0 | 0 | 0 | 38 |
| 2265004075 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Other Lawn and Garden Equipment (Residential) | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 2265004076 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Lawn and Garden Equipment Other Lawn and Garden Equipment (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2265005010 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Agricultural Equipment 2-Wheel Tractors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265005015 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Agricultural Equipment Agricultural Tractors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265005020 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Agricultural Equipment Combines | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265005025 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Agricultural Equipment Balers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265005030 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Agricultural Equipment Agricultural Mowers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265005035 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Agricultural Equipment Sprayers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265005040 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Agricultural Equipment Tillers > 6 HP | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265005045 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Agricultural Equipment Swathers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265005055 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Agricultural Equipment Other Agricultural Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265005060 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Agricultural Equipment Irrigation Sets | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265006005 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Commercial Equipment Generator Sets | 5 | 1 | 0 | 0 | 0 | 0 | 192 |
| 2265006010 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Commercial Equipment Pumps | 2 | 0 | 0 | 0 | 0 | 0 | 45 |
| 2265006015 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Commercial Equipment Air Compressors | 1 | 0 | 0 | 0 | 0 | 0 | 22 |
| 2265006025 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Commercial Equipment Welders | 1 | 0 | 0 | 0 | 0 | 0 | 57 |
| 2265006030 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Commercial Equipment Pressure Washers | 3 | 1 | 0 | 0 | 0 | 0 | 85 |
| 2265006035 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Mobile Sources : Off-highway Vehicle Gasoline, 4-Stroke: Commercial Equipment Mobile Sources : Off-highway Vehicle Gasoline, 4-Stroke: Commercial Equipment : Hydro-power Units | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 2265007010 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Logging Equipment Shredders > 6 HP | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265007015 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Logging Equipment Forest Eqp - Feller/Bunch/Skidder | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2265010010 Mobile Sources Off-highway Vehicle Gasoline, 4-Stroke Industrial Equipment Other Oil Field Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| 2267001060 Mobile Sources LPG Recreational Equipment Specialty Vehicles/Carts | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| City & Borough of Juneau - NonRoad Mobile Emissions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Source Classification Code | 2005 Emissions, TPY | | | | | | |
| | VOC | NOX | SO2 | PM10_PRI | PM25_PRI | NH3 | CO |
| 2267002003 Mobile Sources LPG Construction and Mining Equipment Pavers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002015 Mobile Sources LPG Construction and Mining Equipment Rollers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002021 Mobile Sources LPG Construction and Mining Equipment Paving Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002024 Mobile Sources LPG Construction and Mining Equipment Surfacing Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002030 Mobile Sources LPG Construction and Mining Equipment Trenchers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002033 Mobile Sources LPG Construction and Mining Equipment Bore/Drill Rigs | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002039 Mobile Sources LPG Construction and Mining Equipment Concrete/Industrial Saws | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002045 Mobile Sources LPG Construction and Mining Equipment Cranes | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002054 Mobile Sources LPG Construction and Mining Equipment Crushing/Processing Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002057 Mobile Sources LPG Construction and Mining Equipment Rough Terrain Forklifts | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002060 Mobile Sources LPG Construction and Mining Equipment Rubber Tire Loaders | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002066 Mobile Sources LPG Construction and Mining Equipment Tractors/Loaders/Backhoes | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002072 Mobile Sources LPG Construction and Mining Equipment Skid Steer Loaders | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267002081 Mobile Sources LPG Construction and Mining Equipment Other Construction Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267003010 Mobile Sources LPG Industrial Equipment Aerial Lifts | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267003020 Mobile Sources LPG Industrial Equipment Forklifts | 1 | 3 | 0 | 0 | 0 | 0 | 16 |
