

# Revised PM10 Maintenance Plan for the Steamboat Springs Attainment/Maintenance Area

DRAFT Technical Support Document

Emission Inventory



**DRAFT**

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**Colorado Department of Public Health and Environment**

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## 1. Emission Inventory Methodology

The Air Pollution Control Division (APCD) developed the 2008 and 2024 emission inventories in the “PM10 Maintenance Plan for Steamboat Springs” using U.S. Environmental Protection Agency (EPA) approved emissions modeling methods, including EPA’s MOVES2010a model and local VMT data for on-road mobile source emissions, EPA’s non-road model, local demographic information for area and off-road sources, and reported actual emissions for point sources. Estimates for future emissions are based on the above-mentioned tools and population estimates from the State Demographer. The inventory represents average daily winter emissions. The MOVES2010a and non-road model inputs represent these average daily winter conditions. Heating and wood burning emissions were apportioned from annual emission estimates by heating degree day data from the Western Regional Climate Center. Other source categories were apportioned from annual to daily by dividing by 365.

Highway mobile source emissions are from the EPA model MOVES2010a, an emission factor model for predicting gram per mile emissions of Hydrocarbons (HC), Carbon Monoxide (CO), Nitrogen Oxides (NO<sub>x</sub>), Carbon Dioxide (CO<sub>2</sub>), Particulate Matter (PM), and toxics from cars, trucks, and motorcycles under various conditions.

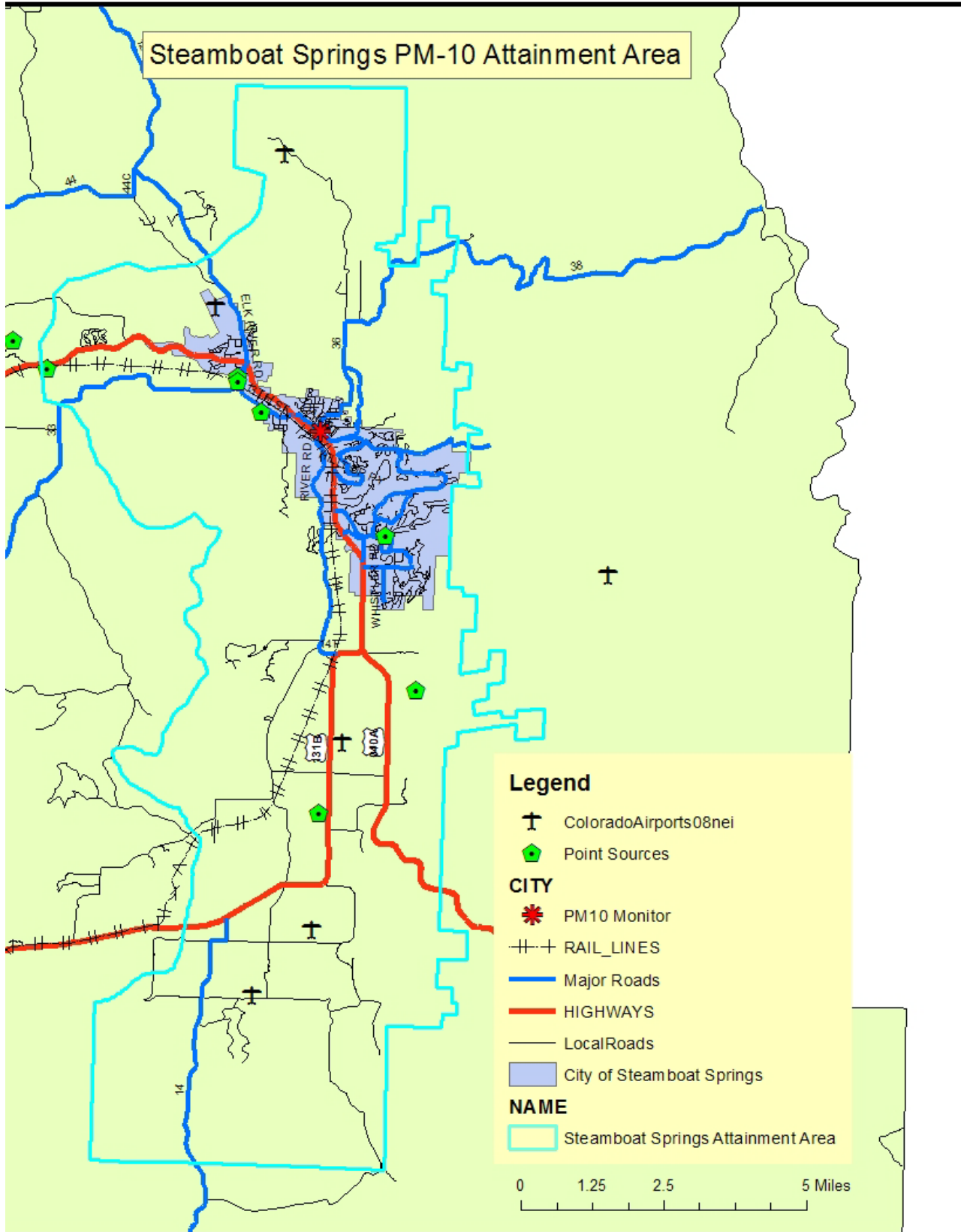
Non-road source emissions are from the EPA Non-Road Model. This model includes the impact of future controls on non-road engines, which is used in equipment such as lawn and garden equipment and construction equipment.

