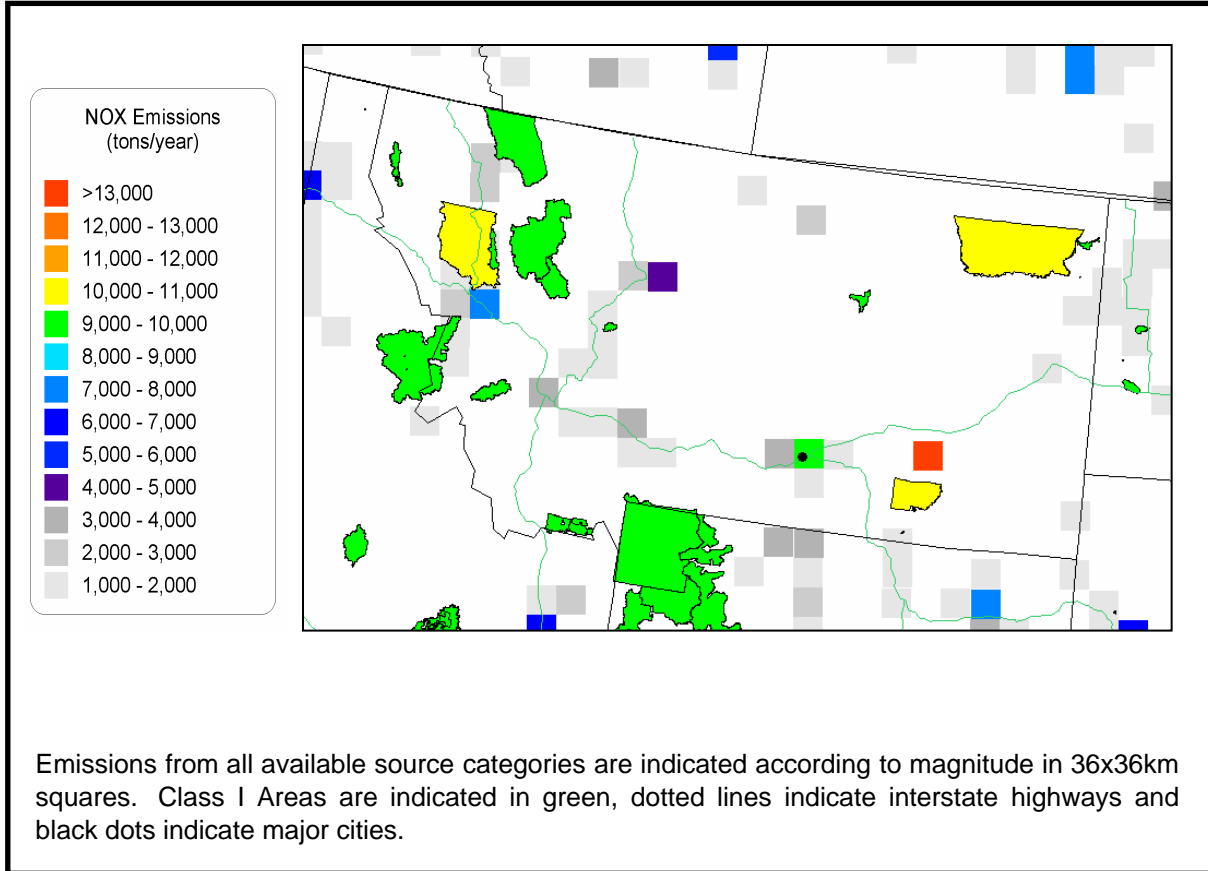
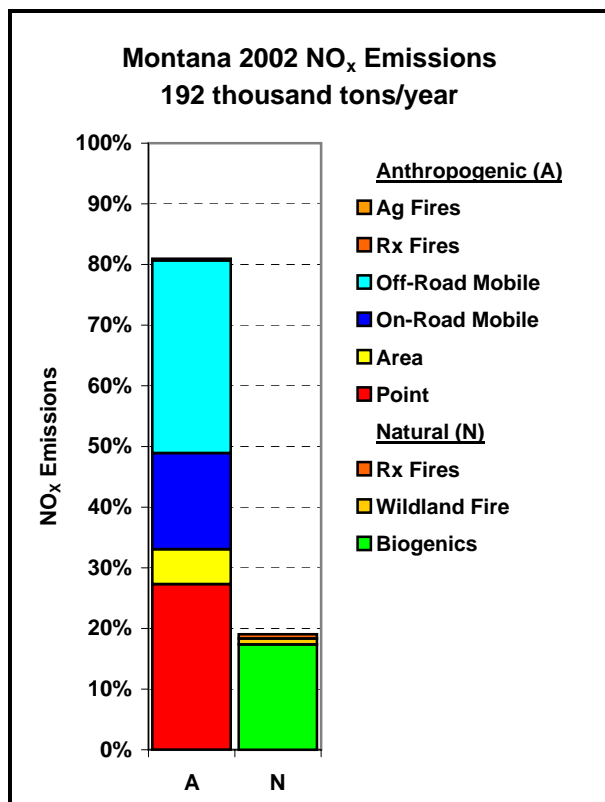