| 2267003030 Mobile Sources LPG Industrial Equipment Sweepers/Scrubbers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267003040 Mobile Sources LPG Industrial Equipment Other General Industrial Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267003050 Mobile Sources LPG Industrial Equipment Other Material Handling Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267003070 Mobile Sources LPG Industrial Equipment Terminal Tractors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267004066 Mobile Sources LPG Lawn and Garden Equipment Chippers/Stump Grinders (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267005055 Mobile Sources LPG Agricultural Equipment Other Agricultural Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267005060 Mobile Sources LPG Agricultural Equipment Irrigation Sets | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267006005 Mobile Sources LPG Commercial Equipment Generator Sets | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 2267006010 Mobile Sources LPG Commercial Equipment Pumps | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267006015 Mobile Sources LPG Commercial Equipment Air Compressors | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2267006025 Mobile Sources LPG Commercial Equipment Welders | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2267006030 Mobile Sources LPG Commercial Equipment Pressure Washers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2267006035 Mobile Sources LPG Mobile Sources : LPG: Commercial Equipment Mobile Sources : LPG: Commercial Equipment : Hydro-power Units | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2268002081 Mobile Sources CNG Construction and Mining Equipment Other Construction Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2268003020 Mobile Sources CNG Industrial Equipment Forklifts | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2268003030 Mobile Sources CNG Industrial Equipment Sweepers/Scrubbers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2268003040 Mobile Sources CNG Industrial Equipment Other General Industrial Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2268003060 Mobile Sources CNG Industrial Equipment AC\Refrigeration | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| City & Borough of Juneau - NonRoad Mobile Emissions | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Classification Code** | **2005 Emissions, TPY** | | | | | | |
| | VOC | NOX | SO2 | PM10_PRI | PM25_PRI | NH3 | CO |
| 2268003070 Mobile Sources CNG Industrial Equipment Terminal Tractors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2268005055 Mobile Sources CNG Agricultural Equipment Other Agricultural Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2268005060 Mobile Sources CNG Agricultural Equipment Irrigation Sets | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2268006005 Mobile Sources CNG Commercial Equipment Generator Sets | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2268006010 Mobile Sources CNG Commercial Equipment Pumps | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2268006015 Mobile Sources CNG Commercial Equipment Air Compressors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2268006020 Mobile Sources CNG Commercial Equipment Gas Compressors | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 2268006035 Mobile Sources CNG Mobile Sources : CNG: Commercial Equipment Mobile Sources : CNG: Commercial Equipment : Hydro-power Units | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2268010010 Mobile Sources CNG Industrial Equipment Other Oil Field Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2270001060 Mobile Sources Off-highway Vehicle Diesel Recreational Equipment Specialty Vehicles/Carts | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270002003 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Pavers | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2270002006 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Tampers/Rammers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270002009 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Plate Compactors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270002015 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Rollers | 0 | 2 | 0 | 0 | 0 | 0 | 1 |
| 2270002018 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Scrapers | 0 | 2 | 0 | 0 | 0 | 0 | 1 |
| 2270002021 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Paving Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270002024 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Surfacing Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270002027 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Signal Boards/Light Plants | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270002030 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Trenchers | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2270002033 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Bore/Drill Rigs | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2270002036 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Excavators | 1 | 7 | 1 | 0 | 0 | 0 | 2 |
| 2270002039 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Concrete/Industrial Saws | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270002042 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Cement and Mortar Mixers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270002045 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Cranes | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 2270002048 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Graders | 0 | 2 | 0 | 0 | 0 | 0 | 1 |
| 2270002051 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Off-highway Trucks | 0 | 7 | 1 | 0 | 0 | 0 | 2 |
| 2270002054 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Crushing/Processing Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270002057 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Rough Terrain Forklifts | 0 | 2 | 0 | 0 | 0 | 0 | 1 |
| 2270002060 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Rubber Tire Loaders | 1 | 8 | 1 | 1 | 1 | 0 | 4 |
| 2270002066 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Tractors/Loaders/Backhoes | 1 | 5 | 1 | 1 | 1 | 0 | 5 |
| 2270002069 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Crawler Tractor/Dozers | 1 | 7 | 1 | 1 | 1 | 0 | 3 |
| 2270002072 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Skid Steer Loaders | 1 | 3 | 0 | 1 | 1 | 0 | 4 |
| 2270002075 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Off-highway Tractors | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2270002078 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Dumpers/Tenders | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| City & Borough of Juneau - NonRoad Mobile Emissions | | | | | | | |
|---|---|---|---|---|---|---|---|
| Source Classification Code | 2005 Emissions, TPY | | | | | | |
| | VOC | NOX | SO2 | PM10_PRI | PM25_PRI | NH3 | CO |
| 2270002081 Mobile Sources Off-highway Vehicle Diesel Construction and Mining Equipment Other Construction Equipment | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2270003010 Mobile Sources Off-highway Vehicle Diesel Industrial Equipment Aerial Lifts | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270003020 Mobile Sources Off-highway Vehicle Diesel Industrial Equipment Forklifts | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270003030 Mobile Sources Off-highway Vehicle Diesel Industrial Equipment Sweepers/Scrubbers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270003040 Mobile Sources Off-highway Vehicle Diesel Industrial Equipment Other General Industrial Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270003050 Mobile Sources Off-highway Vehicle Diesel Industrial Equipment Other Material Handling Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270003060 Mobile Sources Off-highway Vehicle Diesel Industrial Equipment AC\Refrigeration | 0 | 4 | 1 | 0 | 0 | 0 | 2 |
