Nature of PM2.5 in the San Joaquin Valley

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California Air Resources Board
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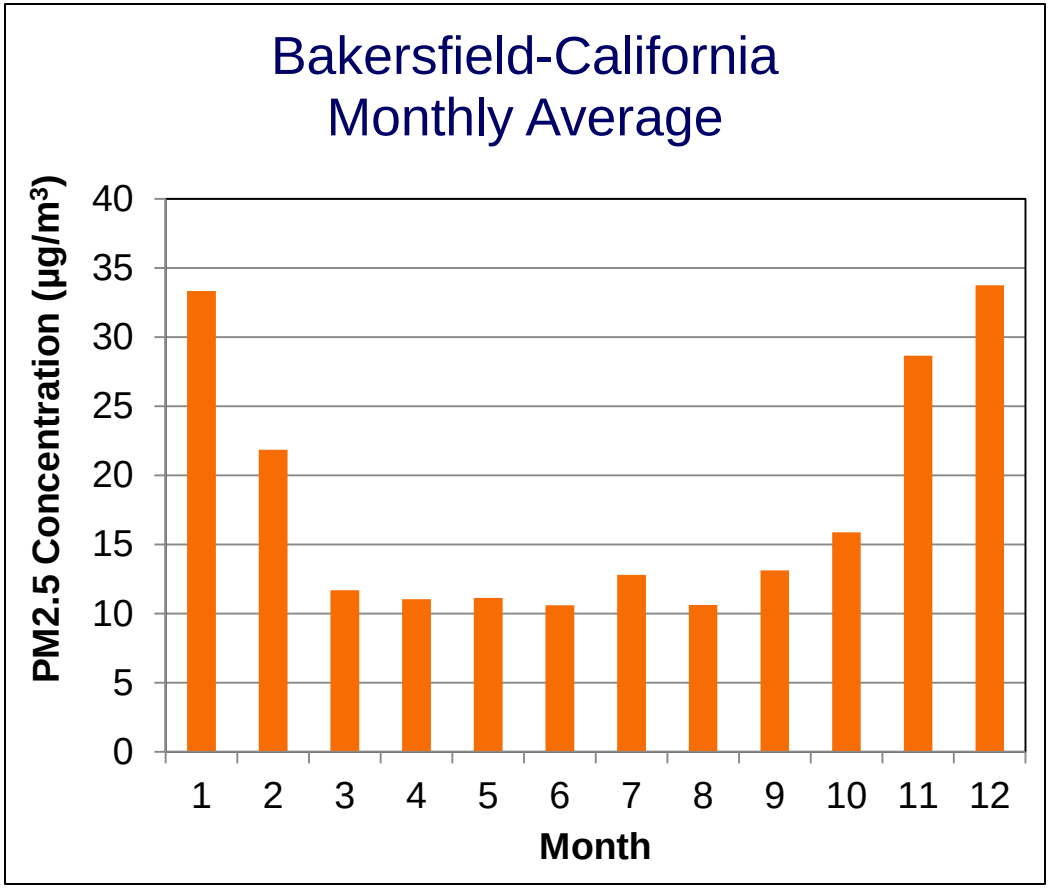
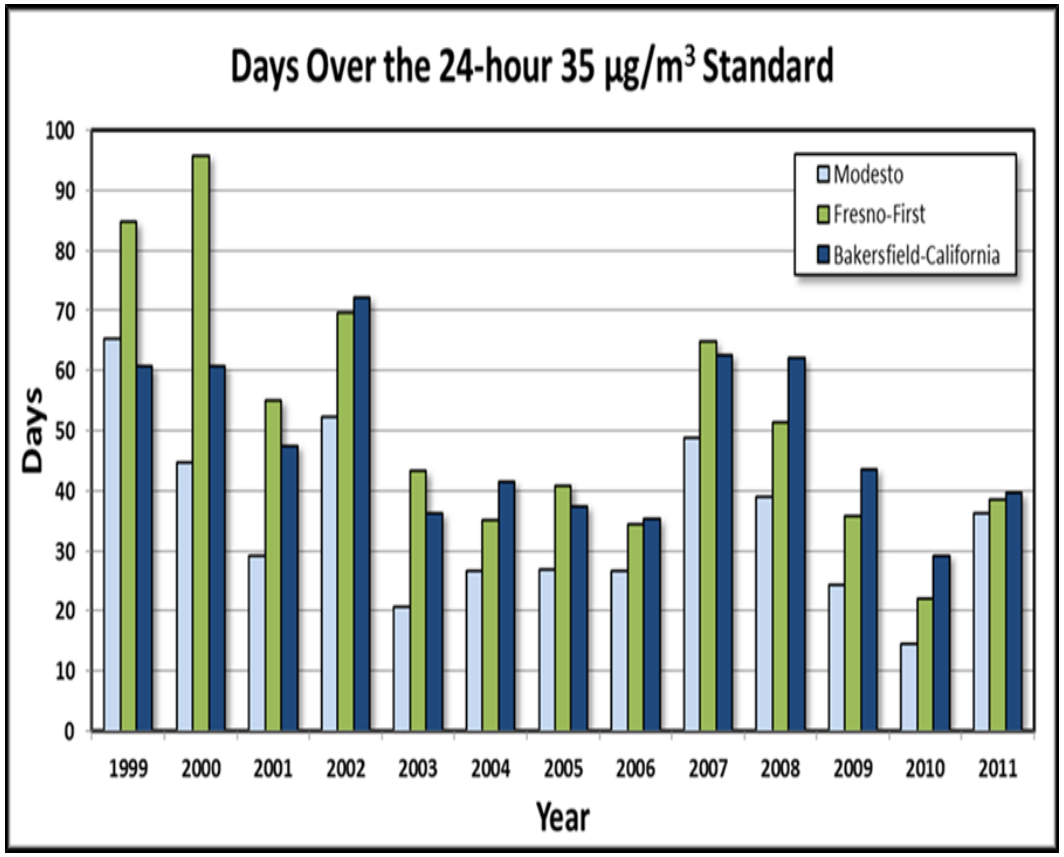
PM Characterization

