Ammonia and PM NAAQS : Policy Considerations

Science and Policy Forum
Ammonia Pollution and Fine Particles

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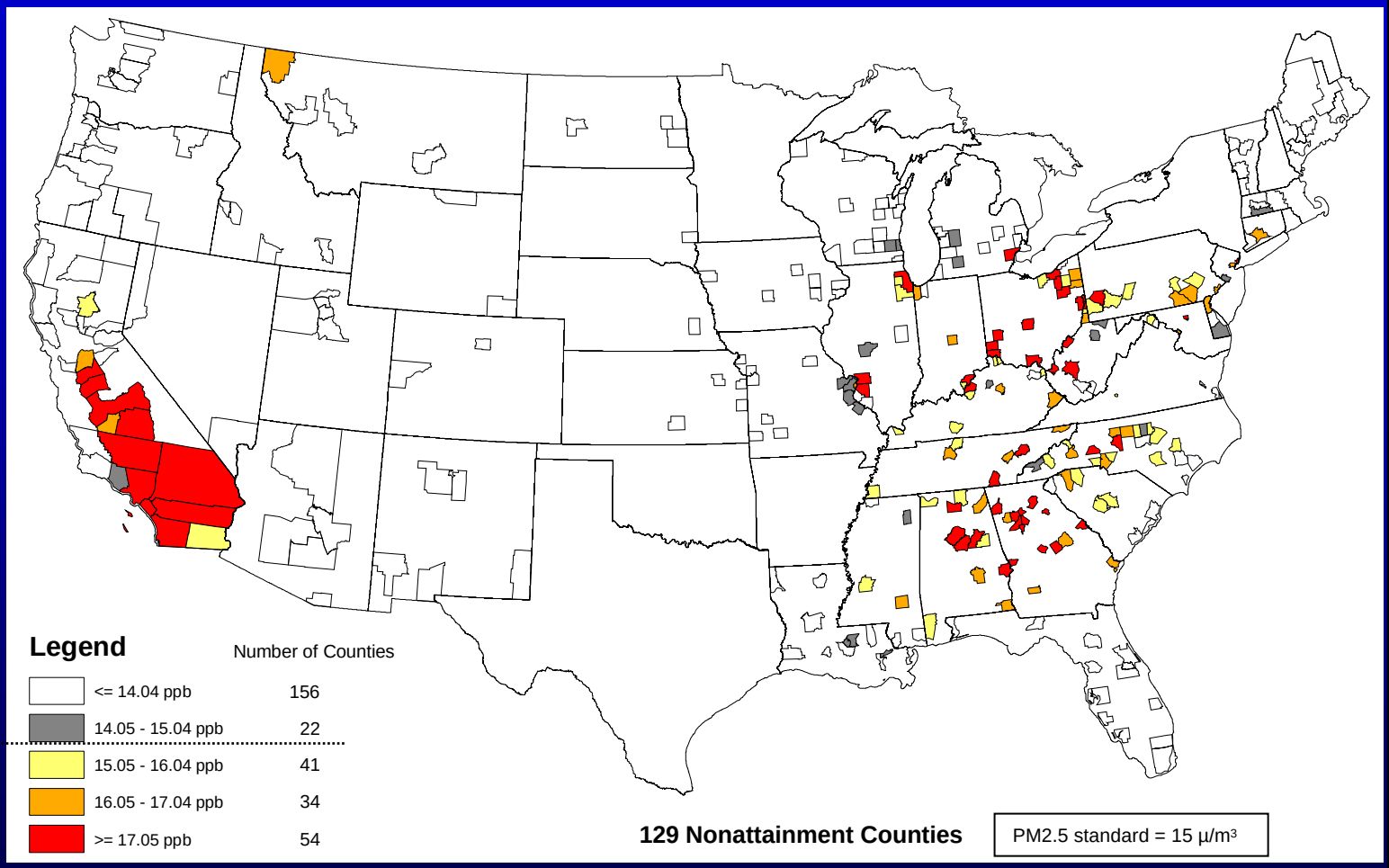
Current Fine Particle ($PM_{2.5}$) Concentrations (1999-2001)

