Air Emissions in Garfield County

15 April 2008

"Smart Citizen Series" Presentation

Emissions – What are they?

- Releases from any source
- For air, may be particulate or gaseous
- May be continuous or one-time
- May be benign or hazardous
- May be locally released or from a long distance
- May react to form other compounds

Possible Sources

- Industrial
- Commercial
- Mobile
- Household
- Recreational
- Natural

Industrial sources of air pollution

- Power plants
- Oil and gas
- Asphalt plants
- Gravel pits
- Cement plants

Commercial sources of air pollution

- Drycleaners
- Restaurants
- Paint shops
- Agriculture
- Gas stations

Mobile sources of air pollution

- Motor vehicles
- Trucking firms
- Aircraft
- Railroads
- Construction equipment
- Drilling rigs
- Well fracing rigs

Household sources of air pollution

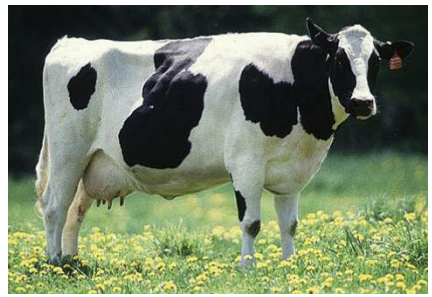
- Cleaners
- Lawnmowers
- Furniture
- Carpeting
- Paint
- Residential heating

Recreational sources of air pollution

- RV’s
- Boats
- ATV’s
- Snowmobiles

Natural sources of air pollution

- Trees / vegetation
- Animals / insects
- Wildfires
- Wind / blowing dust



So how do we know what is in the air?

Emissions Inventories

- An emissions inventory is an estimation of the amount of pollutants (generally tons/year) emitted from pollution sources in a given area over a specific amount of time.
- Inventories are developed using geographic information system (GIS) techniques to determine the known sources of air pollution that exist in an area.
- These sources are typically broken into three categories: point, mobile, and area.

Point sources

- Individual stationary facilities that emit pollution.
  - Power plants
  - Asphalt plants
  - Refineries
  - Compressor stations
  - Quarries/gravel pits
  - Cement plants

Mobile sources

- Typically broken into two major subcategories: highway vehicles emissions (or on-road), and non-road.
  - On-road mobile sources include light-duty vehicles, light-duty trucks, heavy-duty vehicles, and motorcycles, used for transportation on the road.
  - Non-road mobile sources include non-road gasoline equipment and vehicles, non-road diesel equipment and vehicles, aircraft, marine vessels, locomotives, and assorted other engines and vehicles.

Area sources

- Collectively represent individual sources that are small and numerous, and that have not been inventoried as specific point, mobile, or biogenic sources.
  - Residential and commercial fuel combustion
  - Dry cleaners
  - Gas stations
  - Biogenic emissions
  - Structural fires, wild fires and prescribed burning

How can emissions inventory data be used?

- Identify sources and general emission levels.
- Evaluate trends and meeting of air quality goals.
- Evaluate potential exposure risks.
- Inputs for certain air quality models and to compare to results of other air quality models.
- Provide reports to the public and to agencies.
- Planning to ensure that air quality standards are not violated.

How are emission inventory data obtained?

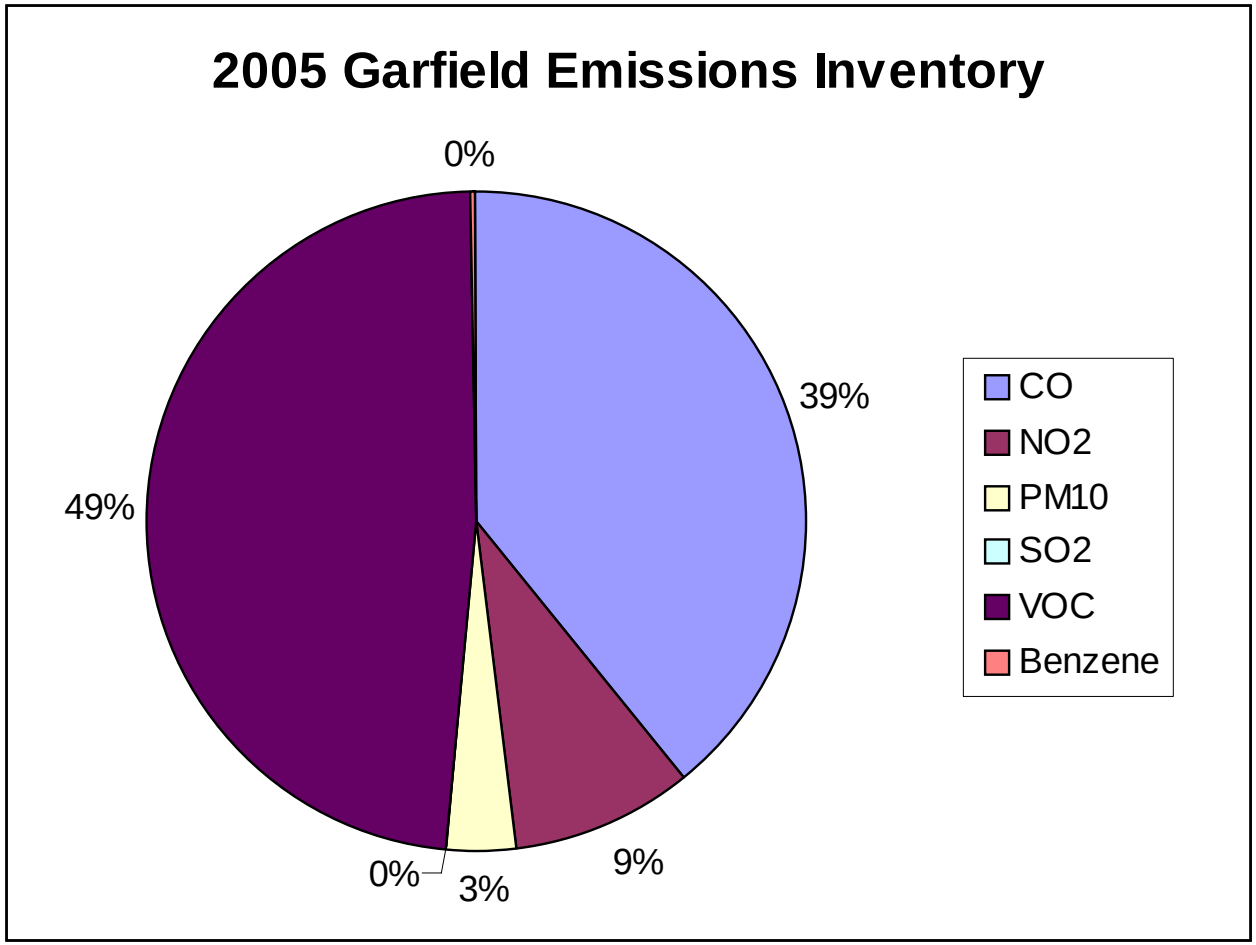
- Point source data from Air Pollution Emission Notice tracking system and from emissions estimates using set emissions factors.
- Mobile source data from EPA models based on countywide vehicle miles traveled and vehicle type data.
- Area source data from emissions estimates based on population, land use and other factors for the county.
- See www.epa.gov/ttn/chief for more information.

What pollutants are included?