High PM2.5 Levels Occur In Winter



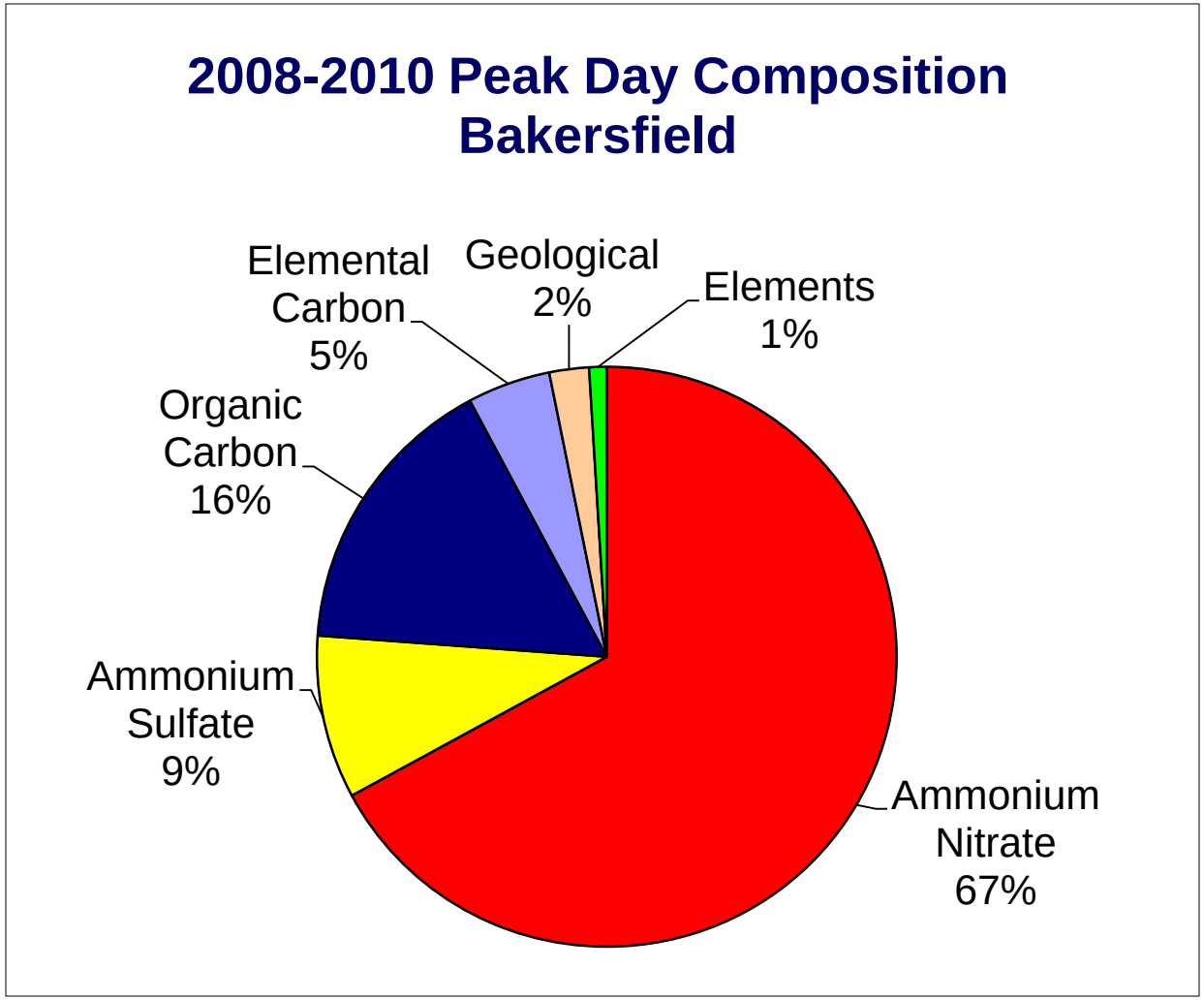
- PM2.5 builds up over several days or weeks (episode)
- Episodes generally occur during periods with:
  - stagnation
  - cool temperatures
  - high humidity
  - low mixing depths