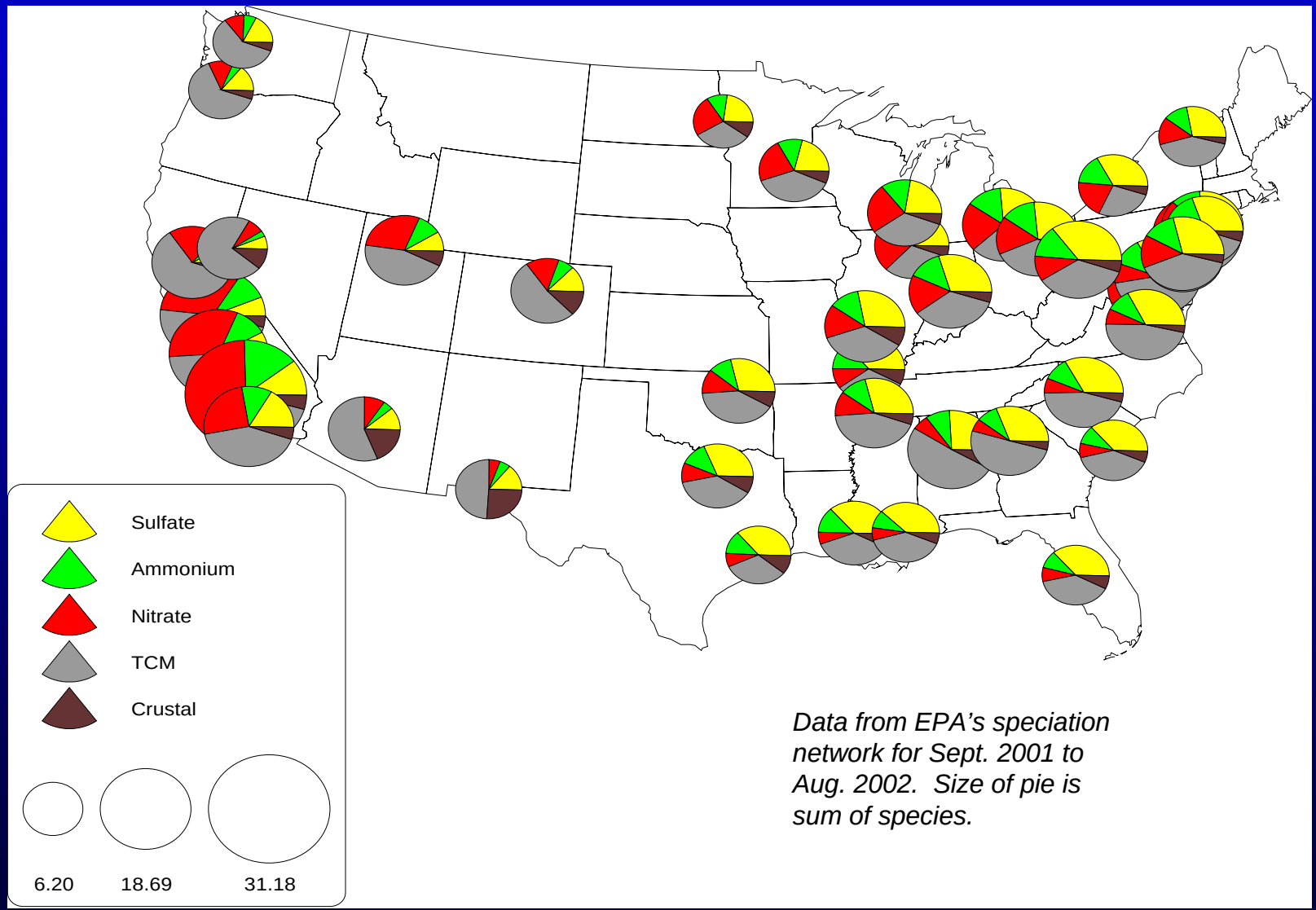


Note: Based on 1999-2001 monitoring data of counties with monitors that have three years of complete data.