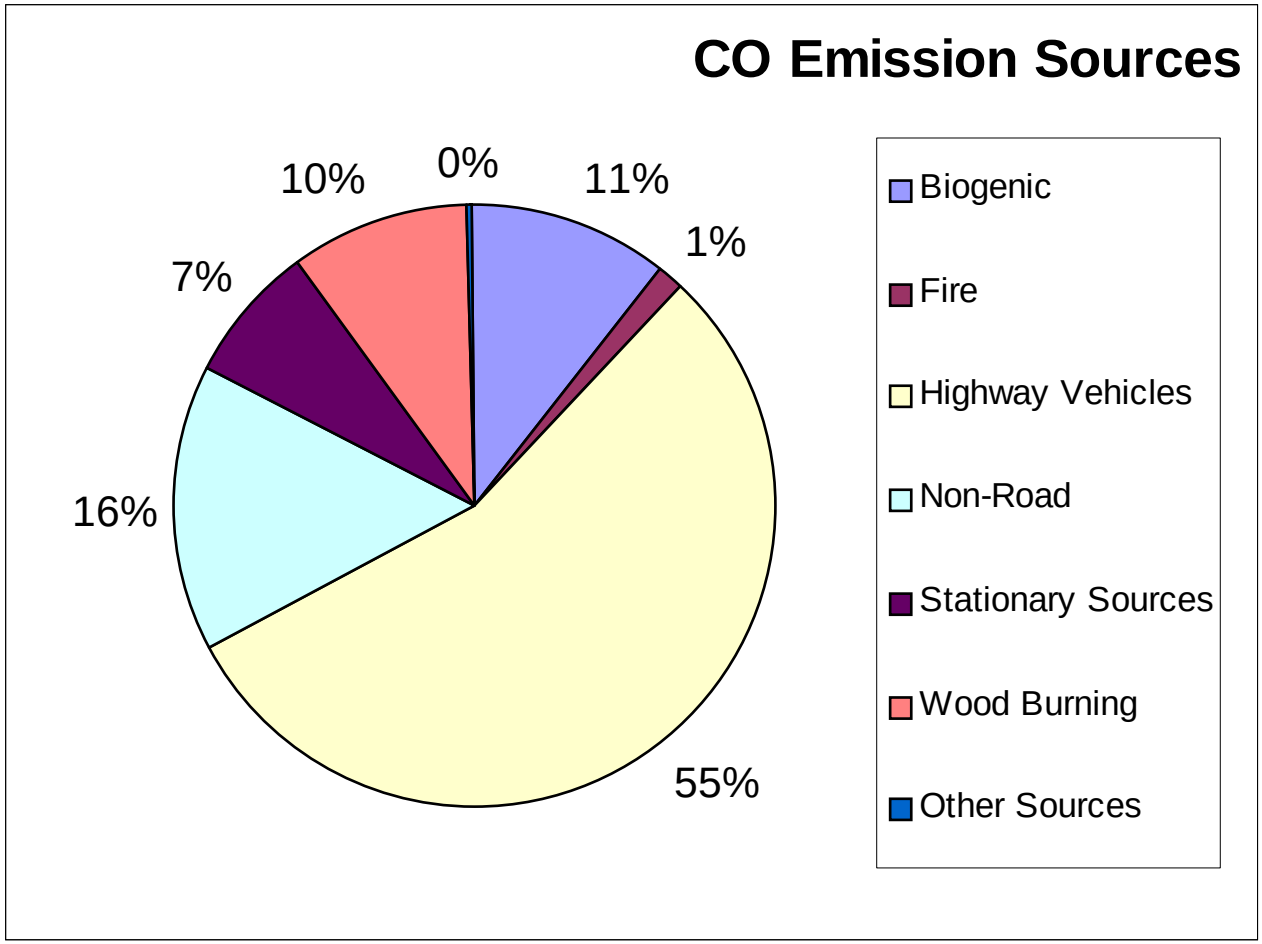
- EPA “Criteria” pollutants
  - Carbon monoxide
  - Nitrogen dioxide
  - Sulfur dioxide
  - PM-10 particulates
- Volatile organic compounds
- Benzene

What are the sources of air pollution in Garfield County?

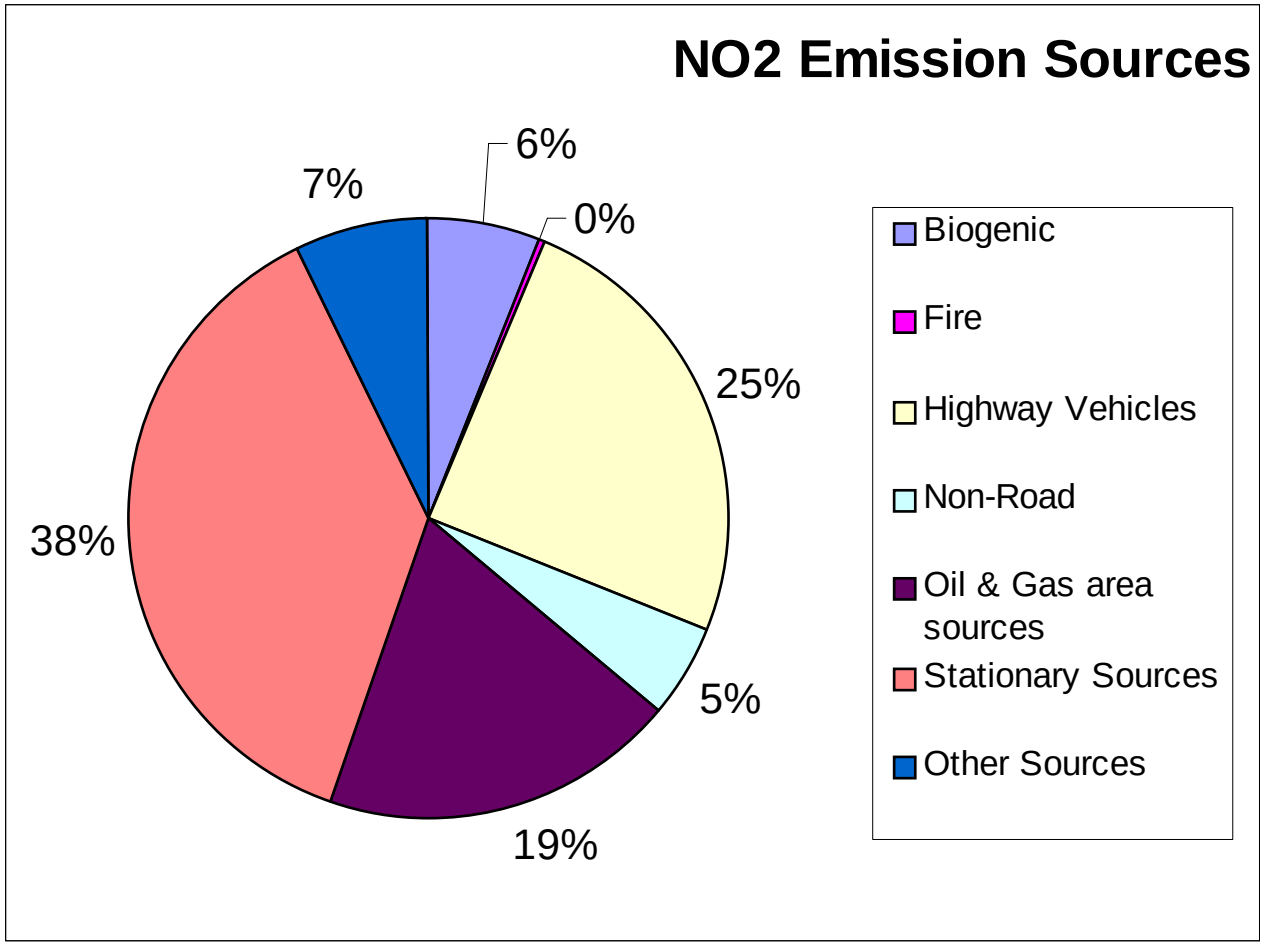
2005 Garfield County Total Emissions Inventory (87,745 tons)