Challenge of 24-Hour Standard

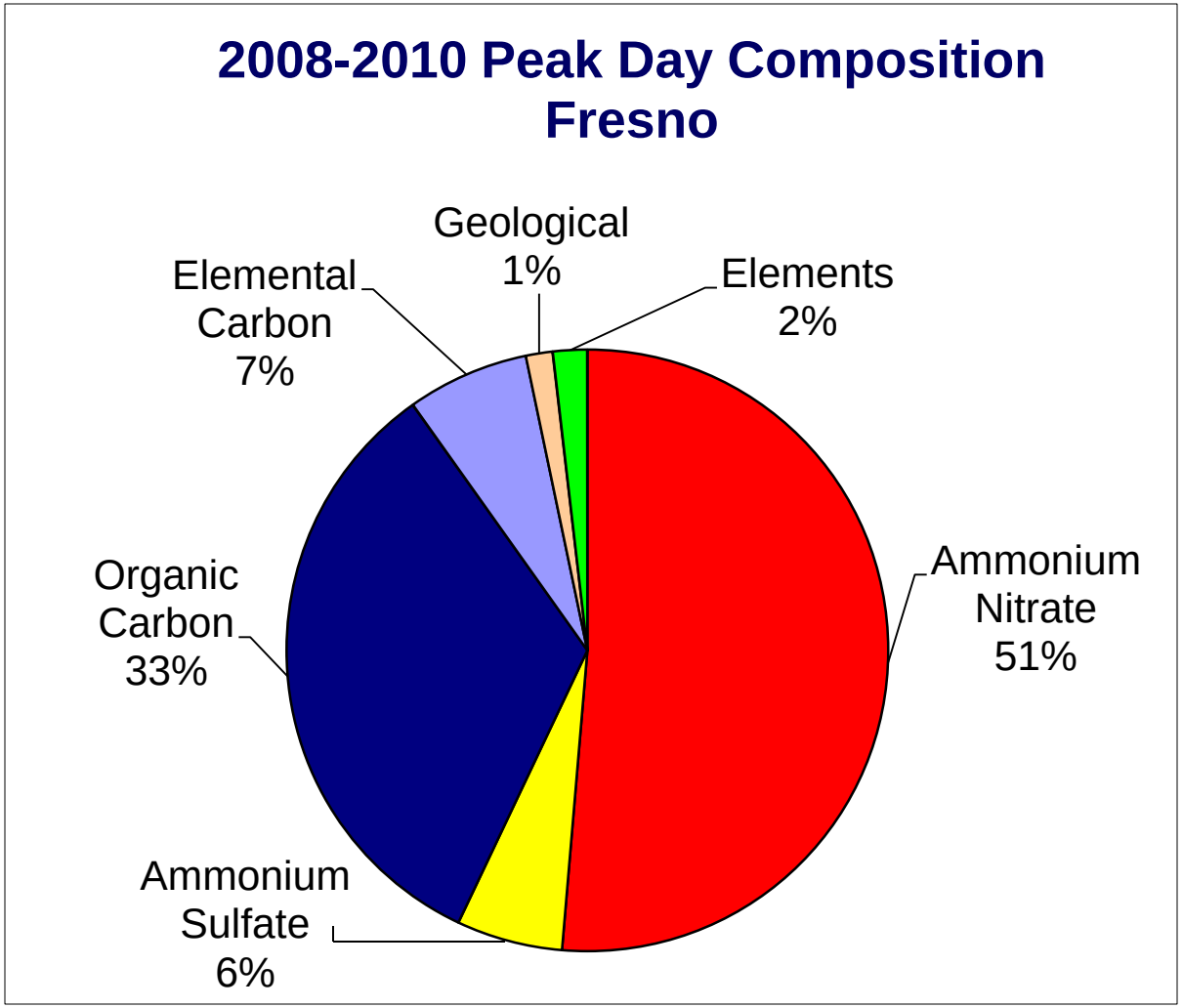


- Focuses on most severe days
- Strongly influenced by meteorology
- Impacts of episodic emissions such as residential wood burning