# Montana NO<sub>x</sub> Emissions WRAP Interim 2002 Inventory

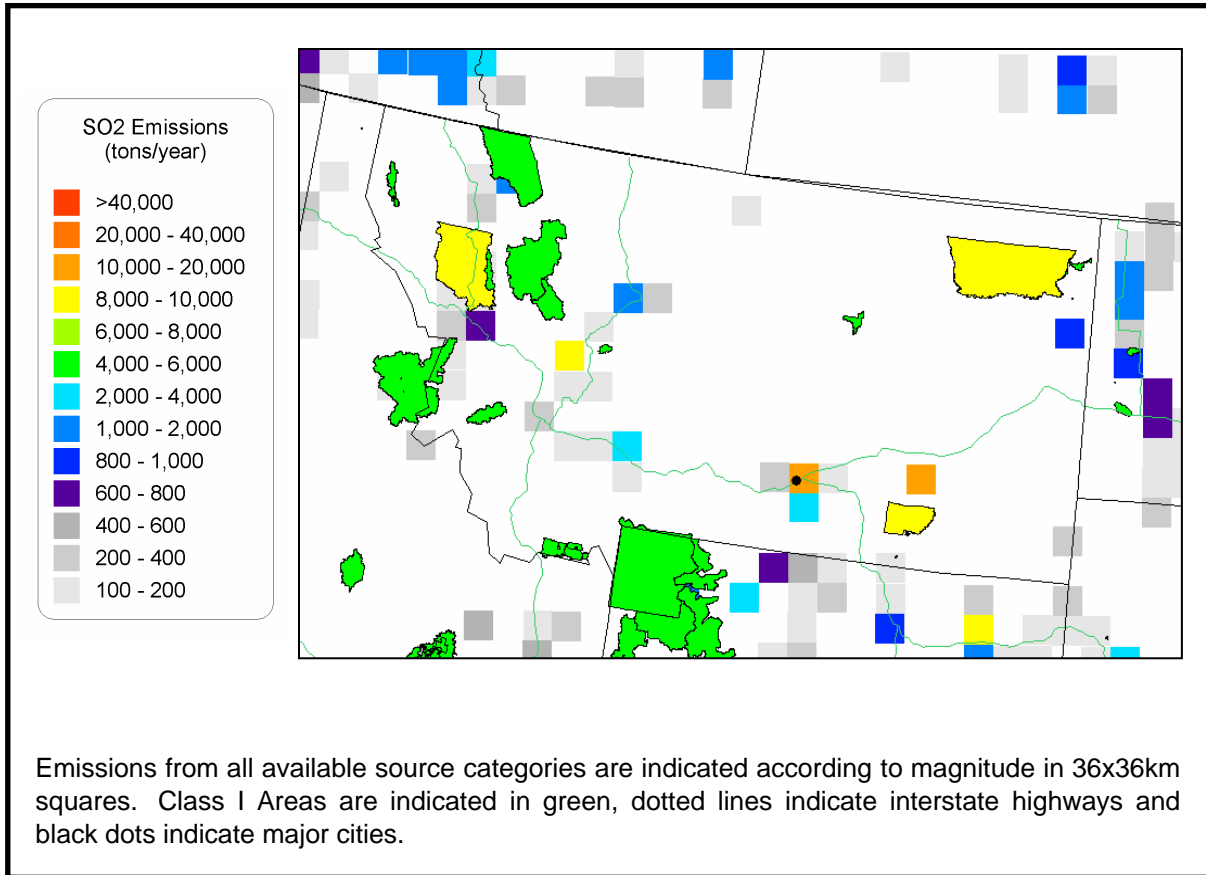


Nitrogen oxides (NO<sub>x</sub>) form when fuel is burned at high temperatures. In Montana, 2002 emissions of NO<sub>x</sub> were dominated by mobile sources (on-road and off-road) and point sources (industrial, commercial, and residential sources that burn fuel).

NO<sub>x</sub> emissions are highly reactive and can form nitrate compounds (e.g. NH<sub>4</sub>NO<sub>3</sub>). These compounds can block the transmission of light, contributing to visibility reduction on a regional scale in our Class I Areas.

