

# Air Monitoring Overview

10/28/2015



**COLORADO**

**Air Pollution Control Division**

Department of Public Health & Environment

# Reasons for air monitoring

- ▶ EPA requirements
- ▶ NAAQS compliance
- ▶ Baseline monitoring
- ▶ Source impacts
- ▶ Air quality trends
- ▶ Permit related
- ▶ Local concerns and requests
- ▶ Community assistance
- ▶ SIP's/maintenance plans/NEPA/EIS
- ▶ Research support

# Monitoring overview

- ▶ Designed to protect public health
- ▶ EPA has 6 “Criteria” pollutants for National Ambient Air Quality Standards (NAAQS)
  - CO, O<sub>3</sub>, NO<sub>2</sub>, SO<sub>2</sub>, PM (PM<sub>10</sub> & PM<sub>2.5</sub>), Pb
- ▶ Colorado has 2 ambient air standards
  - SO<sub>2</sub>, visibility
- ▶ Monitoring performed across State of Colorado
  - Approximately 60 sites
- ▶ Sites added or removed based on needs and concentrations recorded
- ▶ Mainly in population centers
- ▶ Different types
  - “Continuous” provides hourly values
    - CO, O<sub>3</sub>, NO<sub>x</sub>/NO<sub>y</sub>, SO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, meteorology
  - “Daily” provides 24-hour values
    - PM<sub>10</sub>, PM<sub>2.5</sub>, air toxics

# EPA monitoring requirements

- ▶ Set requirements for all “Criteria” pollutants
- ▶ See: 40 CFR part 58
  - Appendix C (Monitoring Methodology)
  - Appendix D (Network Design Criteria)
  - Appendix E (Probe and Path Siting Criteria)
- ▶ Numbers of required monitors set on:
  - Population
  - Design values
  - Sources (stationary, mobile)

# EPA monitoring spatial scales

- ▶ **Microscale**
  - Representative of area up to 100m
  - Typifies maximum concentration areas such as street canyons
- ▶ **Middle scale**
  - Representative of area from 100m up to 500m
  - Typifies areas up to several city blocks in size
- ▶ **Neighborhood scale**
  - Representative of area from 0.5 km up to 4 km
  - Typifies relatively uniform land use areas
- ▶ **Urban scale**
  - Representative of area from 4 km up to 50 km
  - Typifies a city area
- ▶ **Regional scale**
  - Representative of area from tens to hundreds of km
  - Typifies rural areas that have no large sources

# EPA monitoring types

- ▶ Maximum concentration
  - Typically micro, middle or neighborhood
  - Can sometimes be urban or regional for secondarily formed pollutants
- ▶ Population-oriented
  - Neighborhood or urban scales
- ▶ Source impact
  - Micro, middle or neighborhood scales
- ▶ Background/regional transport
  - Urban and regional scales
- ▶ Welfare-related impacts
  - Urban and regional scales

# Designations

## ▶ For Sites

- SLAMS = State/Local Air Monitoring Site
- SPM = Special Purpose Monitor
- NCore = National Core Multipollutant Site
- PAMS = Photochemical Assessment Monitoring Site
- “Other”

## ▶ Regulatory (vs. Non-Regulatory)

- Use a “reference” or “equivalent” analyzer
- Meet all required siting criteria
- Meet all required QA/QC protocols
- Have EPA-approved QAPP

# So how do we select sites?

- ▶ Use meteorology, modeling, short-term monitoring studies, topography and/or professional judgment to determine the best area for monitoring
  - Varies based on monitoring type/need
- ▶ Use satellite images and ground reconnaissance to determine possible locations
- ▶ Evaluate possible locations based on EPA CFR requirements or other needs, including:
  - Terrain
  - Distance to nearby sources
  - Distance to roads
  - Distance to trees, buildings and other obstructions
- ▶ Determine land ownership and evaluate the possibility of getting approval
  - Private ownership is typically more difficult
- ▶ Submit site location approval request to EPA
- ▶ Develop leases/MOUs as needed
- ▶ Install site
  - Need permits, power, shelter, equipment, etc.