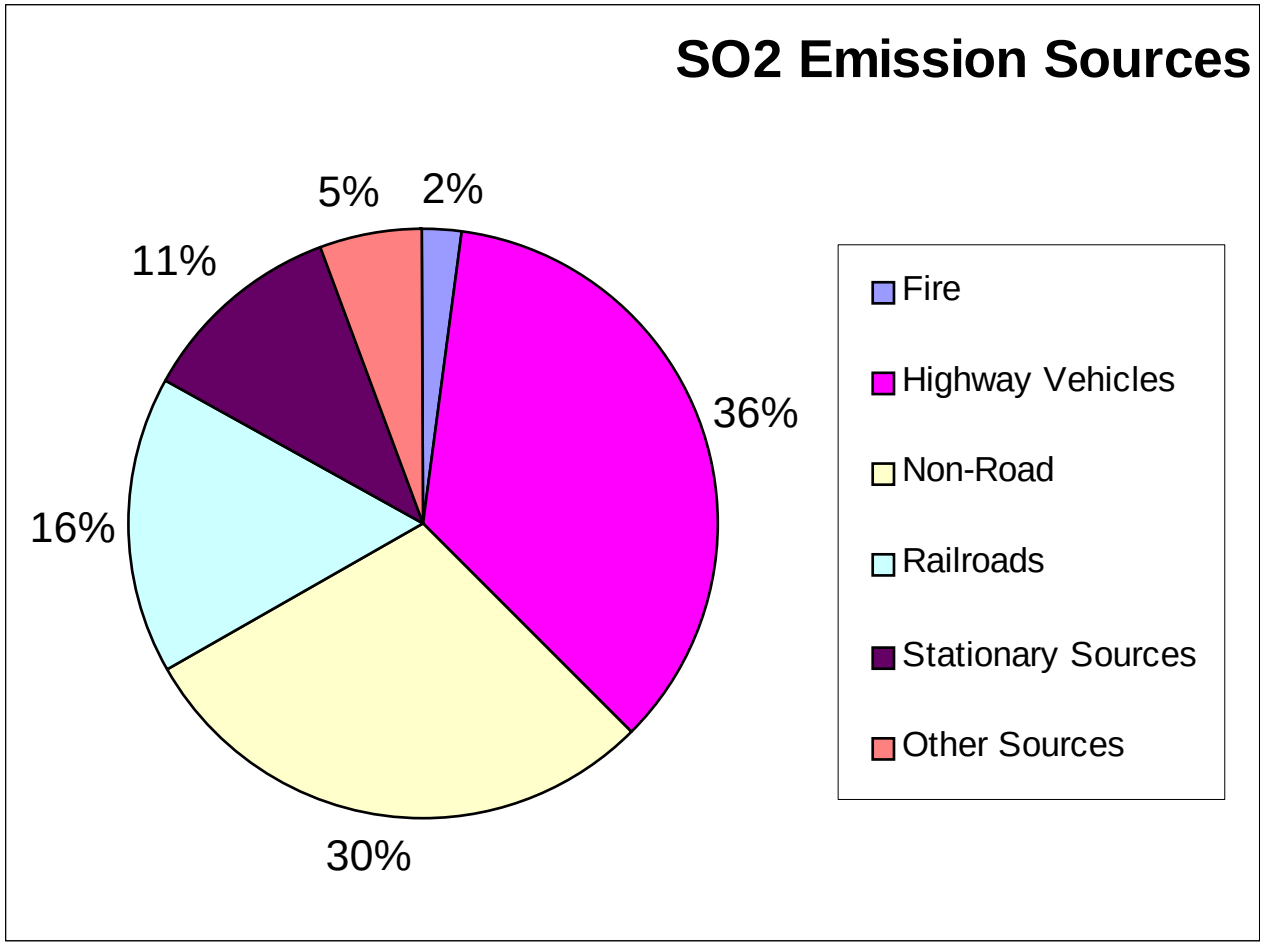
2005
Carbon monoxide (34,289 tons)



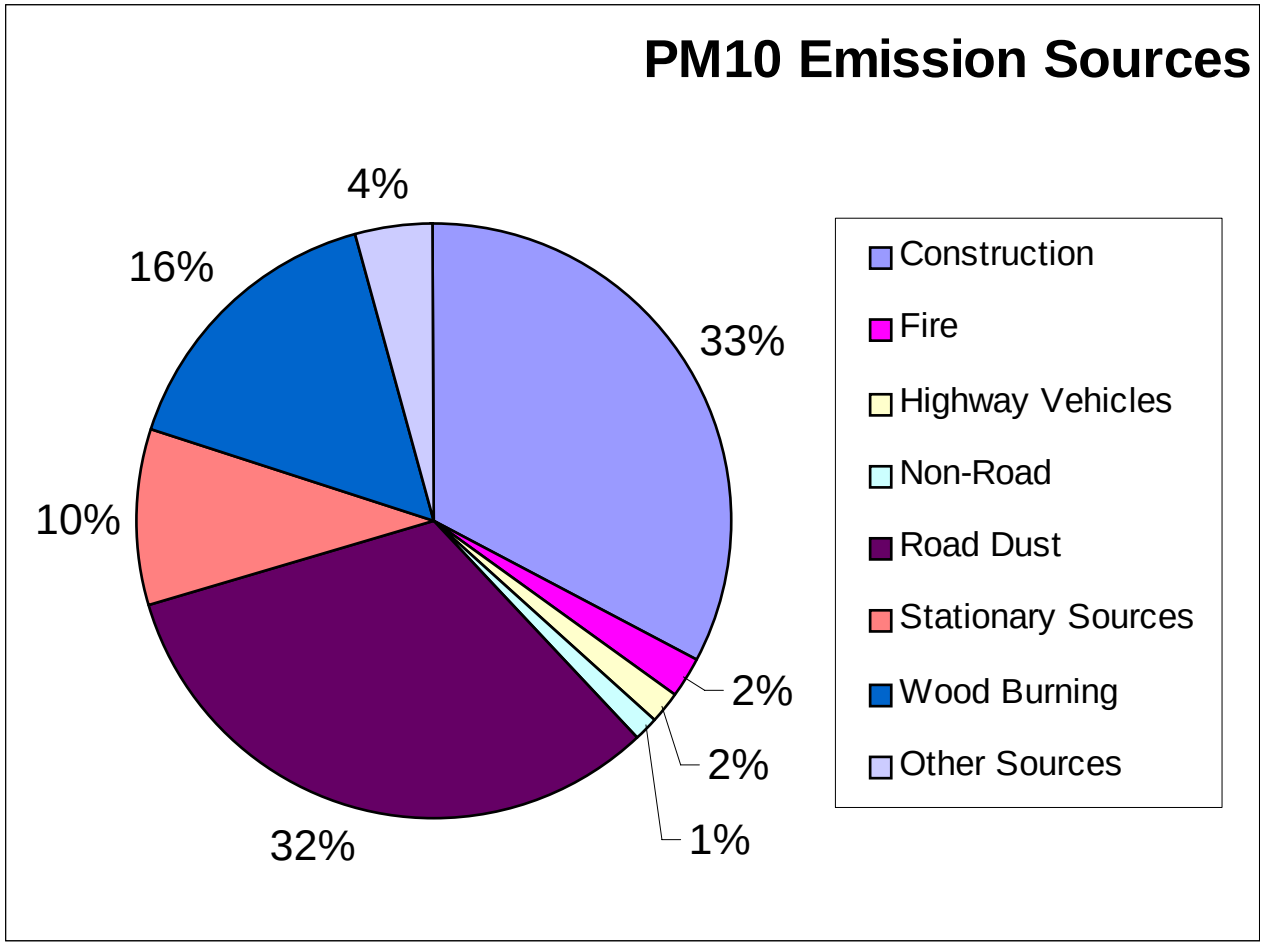
2005
Nitrogen dioxide (7,782 tons)