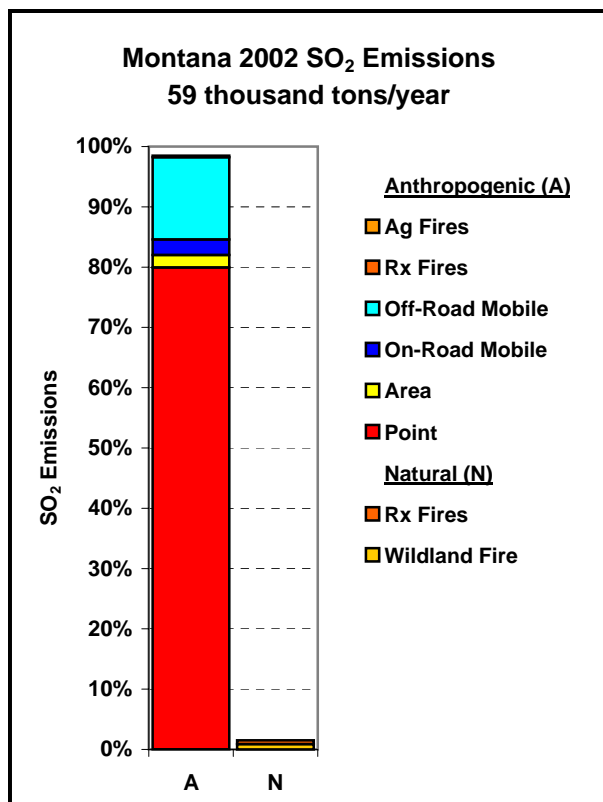


# Montana SO<sub>2</sub> Emissions WRAP Interim 2002 Inventory

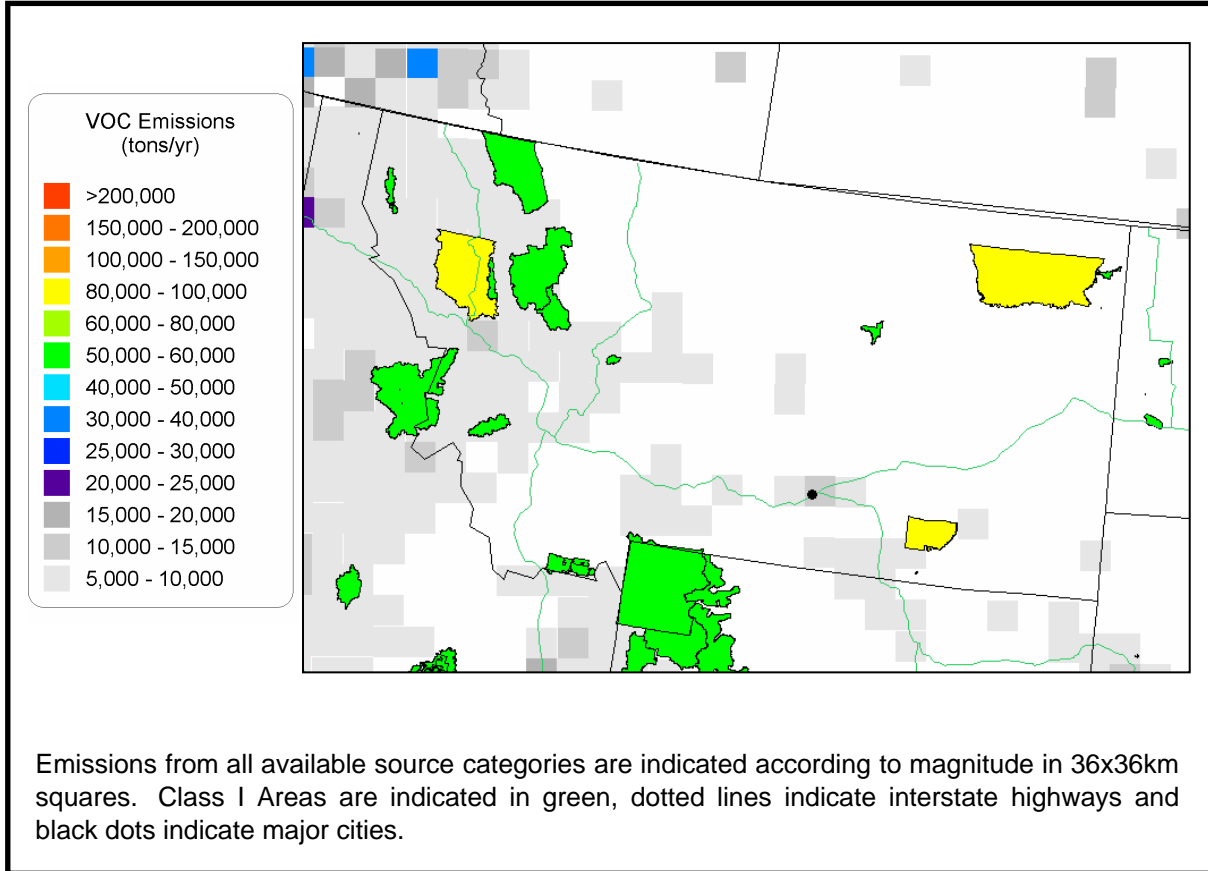


Sulfur oxide gases (SO<sub>x</sub>) are formed when sulfur containing fuels, such as oil or coal, are burned, when gasoline is extracted from oil or when metals are extracted from ore. In Montana, 2002 emissions of SO<sub>2</sub> are dominated by point sources.

SO<sub>2</sub> dissolves in water vapor to form acid, and contributes to the formation of sulfate compounds (e.g. (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>). These compounds can block the transmission of light, contributing to visibility reduction on a regional scale in our Class I Areas.