| 2270003070 Mobile Sources Off-highway Vehicle Diesel Industrial Equipment Terminal Tractors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270004031 Mobile Sources Off-highway Vehicle Diesel Lawn and Garden Equipment Leafblowers/Vacuums (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270004036 Mobile Sources Off-highway Vehicle Diesel Lawn and Garden Equipment Snowblowers (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270004046 Mobile Sources Off-highway Vehicle Diesel Lawn and Garden Equipment Front Mowers (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270004056 Mobile Sources Off-highway Vehicle Diesel Lawn and Garden Equipment Lawn and Garden Tractors (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270004066 Mobile Sources Off-highway Vehicle Diesel Lawn and Garden Equipment Chippers/Stump Grinders (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270004071 Mobile Sources Off-highway Vehicle Diesel Lawn and Garden Equipment Turf Equipment (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270004076 Mobile Sources Off-highway Vehicle Diesel Lawn and Garden Equipment Other Lawn and Garden Equipment (Commercial) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270005010 Mobile Sources Off-highway Vehicle Diesel Agricultural Equipment 2-Wheel Tractors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270005015 Mobile Sources Off-highway Vehicle Diesel Agricultural Equipment Agricultural Tractors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270005020 Mobile Sources Off-highway Vehicle Diesel Agricultural Equipment Combines | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270005025 Mobile Sources Off-highway Vehicle Diesel Agricultural Equipment Balers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270005030 Mobile Sources Off-highway Vehicle Diesel Agricultural Equipment Agricultural Mowers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270005035 Mobile Sources Off-highway Vehicle Diesel Agricultural Equipment Sprayers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270005040 Mobile Sources Off-highway Vehicle Diesel Agricultural Equipment Tillers > 6 HP | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270005045 Mobile Sources Off-highway Vehicle Diesel Agricultural Equipment Swathers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270005055 Mobile Sources Off-highway Vehicle Diesel Agricultural Equipment Other Agricultural Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270005060 Mobile Sources Off-highway Vehicle Diesel Agricultural Equipment Irrigation Sets | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270006005 Mobile Sources Off-highway Vehicle Diesel Commercial Equipment Generator Sets | 0 | 3 | 0 | 0 | 0 | 0 | 1 |
| 2270006010 Mobile Sources Off-highway Vehicle Diesel Commercial Equipment Pumps | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2270006015 Mobile Sources Off-highway Vehicle Diesel Commercial Equipment Air Compressors | 0 | 2 | 0 | 0 | 0 | 0 | 1 |
| 2270006020 Mobile Sources Off-highway Vehicle Diesel Commercial Equipment Gas Compressors | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270006025 Mobile Sources Off-highway Vehicle Diesel Commercial Equipment Welders | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2270006030 Mobile Sources Off-highway Vehicle Diesel Commercial Equipment Pressure Washers | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270006035 Mobile Sources Off-highway Vehicle Diesel Mobile Sources : Off-highway Vehicle Diesel: Commercial Equipment Mobile Sources : Off-highway Vehicle Diesel: Commercial Equipment : Hydro-power Units | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270007010 Mobile Sources Off-highway Vehicle Diesel Logging Equipment Shredders > 6 HP | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| City & Borough of Juneau - NonRoad Mobile Emissions | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Classification Code** | **2005 Emissions, TPY** | | | | | | |
| | VOC | NOX | SO2 | PM10_PRI | PM25_PRI | NH3 | CO |
| 2270007015 Mobile Sources Off-highway Vehicle Diesel Logging Equipment Forest Eqp - Feller/Bunch/Skidder | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270009010 Mobile Sources Off-highway Vehicle Diesel Underground Mining Equipment Other Underground Mining Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2270010010 Mobile Sources Off-highway Vehicle Diesel Industrial Equipment Other Oil Field Equipment | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2280002030 Mobile Sources Marine Vessels, Commercial Diesel Fishing Vessels | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2280004030 Mobile Sources Marine Vessels, Commercial Gasoline Fishing Vessels | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2282005010 Mobile Sources Pleasure Craft Gasoline 2-Stroke Outboard | 11 | 0 | 0 | 0 | 0 | 0 | 25 |
| 2282005015 Mobile Sources Pleasure Craft Gasoline 2-Stroke Personal Water Craft | 11 | 0 | 0 | 0 | 0 | 0 | 24 |
| 2282010005 Mobile Sources Pleasure Craft Gasoline 4-Stroke Inboard/Sterndrive | 1 | 1 | 0 | 0 | 0 | 0 | 15 |
| 2282020005 Mobile Sources Pleasure Craft Diesel Inboard/Sterndrive | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2282020010 Mobile Sources Pleasure Craft Diesel Outboard | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2285002015 Mobile Sources Railroad Equipment Diesel Railway Maintenance | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2285004015 Mobile Sources Railroad Equipment Gasoline, 4-Stroke Railway Maintenance | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 2285006015 Mobile Sources Railroad Equipment LPG Railway Maintenance | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2294000000 Mobile Sources Paved Roads All Paved Roads Total: Fugitives | 0 | 0 | 0 | 2548 | 609 | 0 | 0 |
| 2296000000 Mobile Sources Unpaved Roads All Unpaved Roads Total: Fugitives | 0 | 0 | 0 | 201 | 30 | 0 | 0 |
| 2275001000 | 0 | 0 | 0 | 1 | 26 | 0 | 1 |
| 2275020000 | 23 | 73 | 8 | 26 | | 0 | 530 |
| 2275050000 | 12 | 5 | 1 | 7 | | 0 | 336 |
| 2275060000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total NonRoad Emissions** | 266 | 156 | 16 | 2791 | 673 | 0 | 2504 |