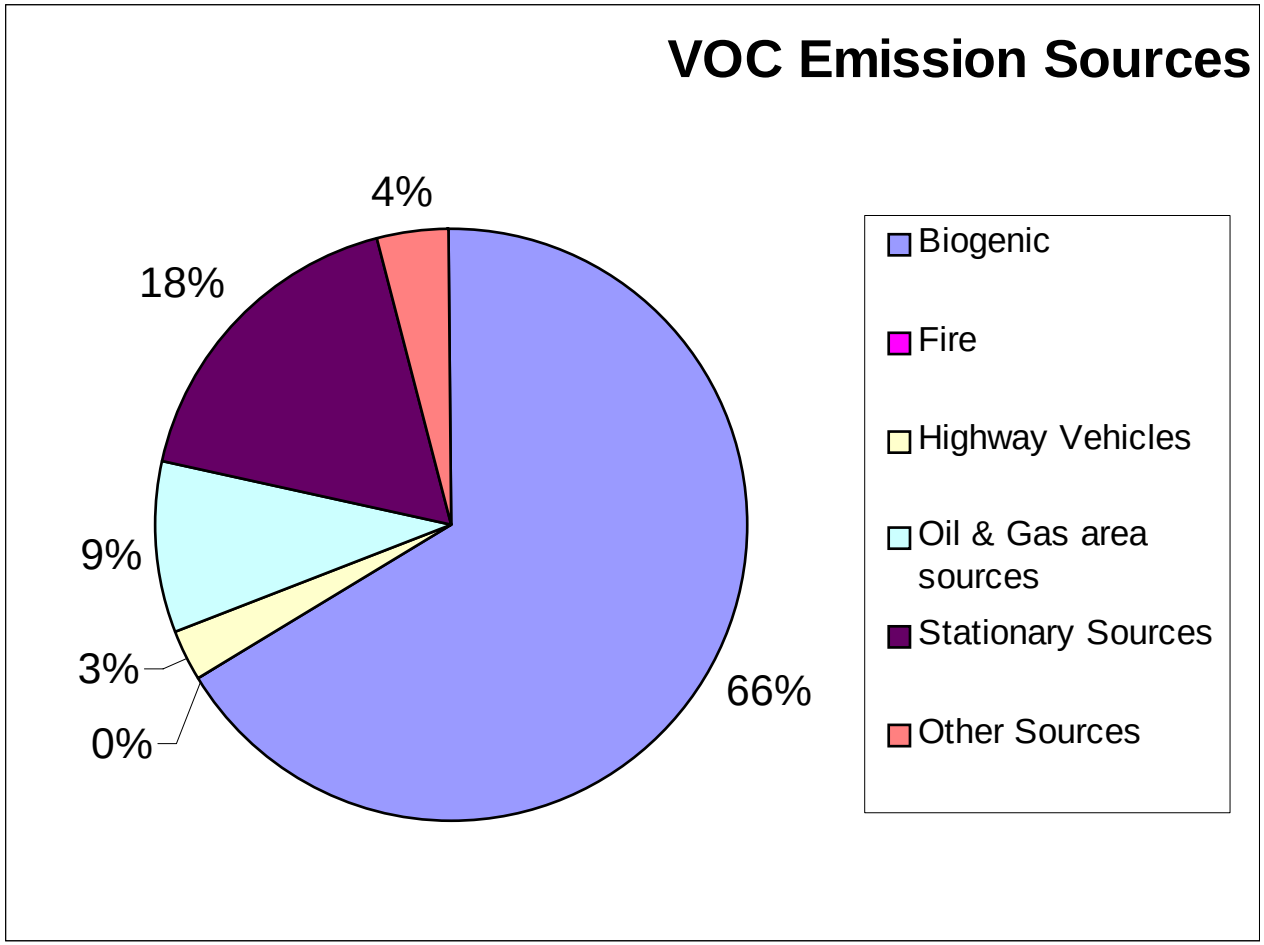
2005
Sulfur dioxide (162 tons)



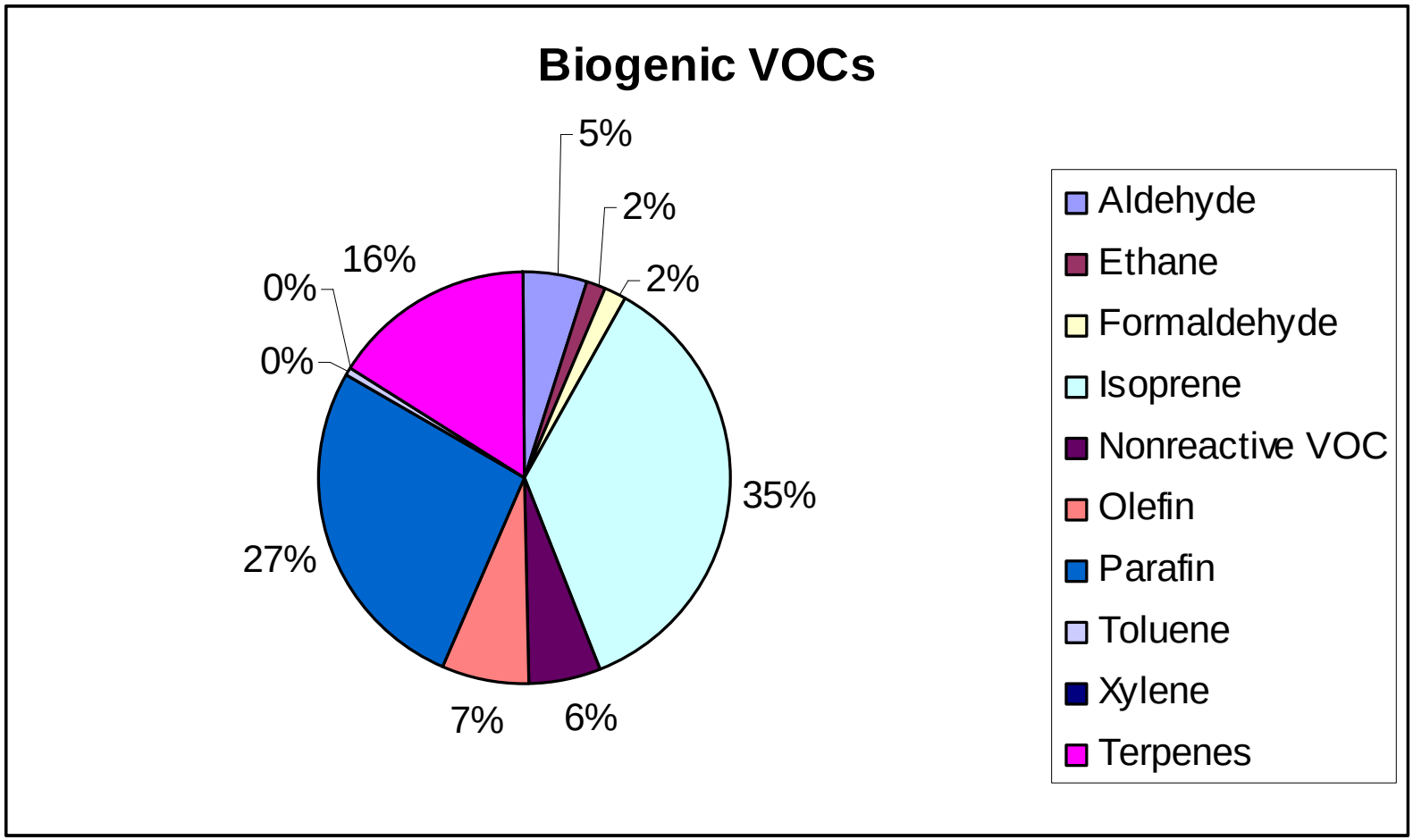
2005
PM-10 particulates (2,962 tons)



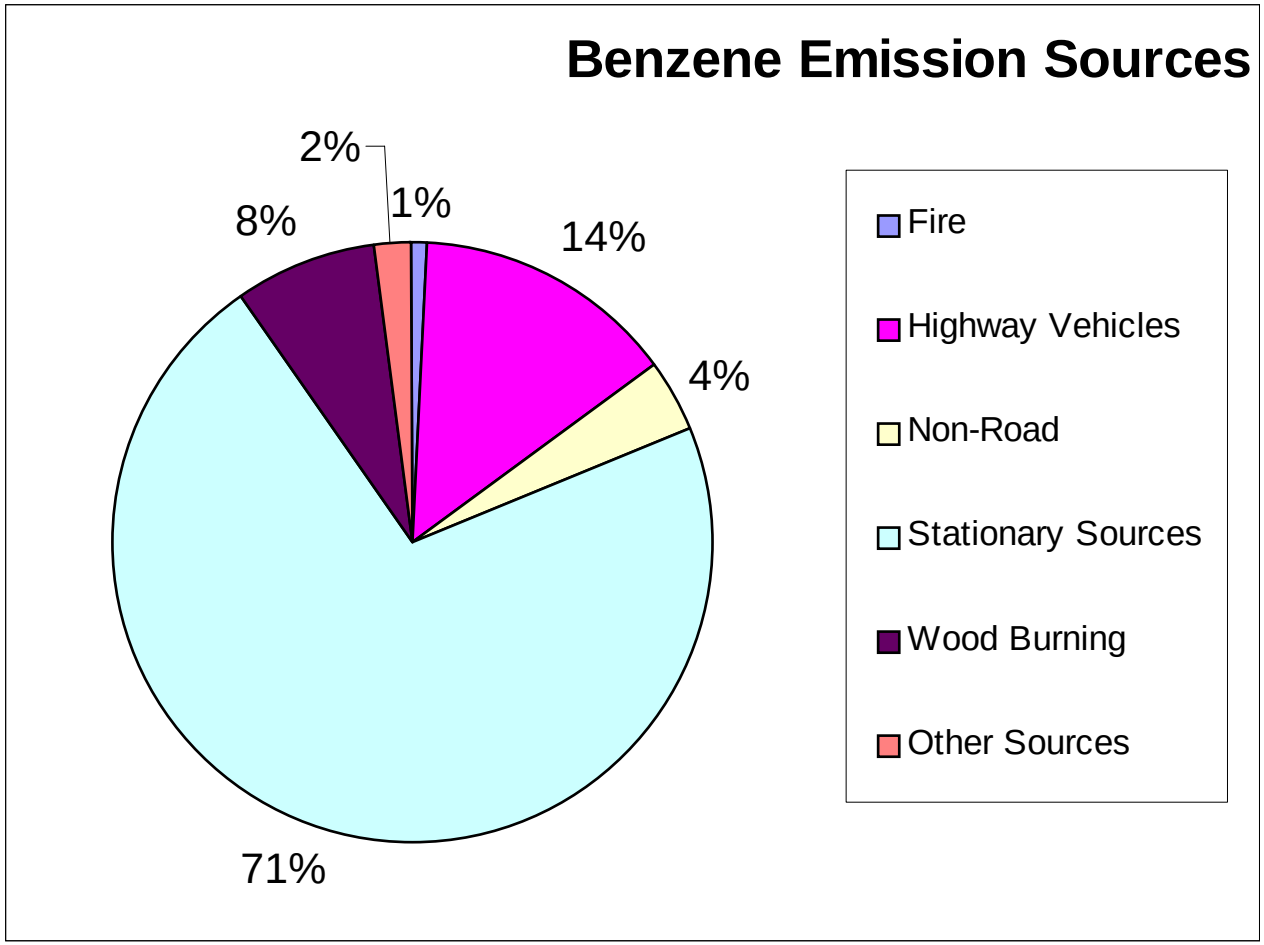
2005
Volatile organic compounds (42,266 tons)