Area source emissions (including heating, construction, commercial cooking, etc.) are from the 2008 EPA National Emissions Inventory (NEI), grown to 2024 by population growth from data from the State. For more documentation for these categories, refer to the NEI documentation (EPA, 2010). Wood burning and road dust emissions were calculated using local data and EPA AP-42 emission factors.

It should be noted that the previous emissions inventory was based on data from 1997. Emission factors and activity data have evolved since that time. The largest share of total emissions, both in 1997 and 2008 and beyond, is dust from paved roads. These emissions are a function of VMT, silt loading and empirically derived constants. The VMT’s are nearly the same, a silt loading of about 10 grams per square meter was used in the 1997 inventory, while a silt loading of only 0.5 grams per square meter was used in this inventory. This results in an emission factor which is more than 20 times higher for paved road dust in 1997 than in the current inventory. The lower silt loading number used in the current inventory is more in line with current practices of using less sand for snow events, and quicker cleanup after the events.

The MOVES2010A and Non-Road Models and the NEI report emissions for Pitkin County as a whole. Emissions were apportioned to the Attainment Area using geographical information system (GIS) techniques, using population, VMT and land area.

Under Air Quality Control Commission Regulation No. 3, the APCD requires any source that emits two tons per year or greater to submit an Air Pollutant Emission Notice (APEN) (APCD, 2008). This means that sources that emit less than two tons per year are not necessarily accounted for in an emissions inventory. The point source emissions for Steamboat Springs were obtained from this tracking system. The emission estimates are made using a variety of methodologies. Data from source-specific emission tests, or continuous emission monitors are preferable, but not always available. The EPA has developed a variety of emission factors to estimate emissions as well. Emission factors are frequently the best or only method available for estimating emissions.



## 2. 2008 and 2024 Emission Inventory Summaries

This section presents the 2008 and 2024 emission inventories for the maintenance plan.

**Table 1. PM10 Emission Inventories Based on 2008 NEI and Projected by Population (except as noted)**

Steamboat Springs Attainment Area Category	2008		2024	
	PM10 t/d	PM10 Pounds/d	PM10 t/d	PM10 Pounds/d
Commercial Cooking	0.008	16.6	0.012	24.4
Construction	1.755	3,509.7	2.572	5,143.1
Fuel Combustion	0.004	8.6	0.006	12.6
Highway Vehicles*	0.070	140.5	0.105	209.6
Non-Road**	0.045	89.6	0.024	47.5
Railroad	0.002	3.6	0.003	5.3
Road_Dust***	0.332	663.4	0.447	893.6
Structure Fires	0.000	0.7	0.001	1.0
Woodburning****	0.239	478.0	0.350	700.5
Point Sources*****	0.093	185.1	0.136	271.3
<b>TOTAL</b>	<b>2.548</b>	<b>5,095.9</b>	<b>3.654</b>	<b>7,308.8</b>

\* Based on MOVES, CDOT VMT

\*\* Based on NonRoad Model

\*\*\* Based on Latest AP-42, CDOT VMT

\*\*\*\* Based on AP-42, Projected by Population as of 4/25/2011 data from State Demographer

\*\*\*\*\* Based on APENS, Projected by Population as of 4/25/2011 data from State Demographer

### 3. References

- APCD, 2008. Air Quality Control Commission Regulation Number 3. Stationary Source Permitting and Air Pollutant Emission Notice Requirements. 5 CCR 1001-5.  
< <http://www.cdphe.state.co.us/regulations/airregs/100103stationarysourcepermitting.pdf> >
- U.S. EPA, 2010. “2008 National Emissions Inventory Data & Documentation.”  
< <http://www.epa.gov/ttn/chief/net/2008inventory.html> >