Attachment B

Presented by: The Manager
Introduced: 08/25/2008
Drafted by: J.W. Hartle

# ORDINANCE OF THE CITY AND BOROUGH OF JUNEAU, ALASKA

## Serial No. 2008-28

**An Ordinance Amending the Woodsmoke Control Program Regarding Solid Fuel-Fired Burning Devices.**

BE IT ENACTED BY THE ASSEMBLY OF THE CITY AND BOROUGH OF JUNEAU, ALASKA:

**Section 1. Classification.** This ordinance is of a general and permanent nature and shall become a part of the City and Borough Code.

**Section 2. Amendment of Chapter.** CBJ 35.40 Solid Fuel-Fired Burning Devices is amended to read:

### 36.40.010 Findings.

The assembly of the City and Borough finds that there has been a significant and unprecedented increase in the installation and use of solid fuel-fired burning devices in the City and Borough; that the increase in such installations and use in the Mendenhall Valley has been especially great; that such devices generally produce a high level of harmful airborne pollutants; and that the above conditions combined with atmospheric conditions throughout the municipality and other factors causing recurring smoke pollution conditions are detrimental to the health of, and offensive to, the people of Juneau. It is the purpose of this chapter to reduce the increase of airborne pollutants from open burning and from solid fuel-fired heating devices at the times and in the areas of the City and Borough that appear to be most adversely affected by such pollutants.