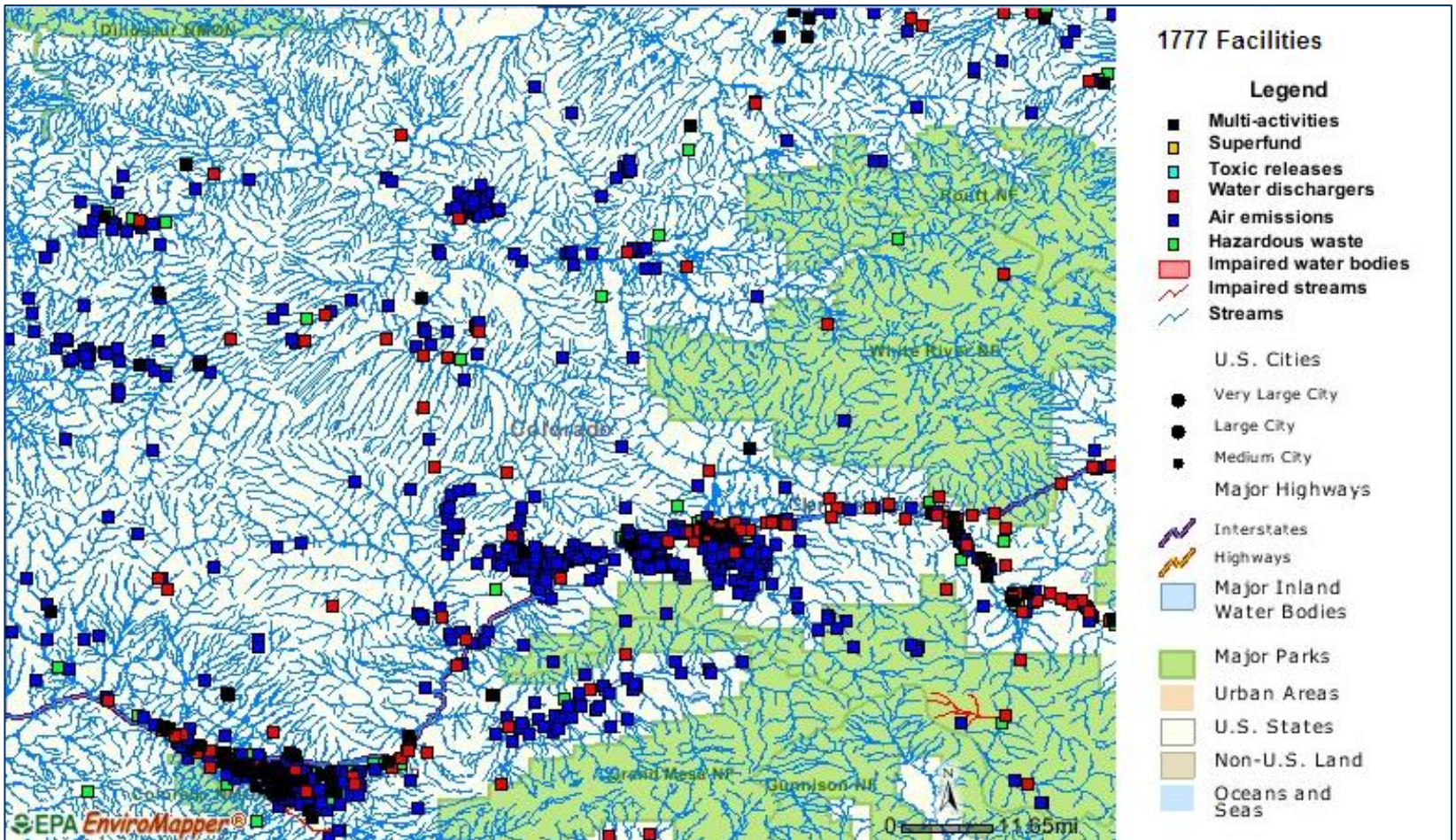
2005 Biogenic volatile organic compounds (33,301 tons)



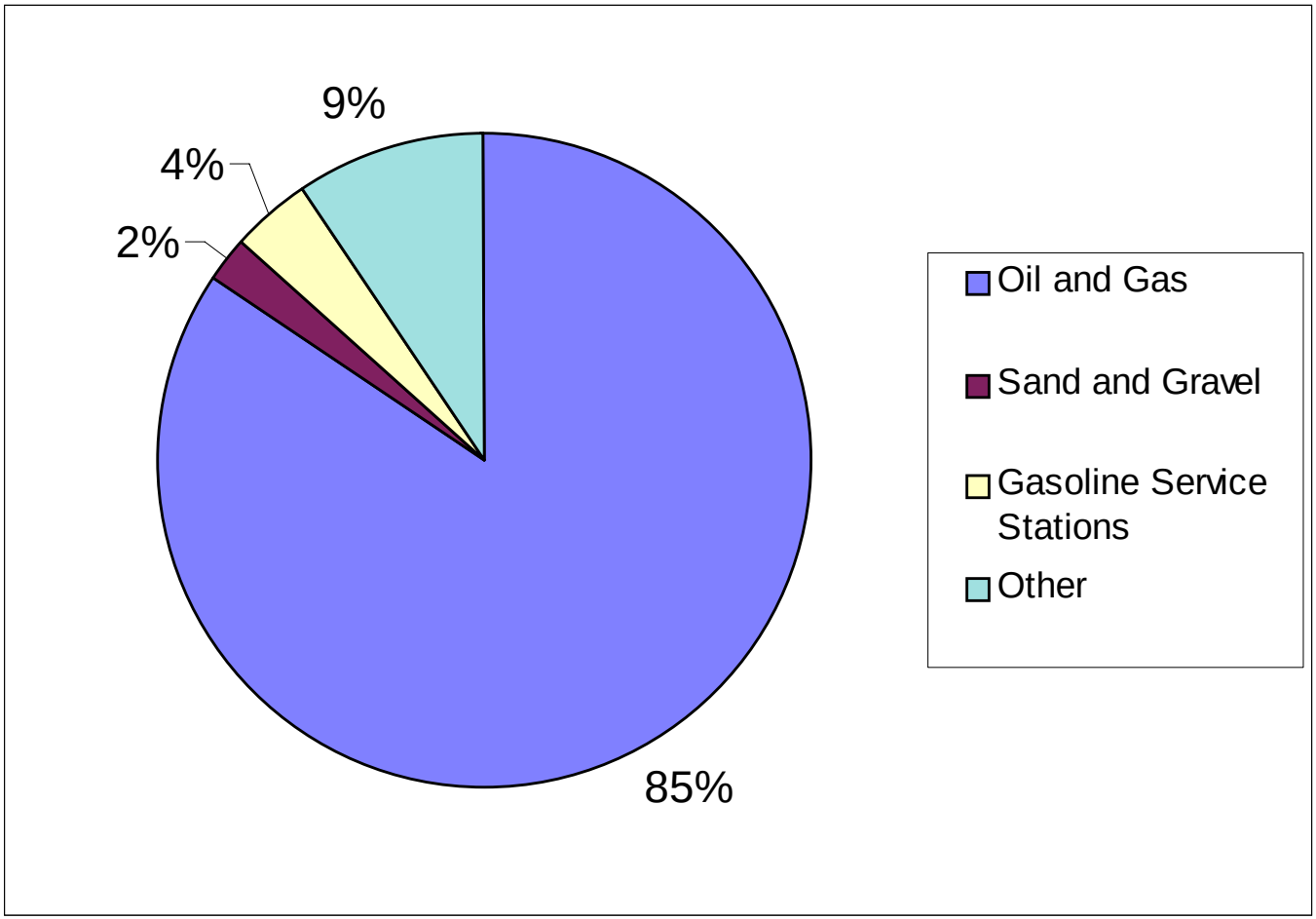
2005
Benzene (284 tons)



Map of point sources in Garfield County



2008
Point source break-down



What are the trends in air pollution emissions for Garfield County?