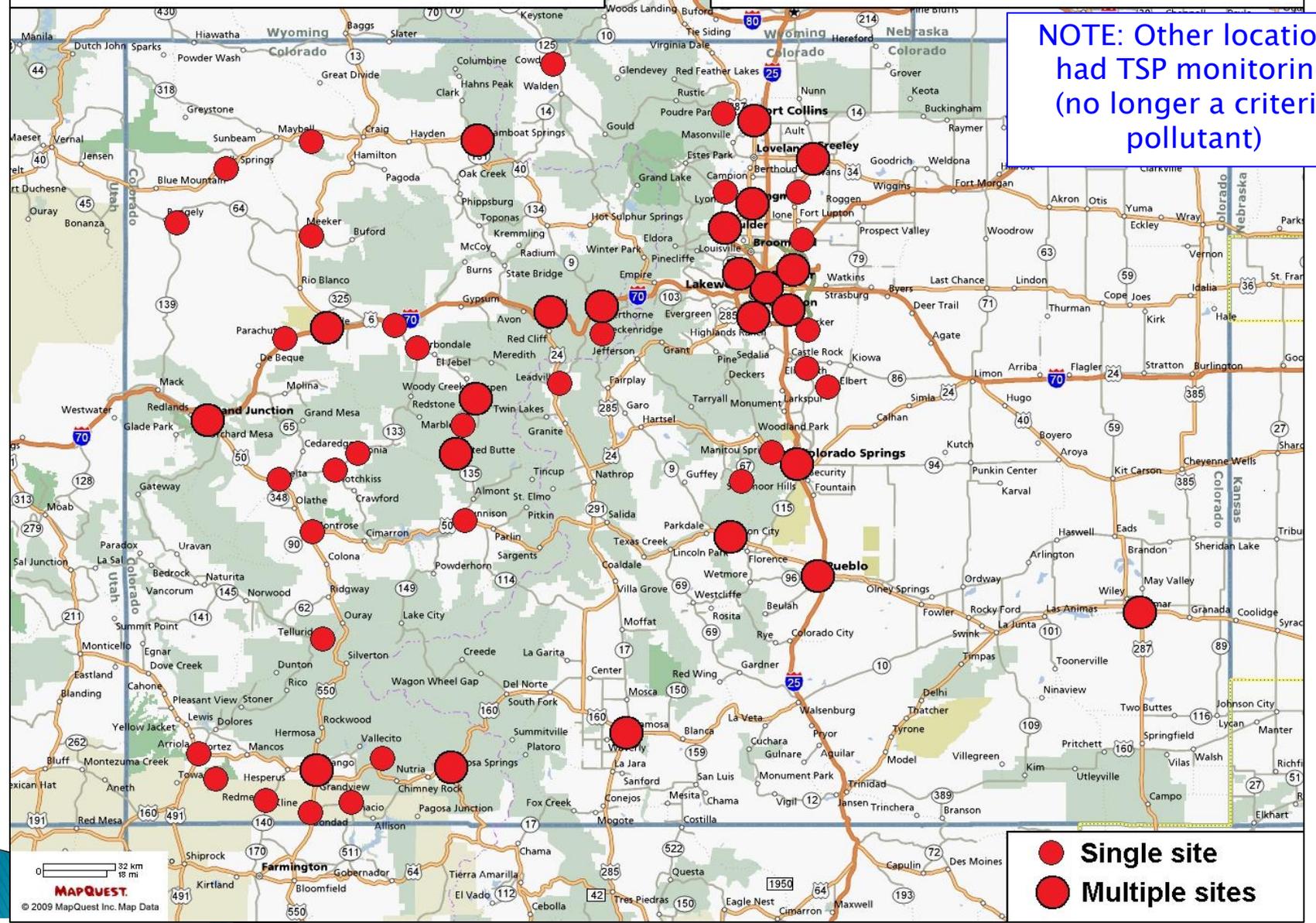
# Who currently performs monitoring in Colorado?

- ▶ Colorado Dept. of Public Health & Environment
- ▶ National Park Service
- ▶ U.S. Forest Service
- ▶ Bureau of Land Management
- ▶ Southern Ute Indian Tribe
- ▶ Local Agencies
  - Garfield County, Aspen, Mesa County
- ▶ Private companies / industry
- ▶ Private citizens