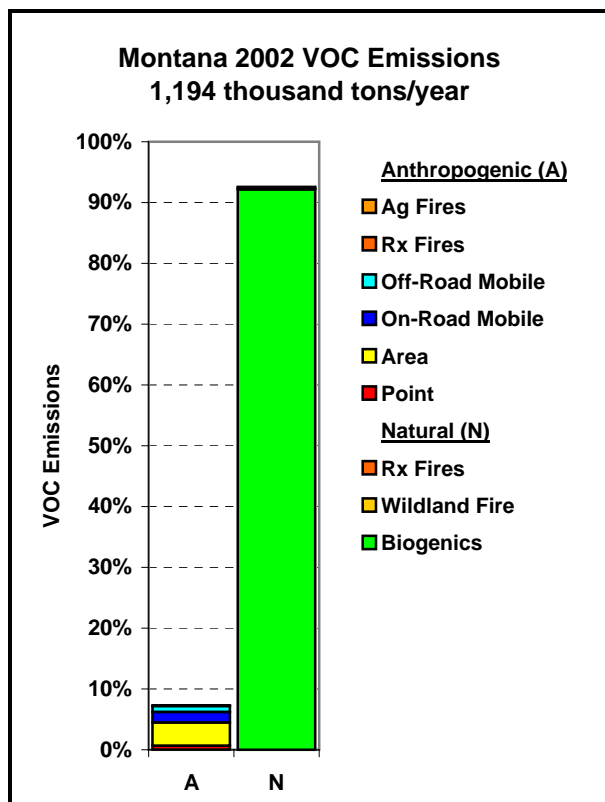


# Montana VOC Emissions WRAP Interim 2002 Inventory

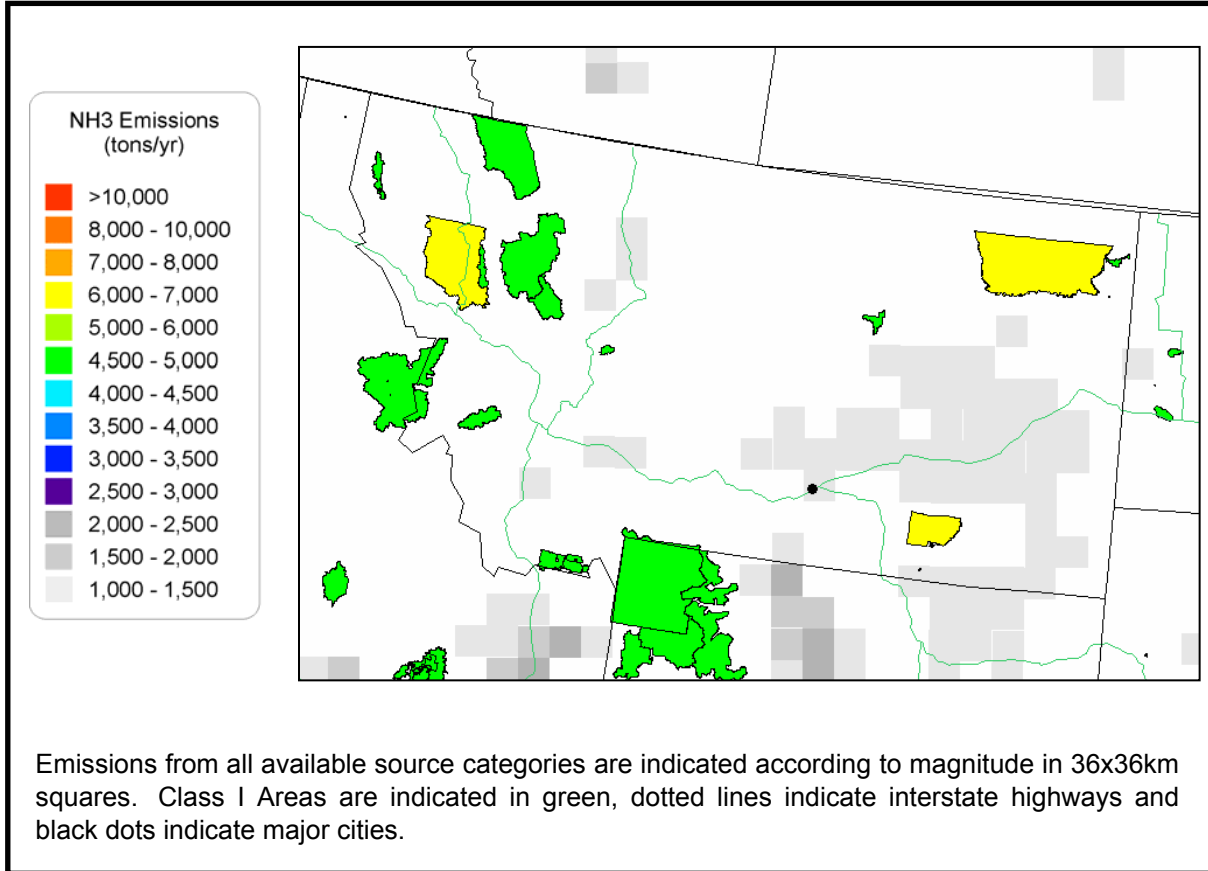


Volatile organic compounds (VOCs) are released predominantly from plants (biogenics). VOCs are also released from burning fuel, such as gasoline, wood, coal, or natural gas, and from products such as solvents, paints and glues.