1996 – 2006 Garfield County Emissions Trends

- Carbon monoxide
  - 20% overall decrease
  - Highway vehicles decreased 40%
  - Non-road vehicles increased 20%
  - Stationary sources increased 308%
- Nitrogen dioxide
  - 82% overall decrease
  - Highway vehicles decreased 94%
  - Non-road vehicles decreased 91%
  - Stationary sources increased 366%

1996 – 2006 Garfield County Emissions Trends (cont.)

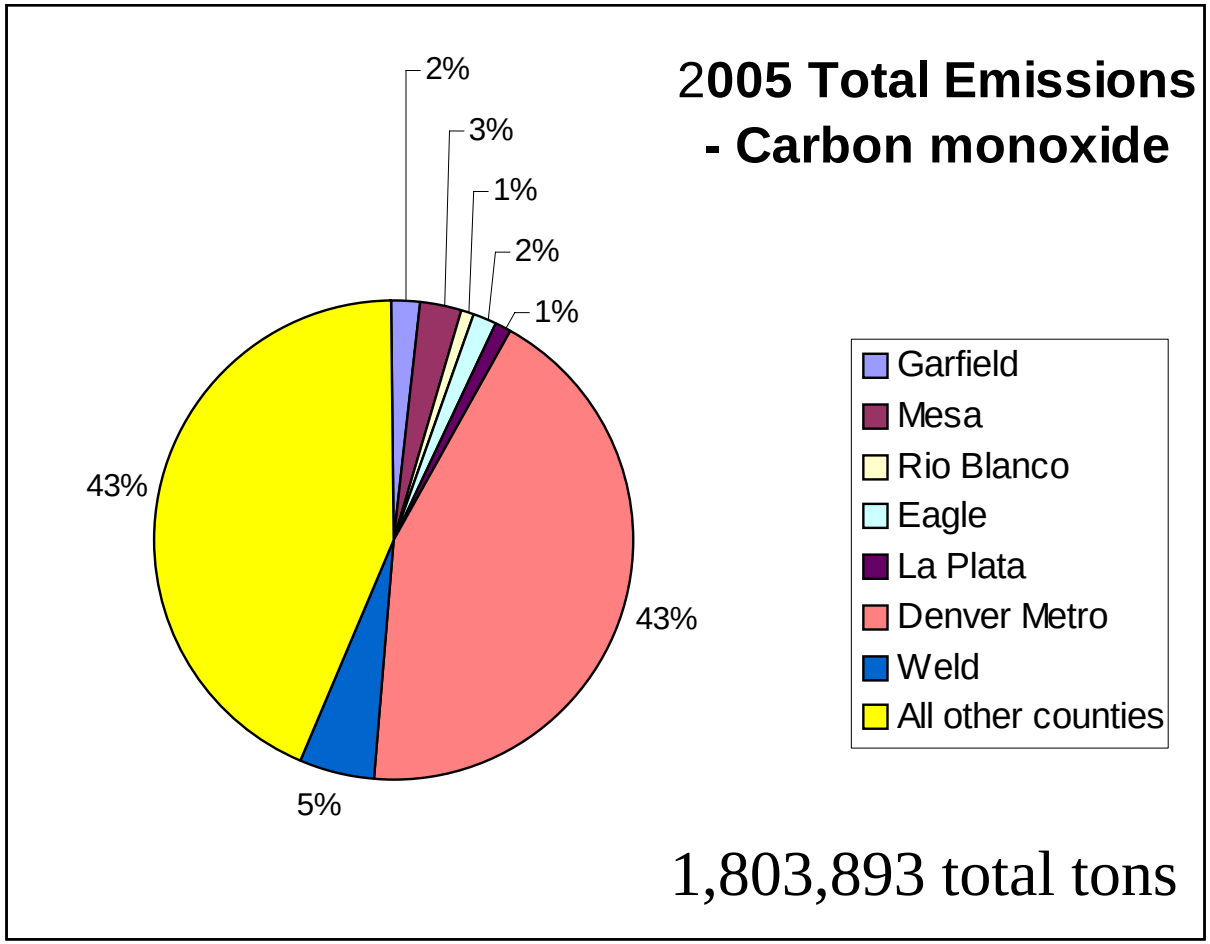
- Sulfur dioxide
  - 23% overall decrease
  - Highway vehicles decreased 44%
  - Non-road vehicles increased 104%
  - Stationary sources decreased 37%
- PM-10 particulates
  - 5% overall decrease
  - Highway vehicles decreased 52%
  - Non-road vehicles increased 21%
  - Stationary sources decreased 51%

1996 – 2006 Garfield County Emissions Trends (cont.)

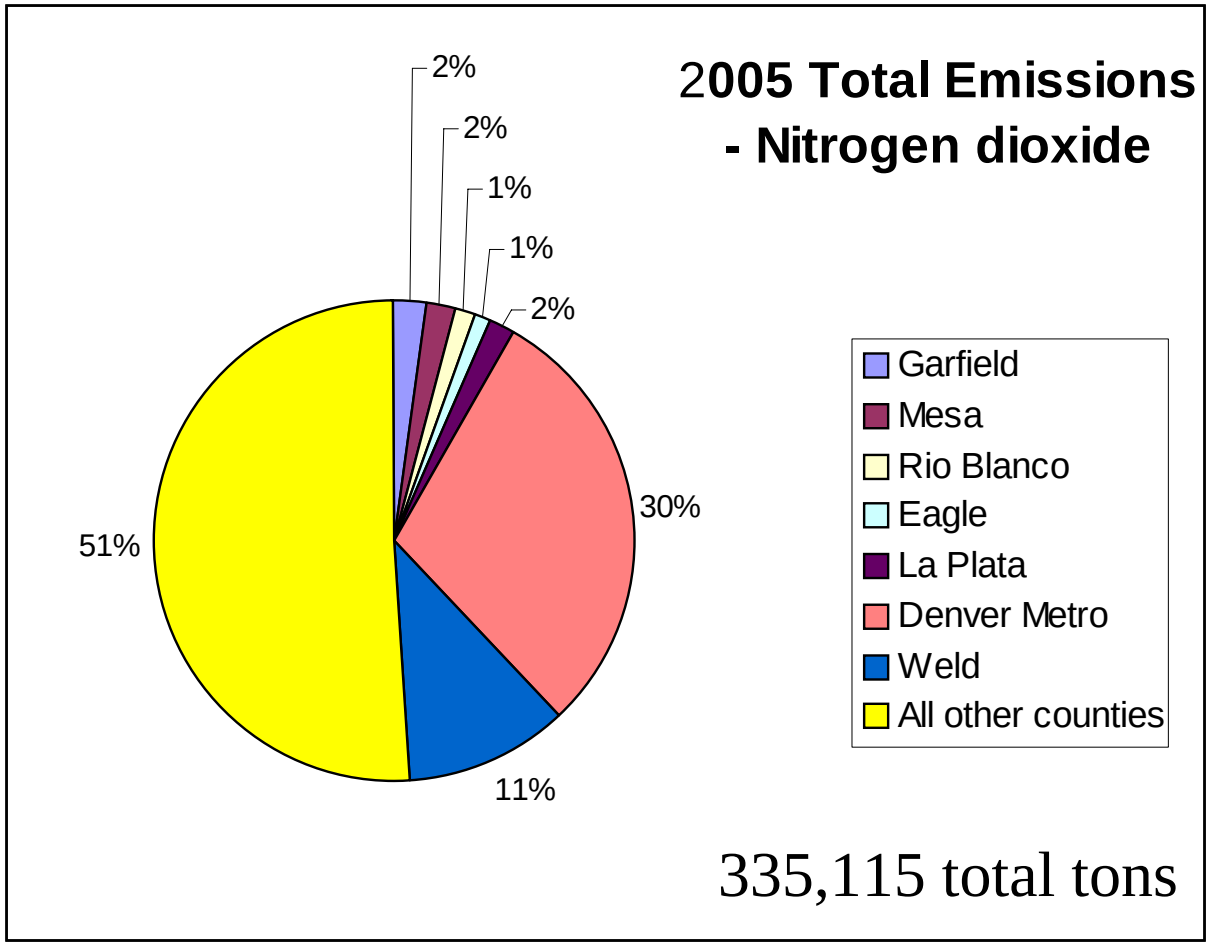
- Volatile organic compounds
  - 28% overall increase
  - Highway vehicles decreased 45%
  - Non-road vehicles decreased 25%
  - Stationary sources increased 442%
- Benzene
  - 54% overall increase
  - Highway vehicles decreased 45%
  - Non-road vehicles decreased 22%
  - Stationary sources increased 157%