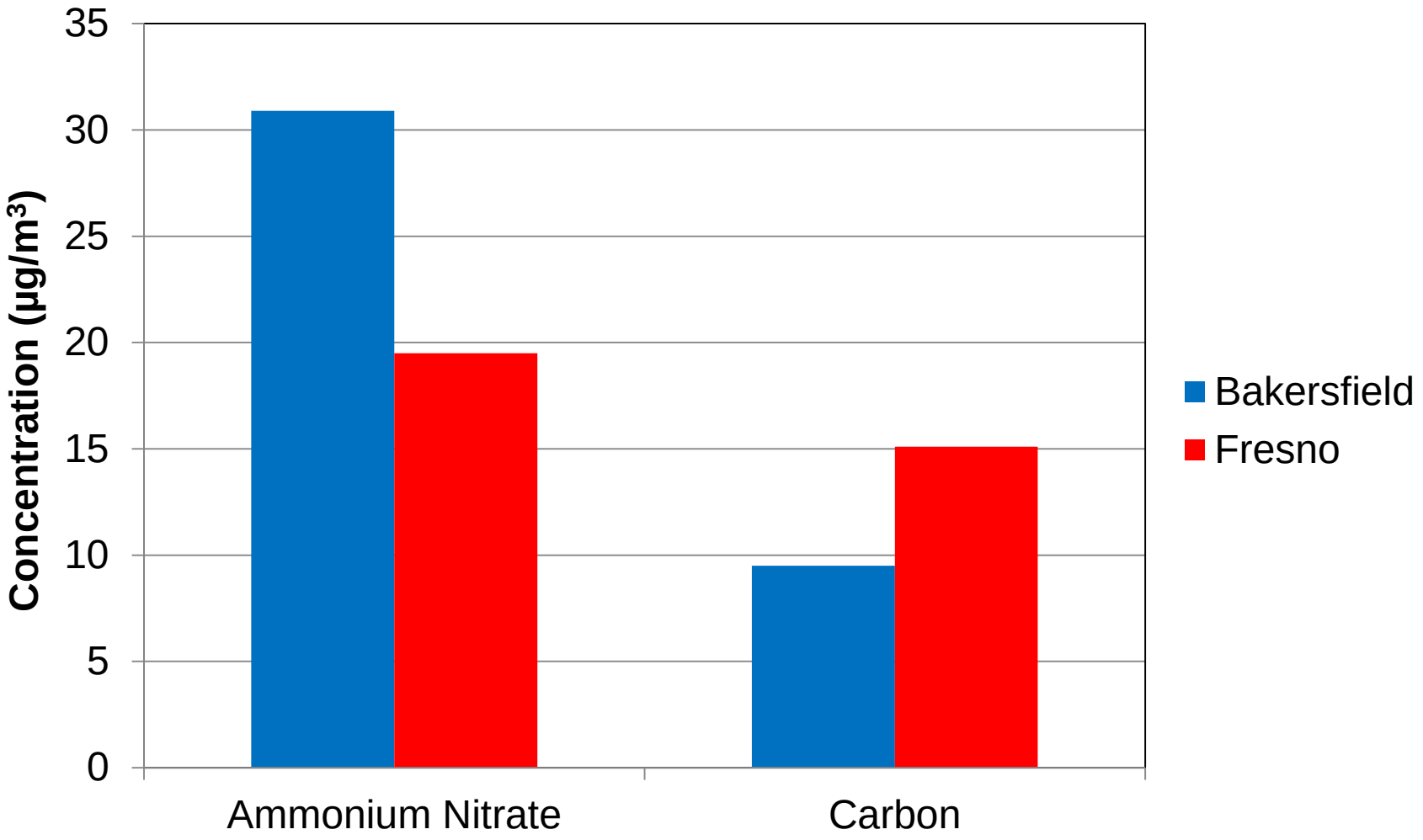
Monitored PM2.5 Chemical Components



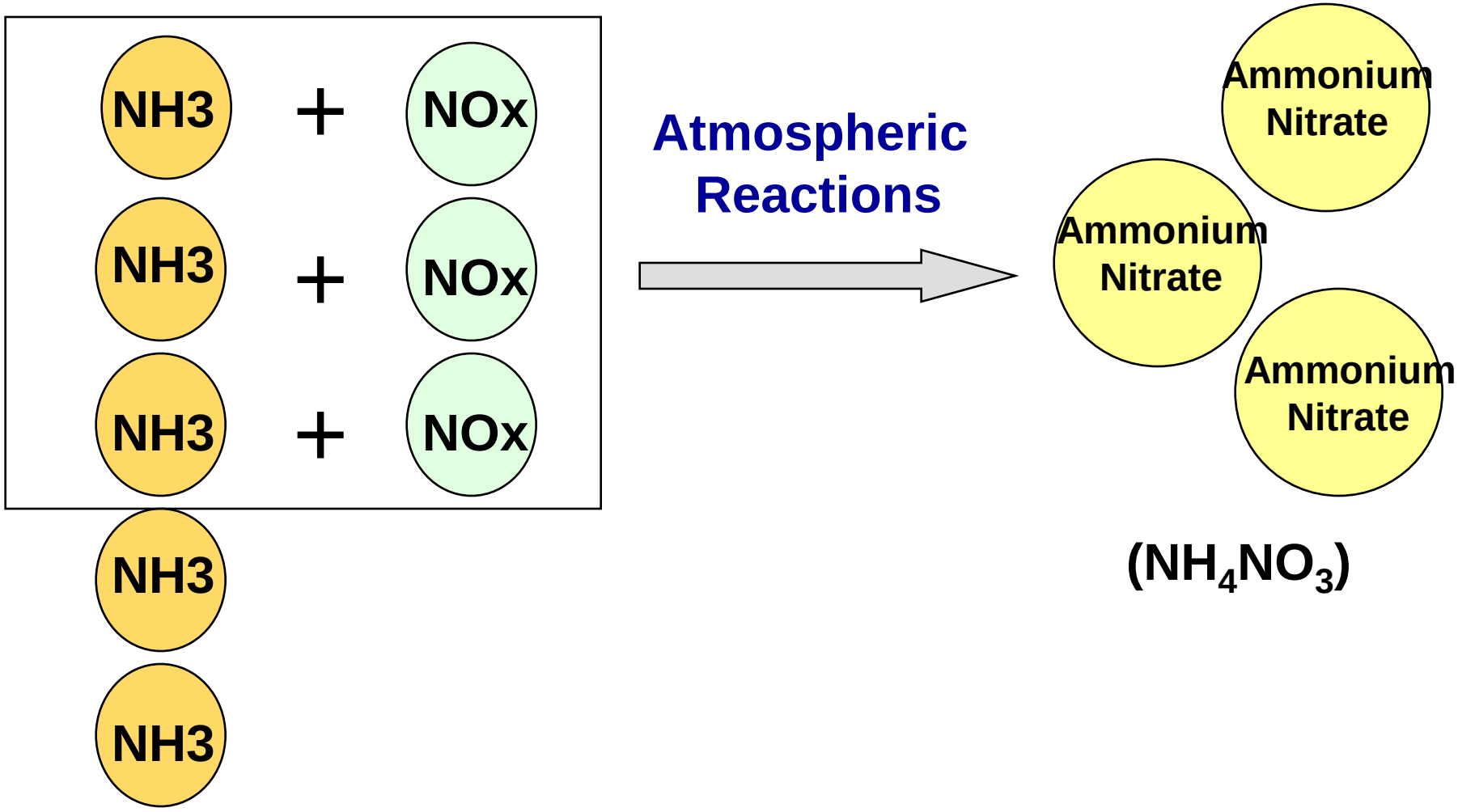
Monitored PM2.5 Chemical Components



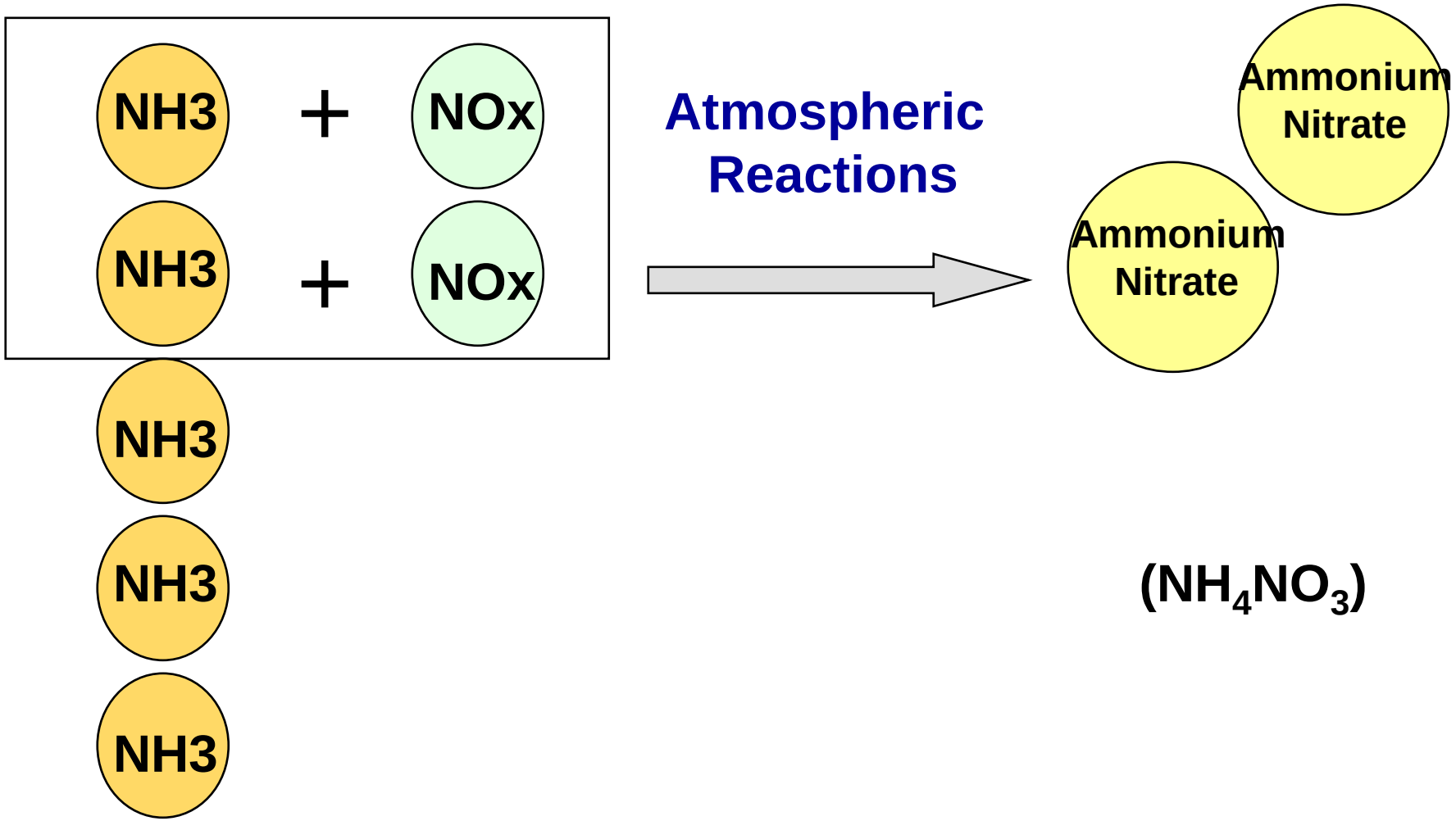
Monitored Concentrations of Key Species