### 36.40.020 Smoke hazard area map adopted.

There are adopted as the maps identifying the smoke hazard areas of the City and Borough the maps entitled "Mendenhall Valley Smoke Hazard Area Map, City and Borough of Juneau, Alaska," dated September 30, 1985, and "Lemon Creek Smoke Hazard Area Map," dated December 10, 1985.

### 36.40.030 Definitions.

The following words, terms and phrases when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Masonry heater means a heating appliance constructed of concrete or solid masonry which is designed to absorb and store heat from a solid fuel fire built in the firebox by routing the exhaust gases through internal heat exchange channels in which the flow path downstream of the firebox may include flow in a horizontal or downward direction before entering the chimney and which delivers heat by radiation from the masonry surface of the heater, or as otherwise defined in the current version of the International Building Code. Masonry heaters shall comply with one of the following:

1. Masonry heaters shall comply with the requirements of ASTM E 1602; or

2. Masonry heaters shall be listed and labeled in accordance with UL 1482 and installed in accordance with the manufacturer's installation instructions.

Open burning means the burning of a material which results in the products of combustion being emitted directly into the ambient air without passing through a stack or flue, but not including the burning of campfires, barbecues, candles or tobacco.

Particulate matter means any combination of particles transported in the air that are either coarse (between 2.5 micrometers and 10 micrometers) or fine (2.5 micrometers or less). The two types of particulate matter have separate regulatory requirements. These particles can form from solids or liquids and can be a health hazard when inhaled.

Person means an individual, partnership corporation, company or other association.

Solid fuel-fired heating device and device mean a device designed for solid fuel combustion so that usable heat is derived for the interior of a building, and includes solid fuel-fired stoves, fireplaces, solid fuel-fired cooking stoves and combination fuel furnaces or boilers which burn solid fuel, but does not include stoves, fireplaces, furnaces, or boilers designed and used exclusively for the combustion of wood pellets having a maximum length of one inch in any dimension.

**36.40.040 Air pollution alerts and emergencies.**

(a) For the purposes of this section, the manager shall declare an air pollution emergency to be in effect whenever the ambient concentration of particulate matter within the air pollution zone equals or exceeds thirty micrograms per cubic meter ($ug/m^3$) averaged over a 24-hour period and will remain at or above 30 $ug/m^3$ if an emergency is not called. The manager may call an emergency whenever available scientific and meteorological data indicate that the ambient concentration of particulate matter within a smoke hazard area can reasonably be expected to equal or exceed 30 $ug/m^3$ averaged over a 24-hour period. When, in the opinion of the manager, meteorological and scientific data indicate that the type of particulate measured is not hazardous, the limit may be adjusted. The manager may call an emergency upon a finding that smoke conditions are, or are likely to become, a danger to health or generally objectionable to persons in a smoke hazard area.

(b) Within a smoke hazard area, no person may operate a solid fuel fired heating device, other than a masonry heater, during an air pollution emergency declared by the manager pursuant to subsection (a) of this section.

(c) *Reserved.*

(d) *Reserved.*

(e) Notice of an air pollution emergency is adequate if published in a newspaper of general circulation within the City and Borough, or if given orally at least three times during a six-hour period by at least two radio stations operating within the City and Borough, or if made available to the general public in the form of a recorded telephone message the telephone number for which is published in the telephone directory or newspaper of general circulation within the City and Borough, or if made available to the general public as a posting on the municipal webpage the address for which is published in the telephone directory or newspaper of general circulation within the City and Borough. The prohibition shall be effective from the earlier of the time stated in the notice, 6:00 p.m. of the day the notice is published in a newspaper, the time the last required announcement of the notice is given by radio, or two hours after the time the recorded message is first made available by telephone or webpage.