How does Garfield County compare to other places in Colorado (including oil and gas development)?

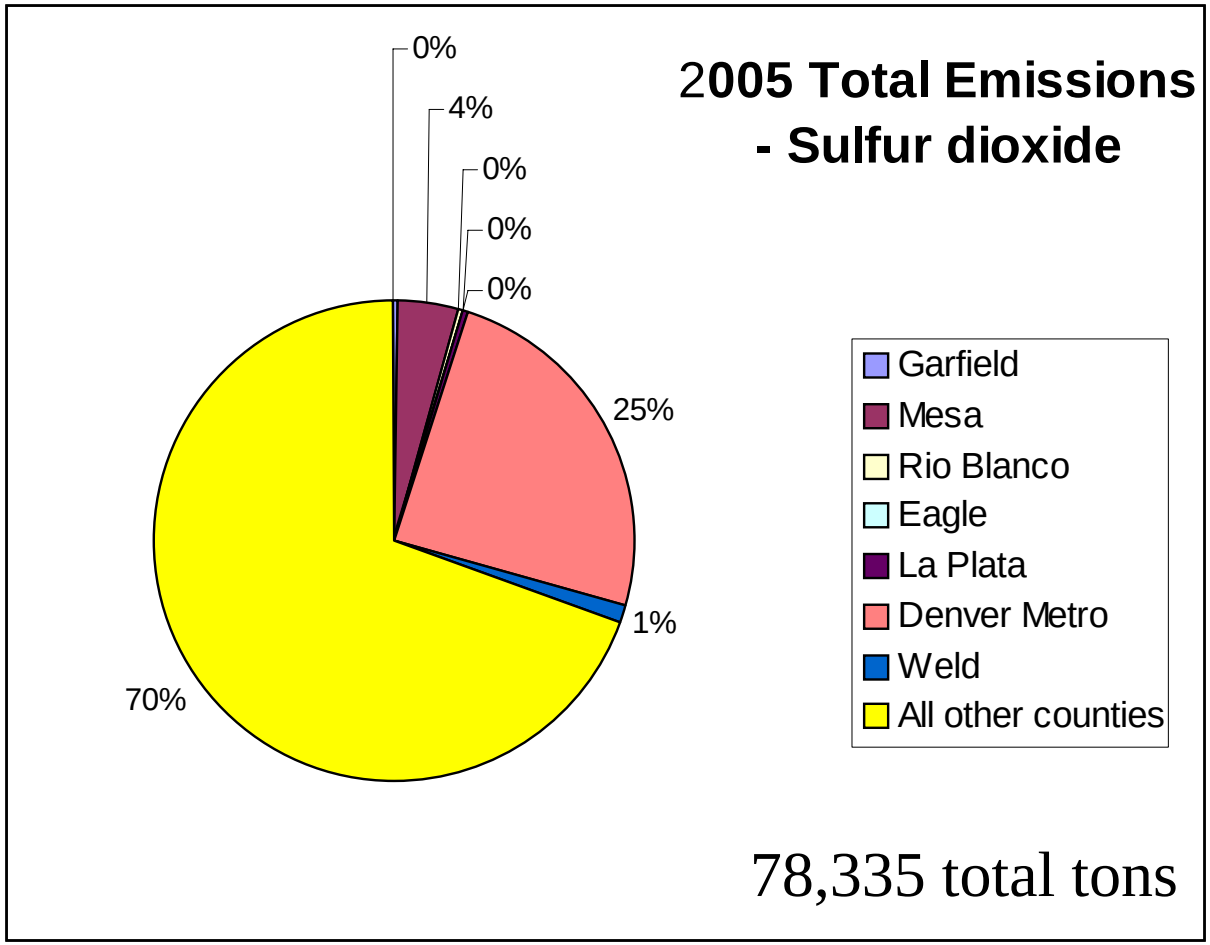
Carbon monoxide comparison



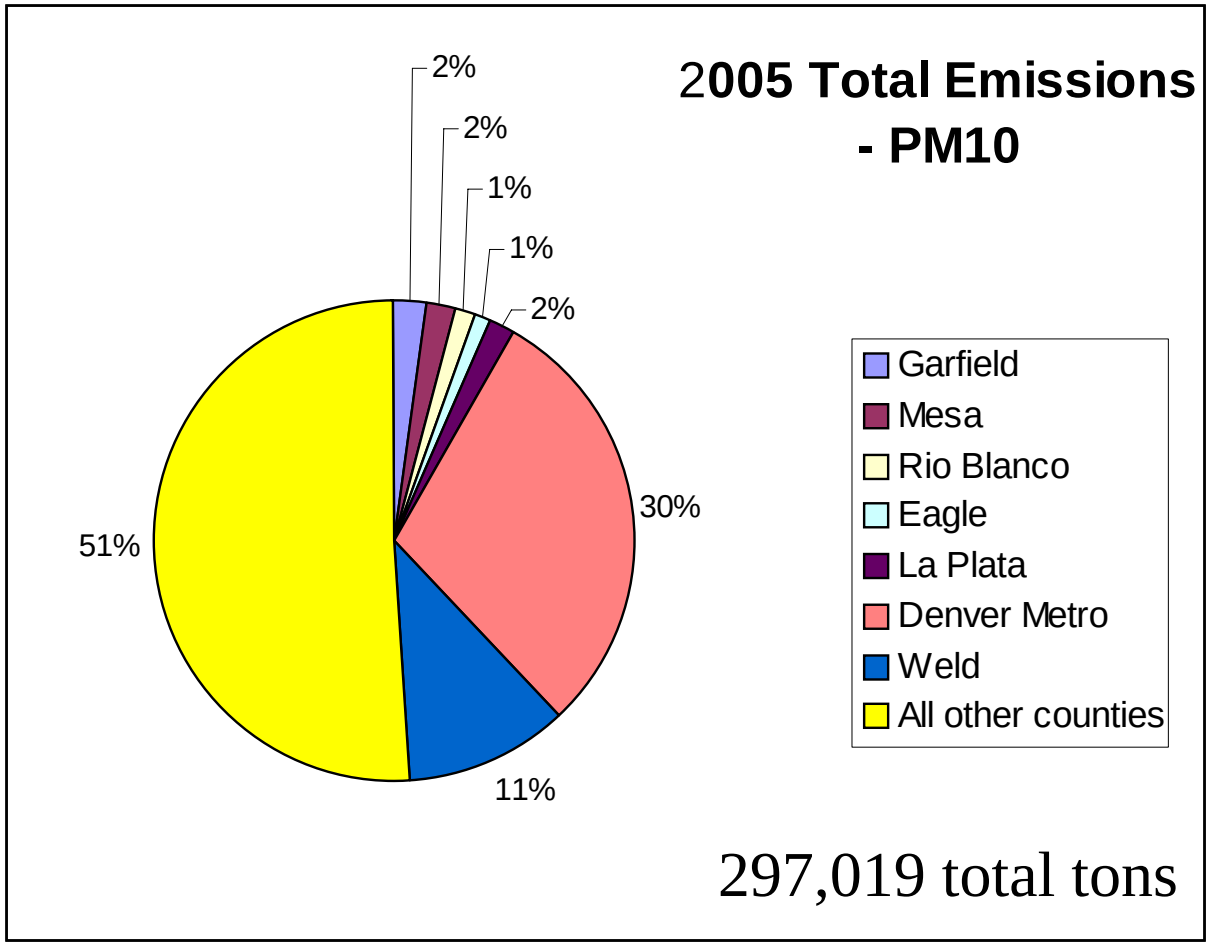
Nitrogen dioxide comparison



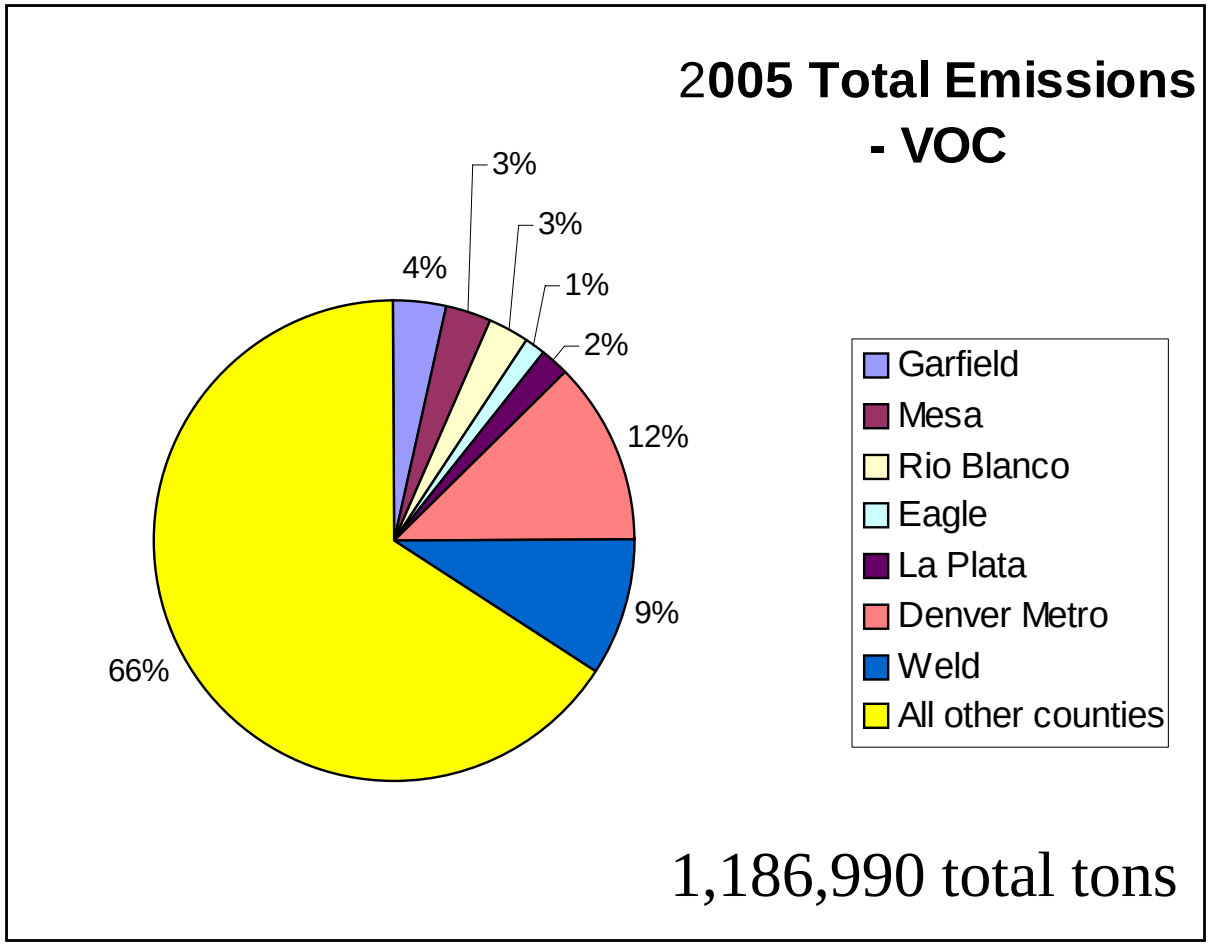
Sulfur dioxide comparison



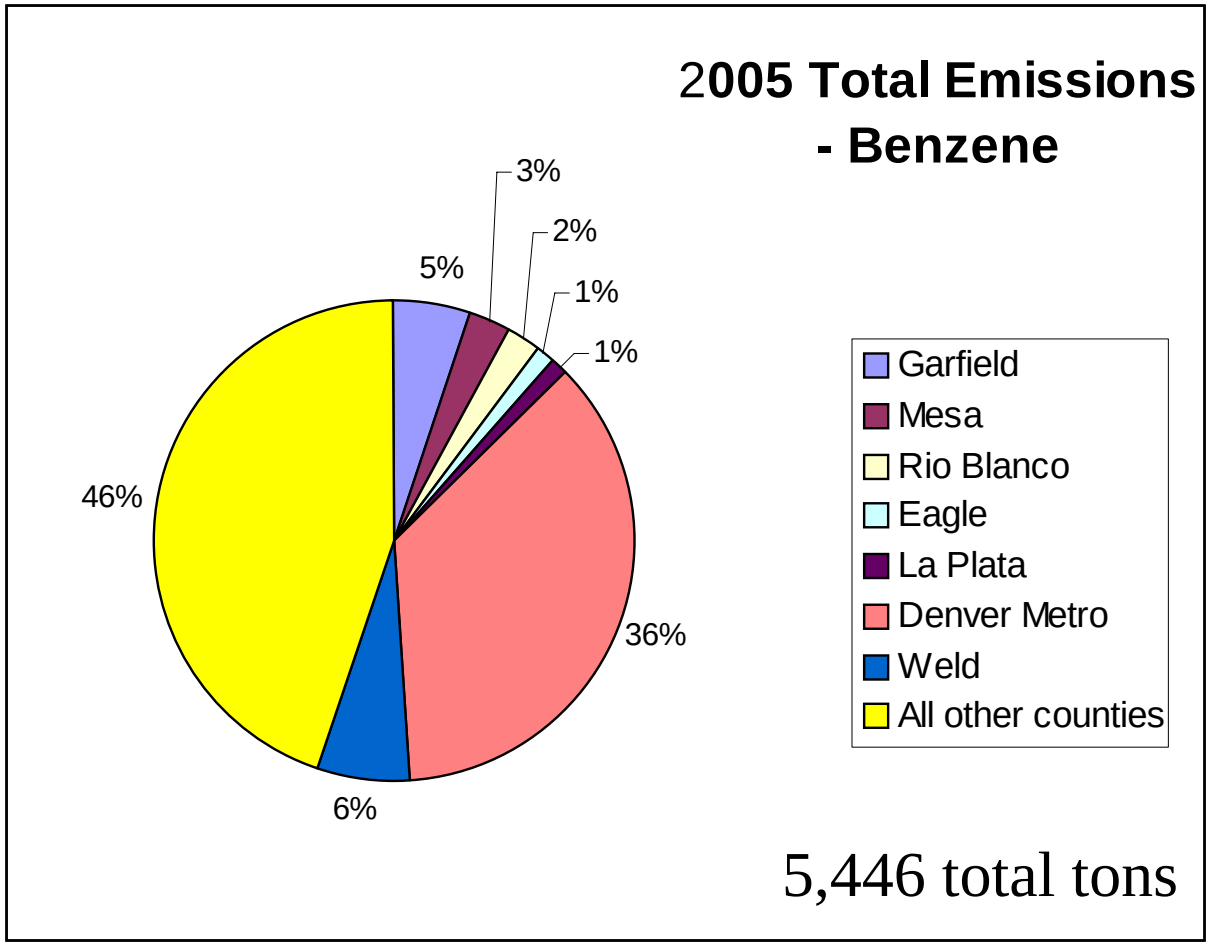
PM-10 particulates comparison



Volatile organic compounds comparison



Benzene comparison



How good are emissions inventories?

- Getting better with time
- Provide reasonable estimates
- Problems
  - De minimis reporting levels (i.e. 2 tons/year)
  - Reporting based on estimates, not actual releases
  - Business change during the year (new or close down)
  - Not all releases are categorized, especially household.

Questions?

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