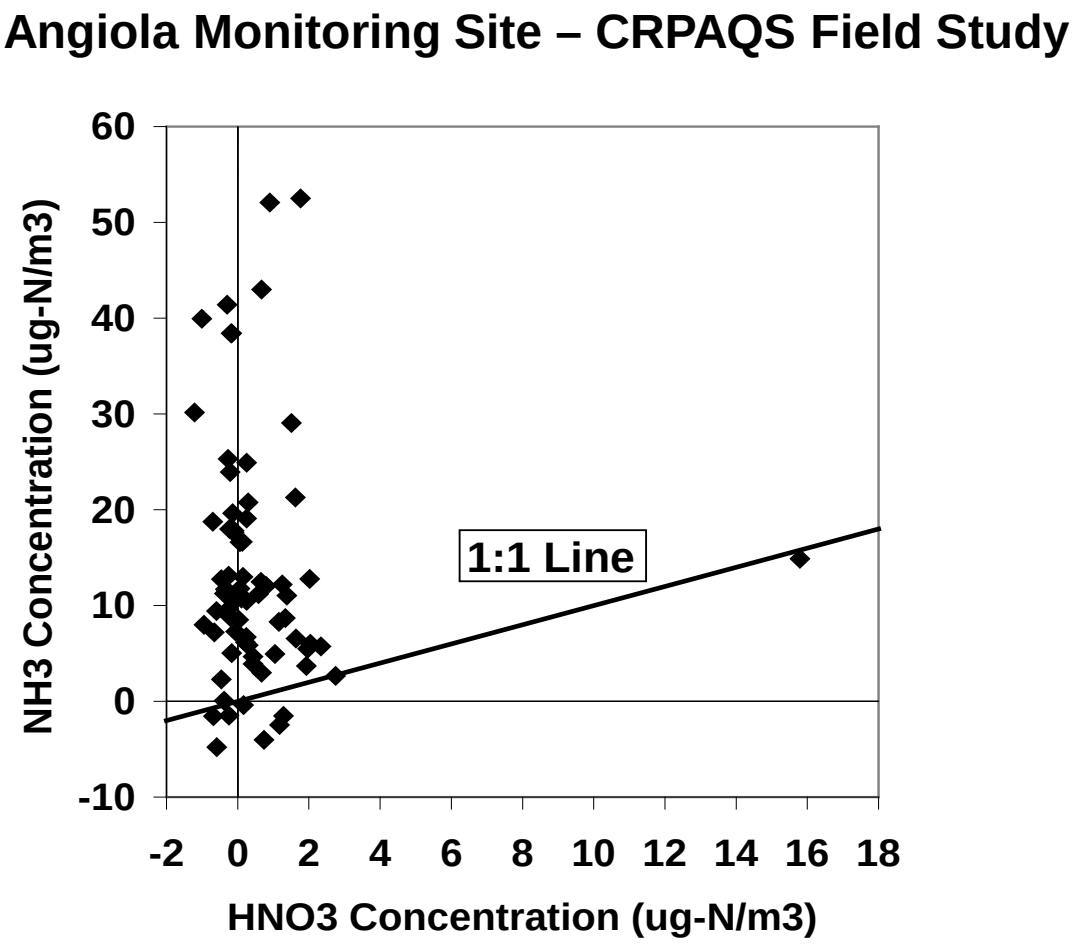
Ammonium Nitrate Formation (Excess Ammonia)



Ammonium Nitrate Formation (NOx Control)



Measured Ammonia Much More Abundant than Nitric Acid



Linkage to Modeling

Role of Air Quality Data in Attainment Demonstration

- Calculate design values
- Select modeling base year
- Weight of Evidence

Design Value Calculation

- Defines air quality starting point
- Uses measured PM2.5 concentrations
- Based on 98th percentile (generally between the 2nd and 8th highest value)
- Calculated as 3-year average