(f) Notwithstanding the provisions of subsection (b) of this section, solid fuel fired heating devices may be used at any location during a loss of electrical power service to that location. Use of the device may commence no sooner than two hours after the loss of electrical service and shall be terminated as soon as practicable after reestablishment of service.

**36.40.050** *Reserved.*

**36.40.060 Open burning.**

(a) No person may engage in the open burning of any material except as authorized by a valid open burning permit. Open burning permits may be issued by the manager or the manager's designee upon application. No permit may be issued for open burning in the Mendenhall Valley or the Lemon Creek smoke hazard areas during the period of November 1 through March 31. Open burning by commercial businesses is not allowed.

(b) Open burning permits shall be valid only for the times and locations specified in the permit. Permits shall be issued only when weather conditions or smoke conditions are not such as to cause the burning to be, or be likely to become, a danger to the public health or generally objectionable. The manager or the manager's designee may base such determination upon direct observation or upon reports or forecasts from other agencies.

(c) A person may engage in open burning only if the fire is tended to at all times; the fire is not within 50 feet of any building; the prevailing wind direction is away from any structure or roadway; and the open burn is conducted during a period of adequate air movement.

(d) When burning land-clearing debris, slash piles must be loosely stacked to promote maximum combustion efficiency throughout the burn cycle. Noncombustible material must be minimized so as to not cause or create dense smoke. The manager or the manager's designee may, at their discretion, require the use of fans to promote enhanced combustion.

(e) No person may cause or allow open burning which creates a danger to public health or safety or a public or private nuisance. No person may cause or allow the open burning of asphalt, rubber, plastic, tar, wire insulation, petroleum products, automobile parts, petroleum-treated products, treated lumber, oily waste, contaminated oil cleanup materials, or other materials in a way that produces black smoke; or of putrescible garbage, animal carcasses, or petroleum-based materials.

(f) "Open burning" means the burning of a material that results in the products of combustion being emitted directly into the ambient air without passing through a contaminant outlet.

(g) This section 36.40.060 is applicable only to those portions of the City and Borough within the Roaded Service Area No. 9.

**36.40.070 Permits.**

(a) Upon a showing of justifiable need, the manager may issue a temporary permit authorizing operation of a solid fuel fired heating device in circumstances otherwise prohibited by this code. "Justifiable need" includes occasions when a furnace or central heating system is inoperable other than through the owner's own actions or neglect.

(b) The manager may issue a temporary special burning permit to the municipal fire department for the purpose of training fire fighters, if the fire is restricted to a building or structure or a permanent training facility, and if the material to be burned is not allowed to smolder after the training session has terminated and no public nuisance is created. Special burning permits will not be issued during either an air alert or an air emergency.

**36.40.080 Solid fuel combustion and smoke emission standards.**

(a) No person shall use a solid fuel-fired heating device for the combustion of any material other than paper, cardboard or untreated wood.

(b) No person may operate a solid fuel-fired heating device in such a manner that visible emissions reduce visibility through the exhaust effluent by 50 percent or greater for more than 15 minutes in any one hour as determined by a test conducted in substantial compliance with the regulations applicable to the visual determination of stationary source emission opacity promulgated at 40 CFR 60, Appendix A, by the United States Environmental Protection Agency; provided, and notwithstanding any contrary provisions in the regulation, opacity observation shall be made at the point of greatest opacity in any portion of the emissions plume without regard to the presence or absence of condensed water vapor.

**36.40.090 Penalties.**

The first violation of any section of this chapter is an infraction. Each subsequent violation is a Class B misdemeanor.