VOCs in the air react with oxides of nitrogen and sunlight to form ozone, which acts as a catalyst for particulate formation. VOCs may also condense to form particulate organic matter. These particulates can block the transmission of light, contributing to visibility reduction on a regional scale in our Class I Areas.

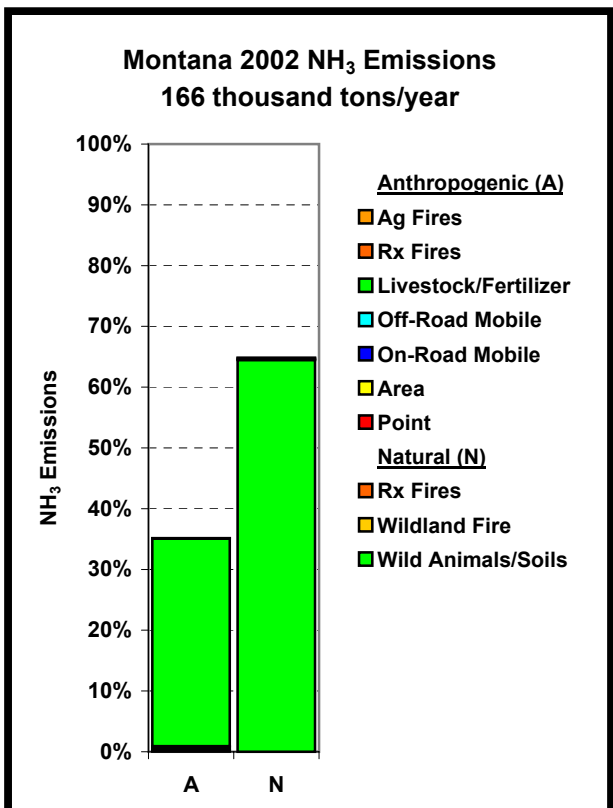


# Montana NH<sub>3</sub> Emissions WRAP Interim 2002 Inventory

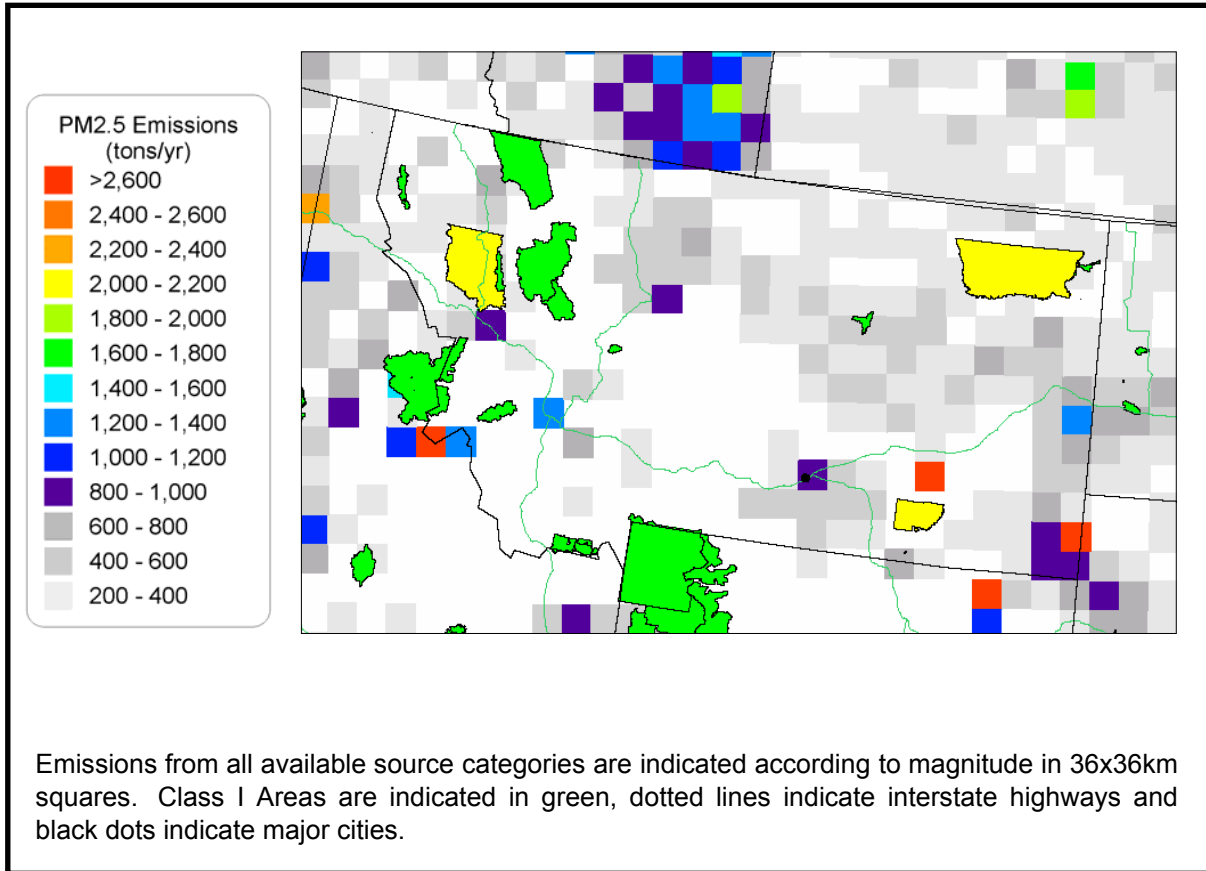


Ammonia (NH<sub>3</sub>) is a naturally occurring, colorless gas found in the atmosphere, emitted from livestock or as a result of the breakdown of organic waste. It is also found in industrial activities; mainly the production of fertilizer.

NH<sub>3</sub> can neutralize sulfate aerosols to form ammonium sulfate ((NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>). Depending on temperature and relative humidity, an excess of NH<sub>3</sub> can react with NO<sub>x</sub> emissions to form ammonium nitrate (NH<sub>4</sub>NO<sub>3</sub>) aerosols. These compounds can block the transmission of light, contributing to visibility reduction on a regional scale in our Class I Areas.