# CDPHE Monitor Locations 1965 - 2015

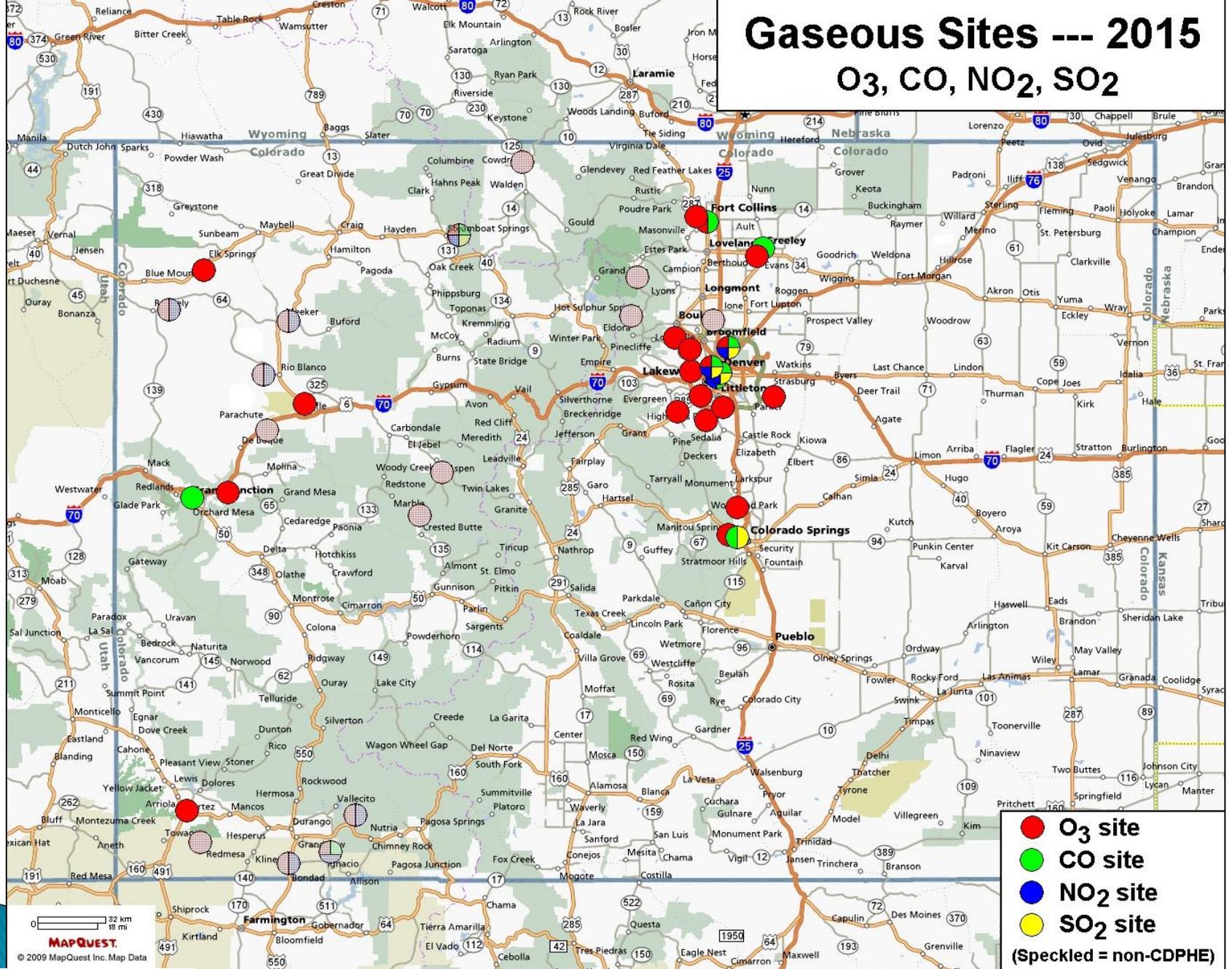
Criteria Pollutants  
O<sub>3</sub>, CO, NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, Pb

NOTE: Other locations had TSP monitoring (no longer a criteria pollutant)