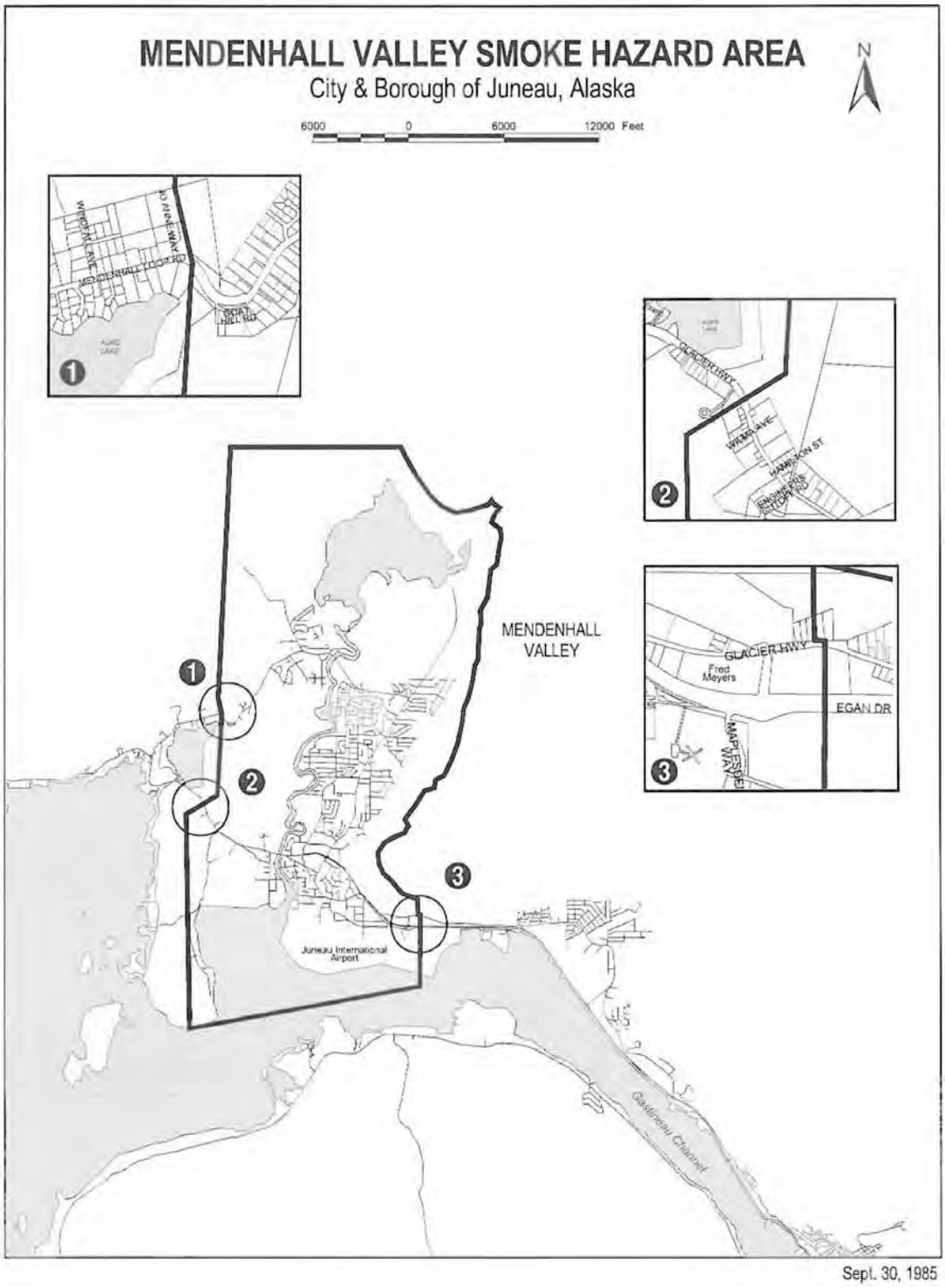
**Section 3. Effective Date.** This ordinance shall be effective 30 days after its adoption.

Adopted this 8th day of September, 2008.

Bruce Botelho, Mayor

Attest:

Elizabeth J. McEwen, Deputy Clerk


MENDENHALL VALLEY SMOKE HAZARD AREA
City & Borough of Juneau, Alaska
6000 0 6000 12000 Feet
N
MENDENHALL VALLEY
GLACIER HWY
Fred Meyers
EGAN DR
Juneau International Airport
Gastineau Channel
Sept. 30, 1985