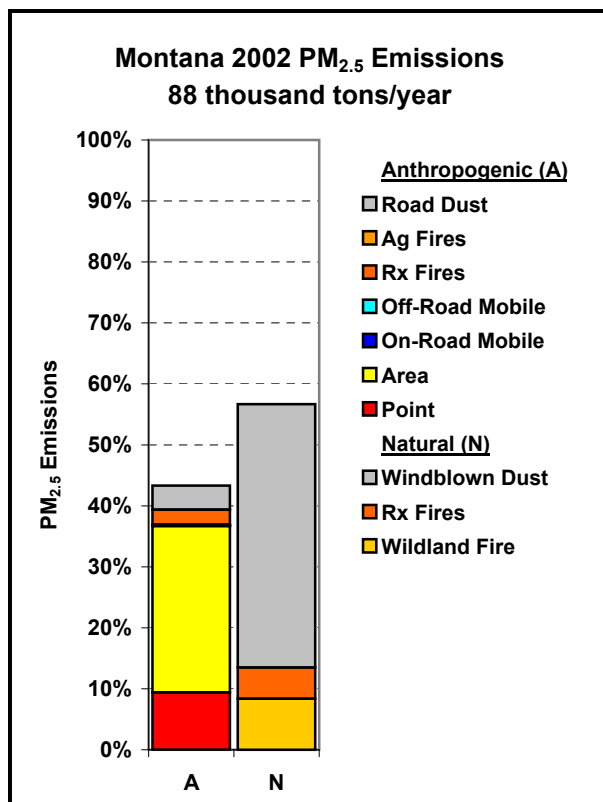


# Montana PM<sub>2.5</sub> Emissions WRAP Interim 2002 Inventory

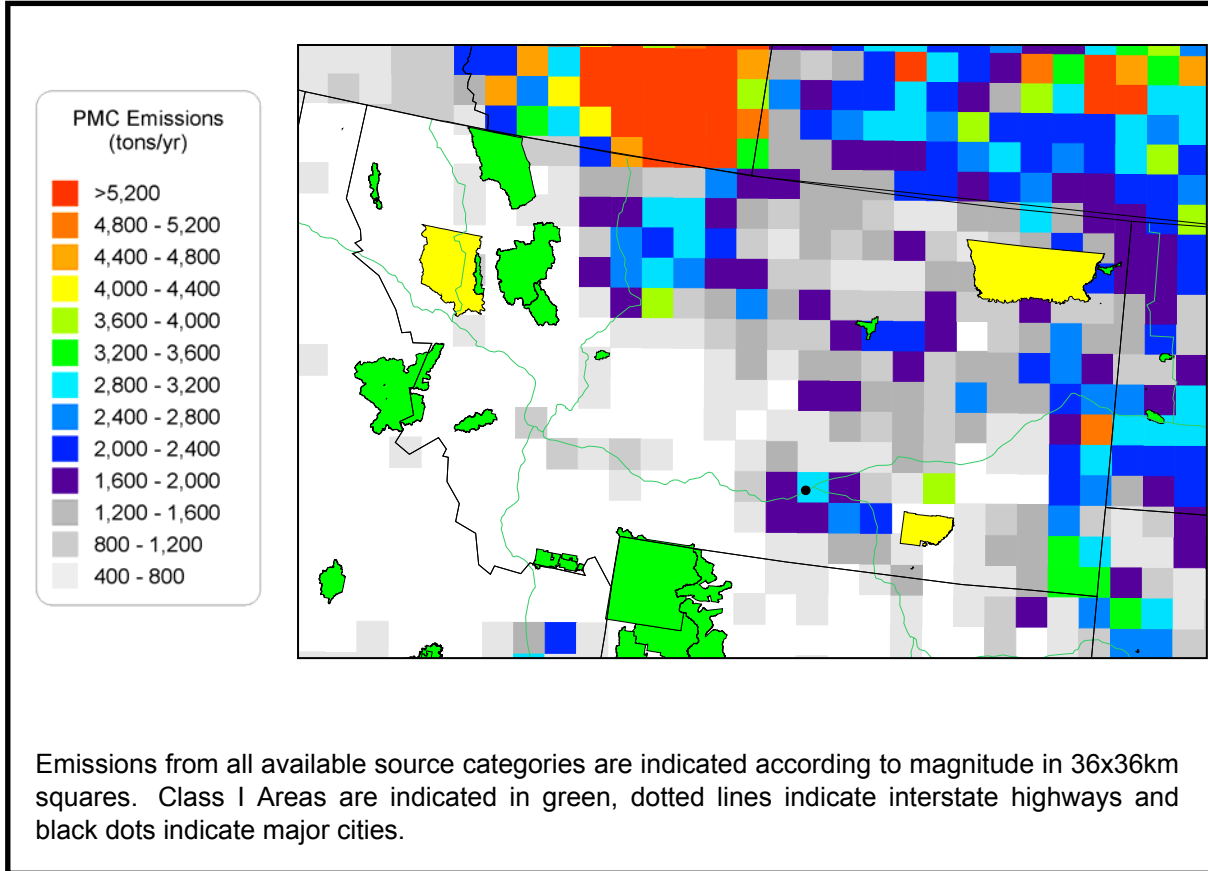


Aerosols with diameters less than 2.5 microns are referred to as PM<sub>2.5</sub> or fine particulate matter. Sources of PM<sub>2.5</sub> include combustion activities or mechanical grinding and soil material.

Fine particulate matter can remain suspended in the atmosphere for long periods of time and travel long distances. This makes PM<sub>2.5</sub> a major source of haze that reduces visibility on a regional scale in our Class I Areas.



# Montana PMC Emissions WRAP Interim 2002 Inventory



Aerosols with diameters between 2.5 and 10 microns are referred to as coarse particulate matter (PMC). Sources of PMC include crushing or grinding operations, combustion activities and soil materials.

Coarse particulate matter typically does not remain suspended as long or travel as far as  $PM_{2.5}$ . PMC can be a major source of haze that reduces visibility, especially on a local scale in our Class I Areas.