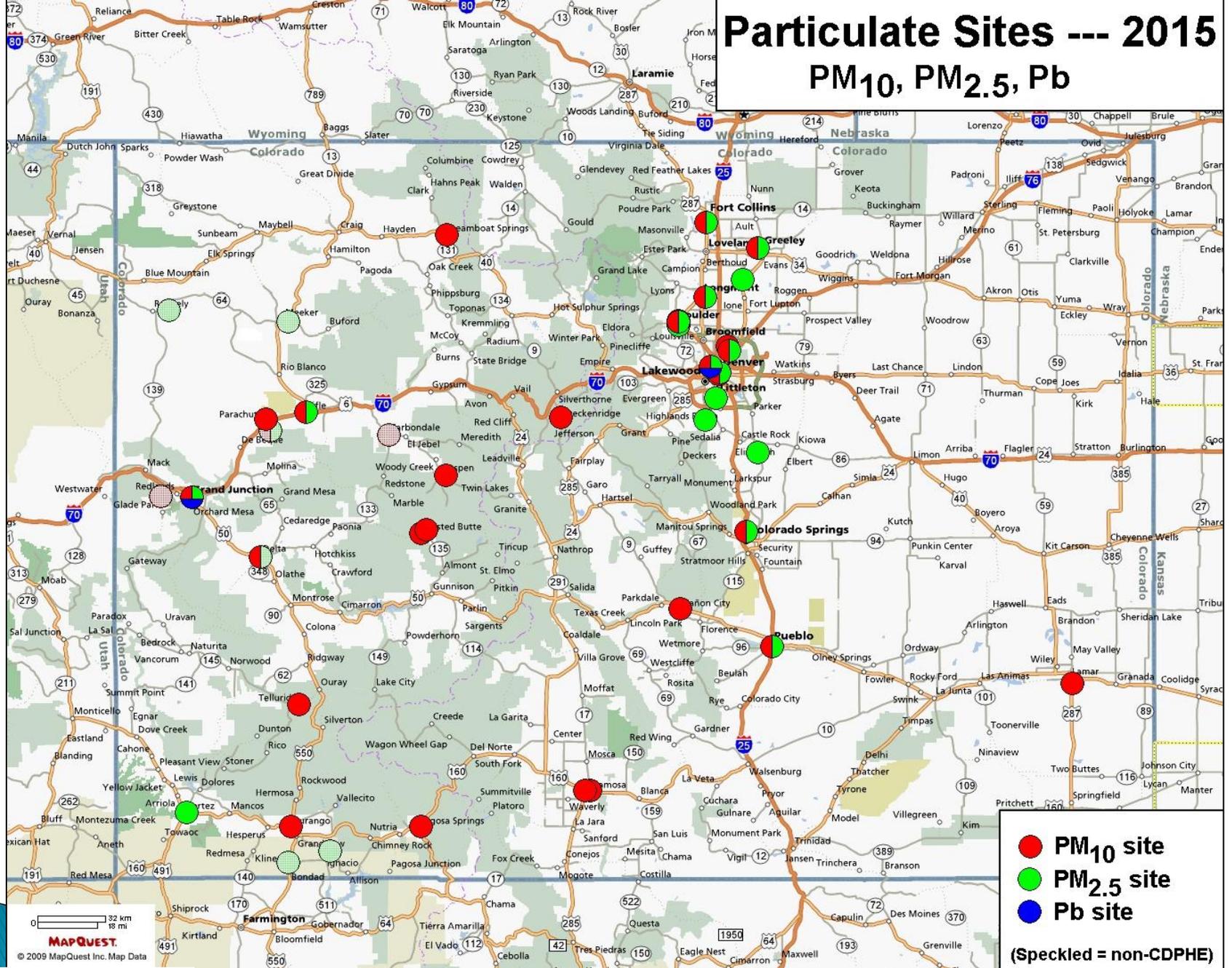
# Gaseous Sites --- 2015

## O<sub>3</sub>, CO, NO<sub>2</sub>, SO<sub>2</sub>



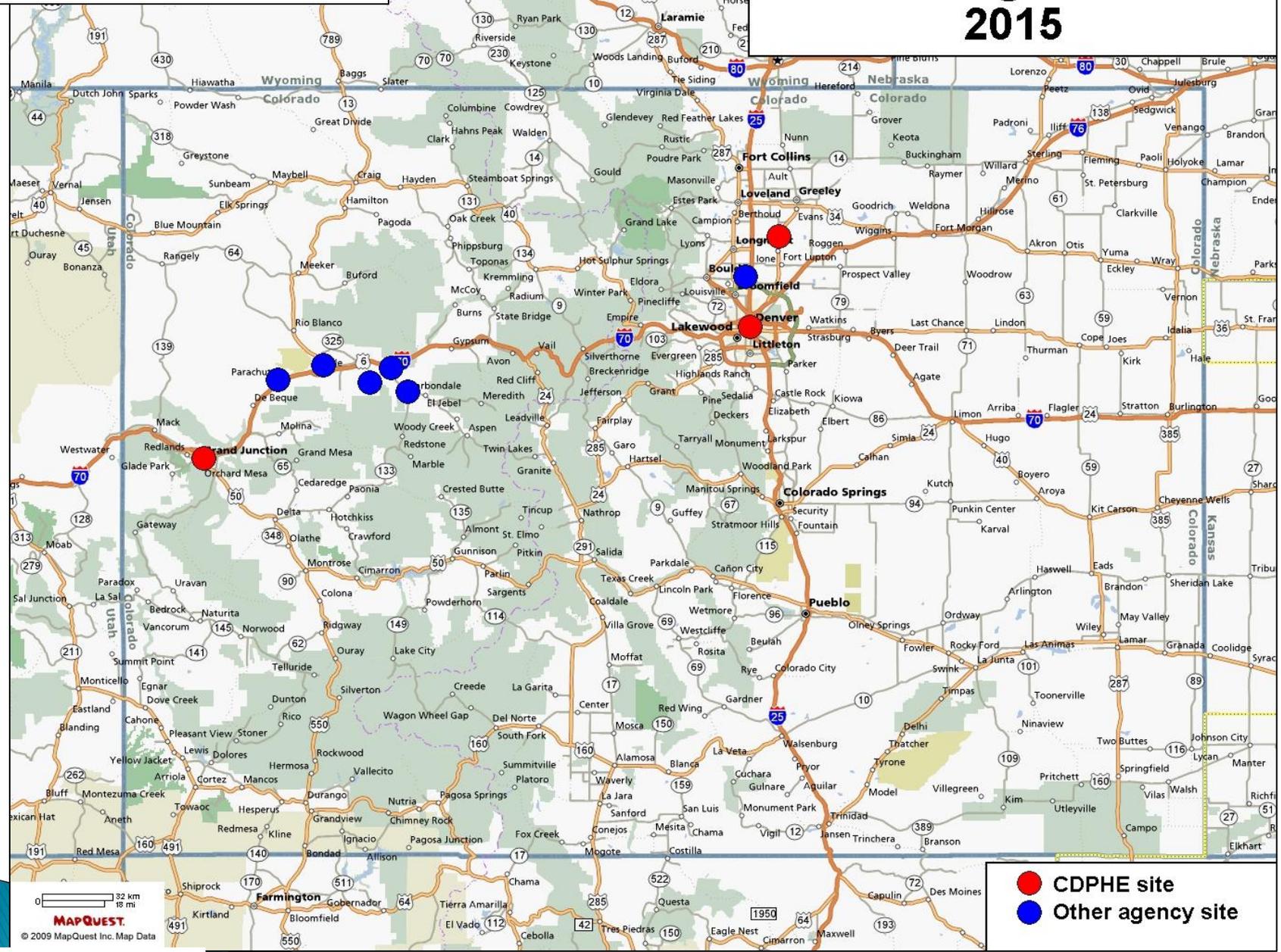
# Particulate Sites --- 2015

## PM<sub>10</sub>, PM<sub>2.5</sub>, Pb



• No EPA requirements

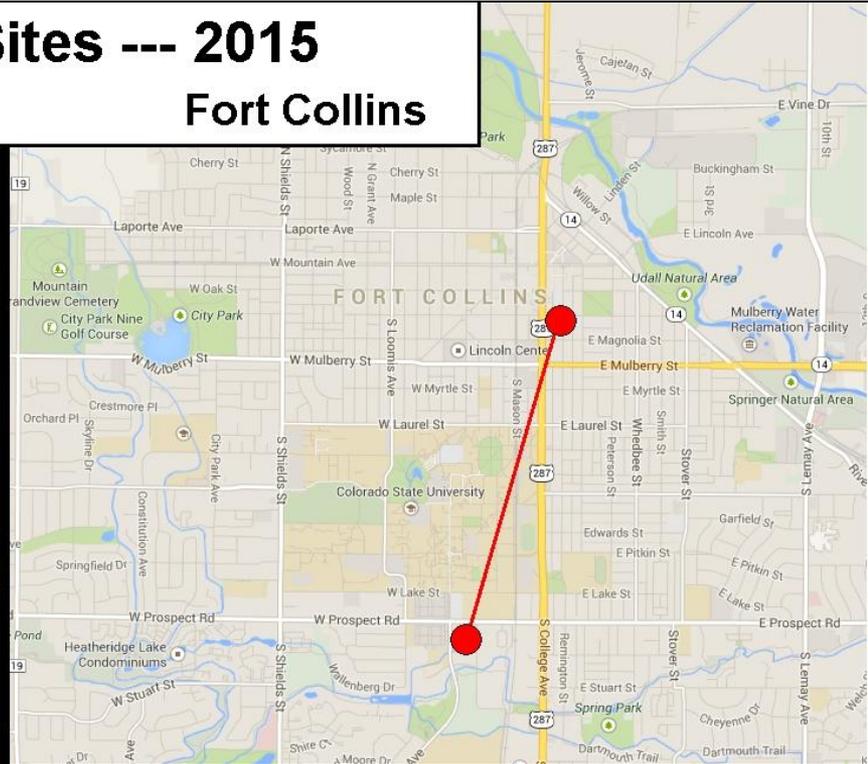
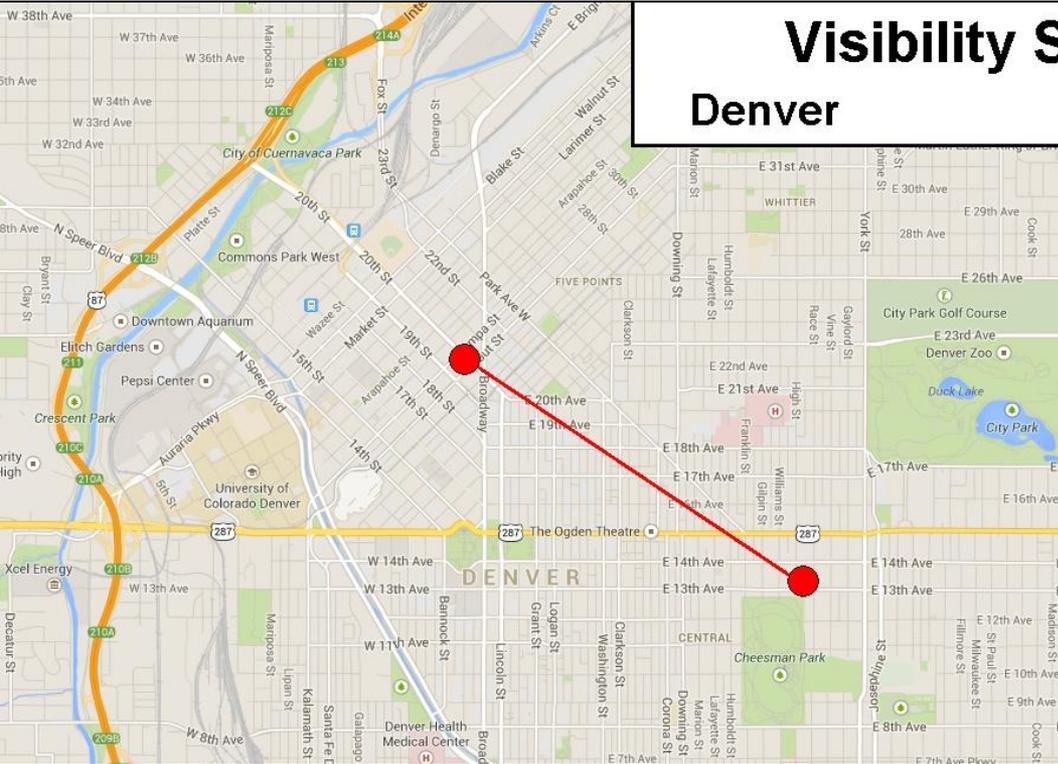
# Toxics / Organics sites 2015



- No EPA requirements
- State standard

# Visibility Sites --- 2015

## Denver Fort Collins



# Other requirements

- ▶ State is the designated air pollution control agency for Colorado
- ▶ Annual Network Plan
- ▶ 5–Year Network Assessment
  - Most recent is 2015
- ▶ Exceptional events
- ▶ Reports available at:
  - [http://www.colorado.gov/airquality/tech\\_doc\\_repository.aspx](http://www.colorado.gov/airquality/tech_doc_repository.aspx)

# Monitoring site costs

- ▶ Cost for a monitoring site:
  - Shelter = \$15,000 – \$35,000
  - Analyzer = \$9,000 – \$32,000
  - Meteorological = \$5,000 – \$10,000
  - On-site QA equipment = \$2,000 – \$25,000
  - Data logging/communications = \$10,000
  - Installation = \$1,000 – \$20,000
- ▶ \$60,000 – \$80,000 for single-pollutant site with meteorology
- ▶ Multi-pollutant site can cost \$250,000 or more
- ▶ Operational:
  - Utilities
  - Filters/consumables/repairs
  - Data processing/QA/QC



# Questions?