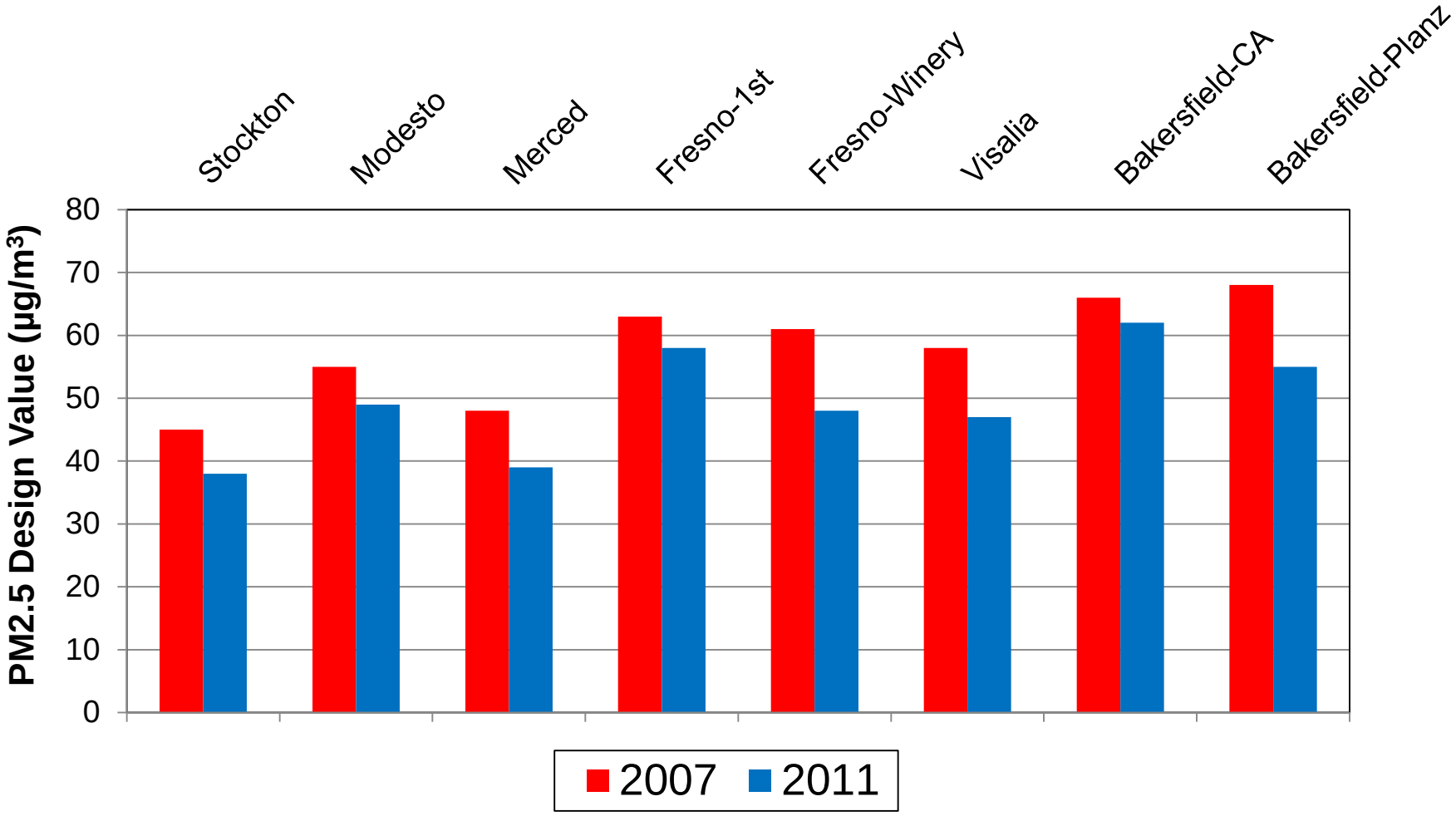
Selecting Base Year For Planning

- Appropriate base year considers air quality and meteorology
- Base year with stagnant meteorology is a conservative approach
- Attainment demonstration estimates change in design value between base year and attainment year

2007 Base Year

- 2007 meteorology one of most conducive to PM2.5 formation
- Includes various types of meteorology conducive to high PM2.5
- 2007 PM2.5 98th percentile concentrations highest in recent years
- Excludes influence of 2008 wild fires

Design Values*

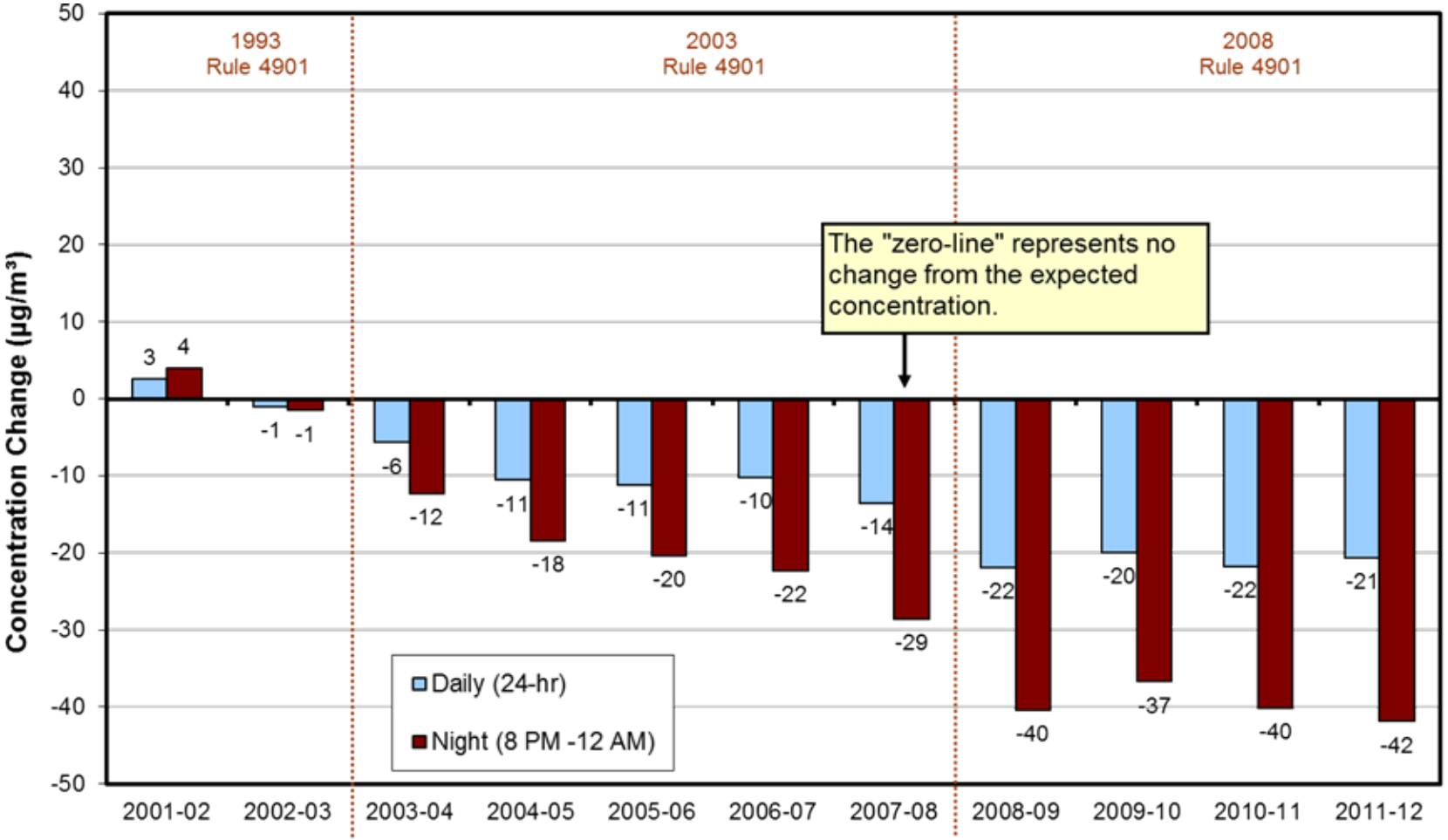


* Year assigned to design value reflects last year of three year period

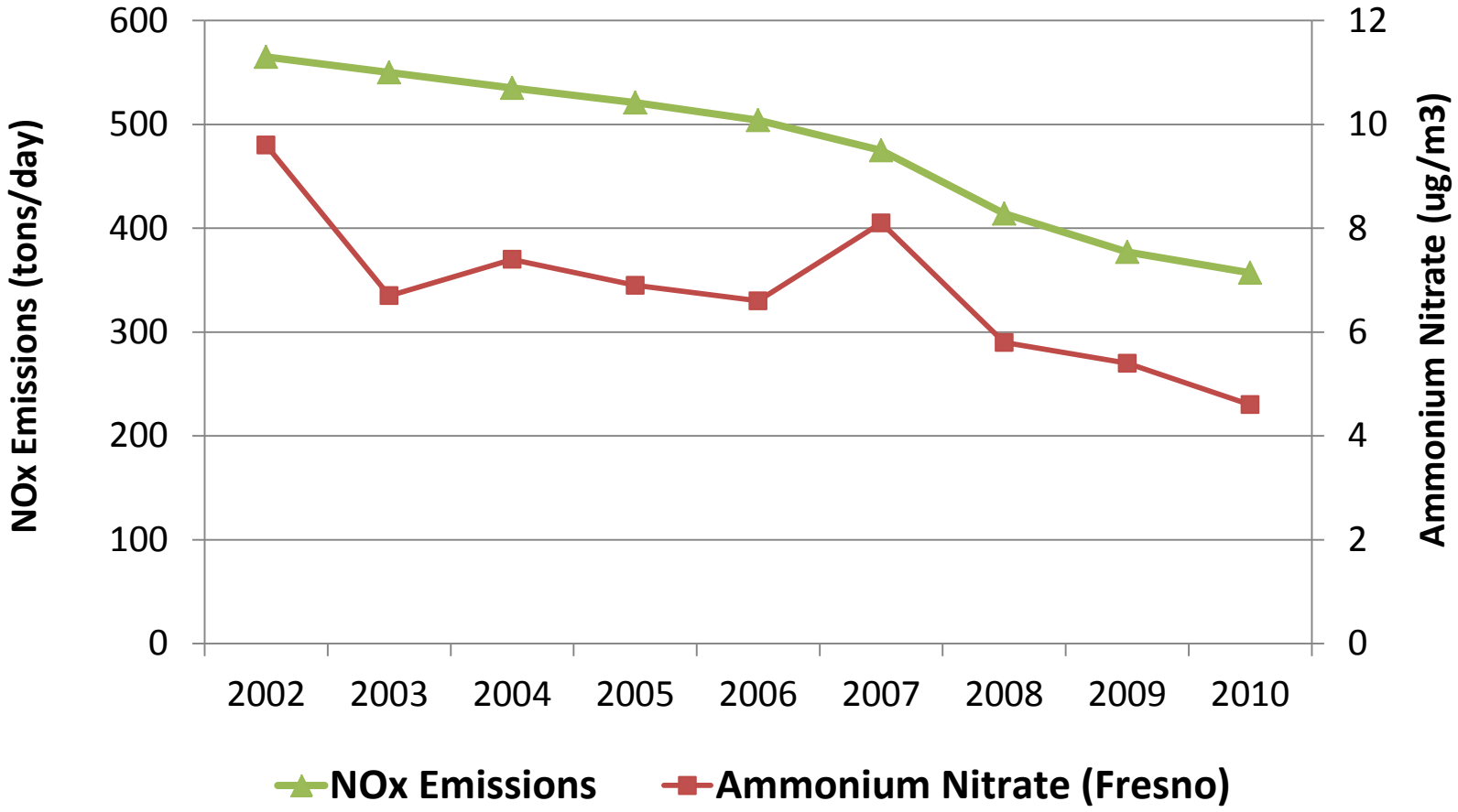
Weight of Evidence

- Attainment demonstration based on weight of evidence approach
- Collective assessment of control approach based on:
  - air quality grid modeling
  - source-receptor modeling
  - observed air quality trends
  - emission trends
  - field/modeling studies

Effectiveness of Wood Burning Controls



Effectiveness of NOx Controls



Future NOx Emission Trends