- **There are 129 counties nationwide (114 counties in the East) that are likely to exceed the annual fine particle standard of 15 µ/m³.**

- **65 million people (43 million people in the East) live in counties that would not meet this standard.**

Main Components of $PM_{2.5}$ in Urban Areas



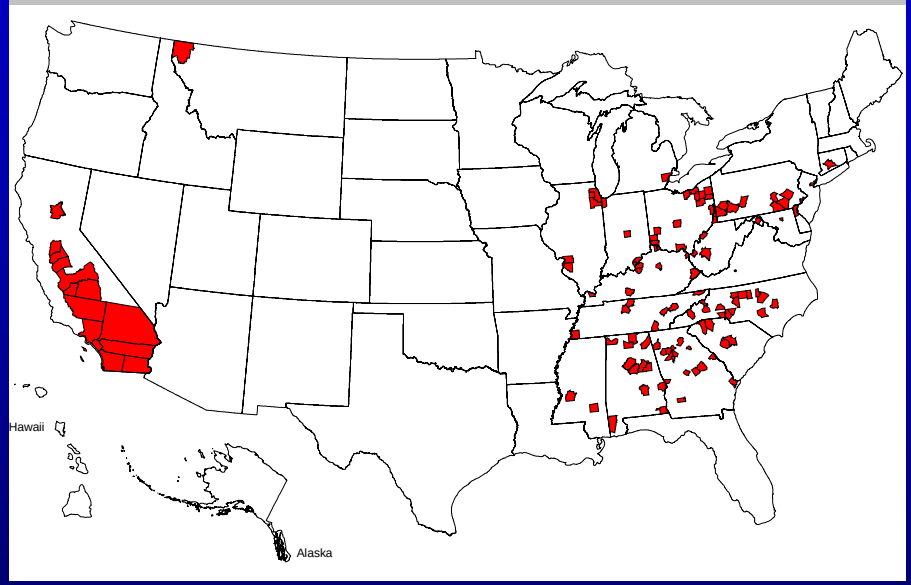
Data from EPA's speciation network for Sept. 2001 to Aug. 2002. Size of pie is sum of species.

Addressing Regional Transport

- EPA is pursuing two mechanisms to address transport in the future:
  - Clear Skies Act
    - Legislation that addresses transported air pollution from power plants in addition to other environmental concerns (e.g., mercury).
  - Transport Rule
    - Regulatory approach that uses existing CAA mechanisms to address transported air pollution from all potential transport sources.
  - Regional Haze long-term strategies

Widespread improvement in attaining $PM_{2.5}$ NAAQS with current mobile rules/Clear Skies (or transport rule)

Counties Exceeding the Annual Fine Particle Standard in 2001



A significant change in the regional/background chemical climate

- Additional pressure on remaining local sources for VOC/PM control
- The 'Post sulfur' era?

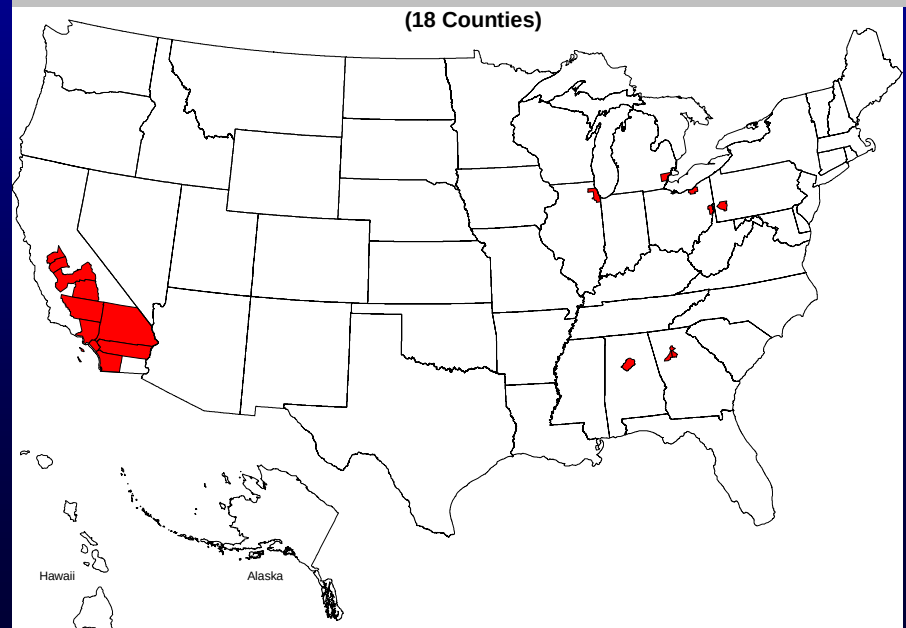
Note: This analysis shows the counties that would come into attainment due to Clear Skies alone in 2020. Additional federal and state programs are designed to bring all counties into attainment by 2017 at the latest.

Widespread $PM_{2.5}$ attainment in 2020:

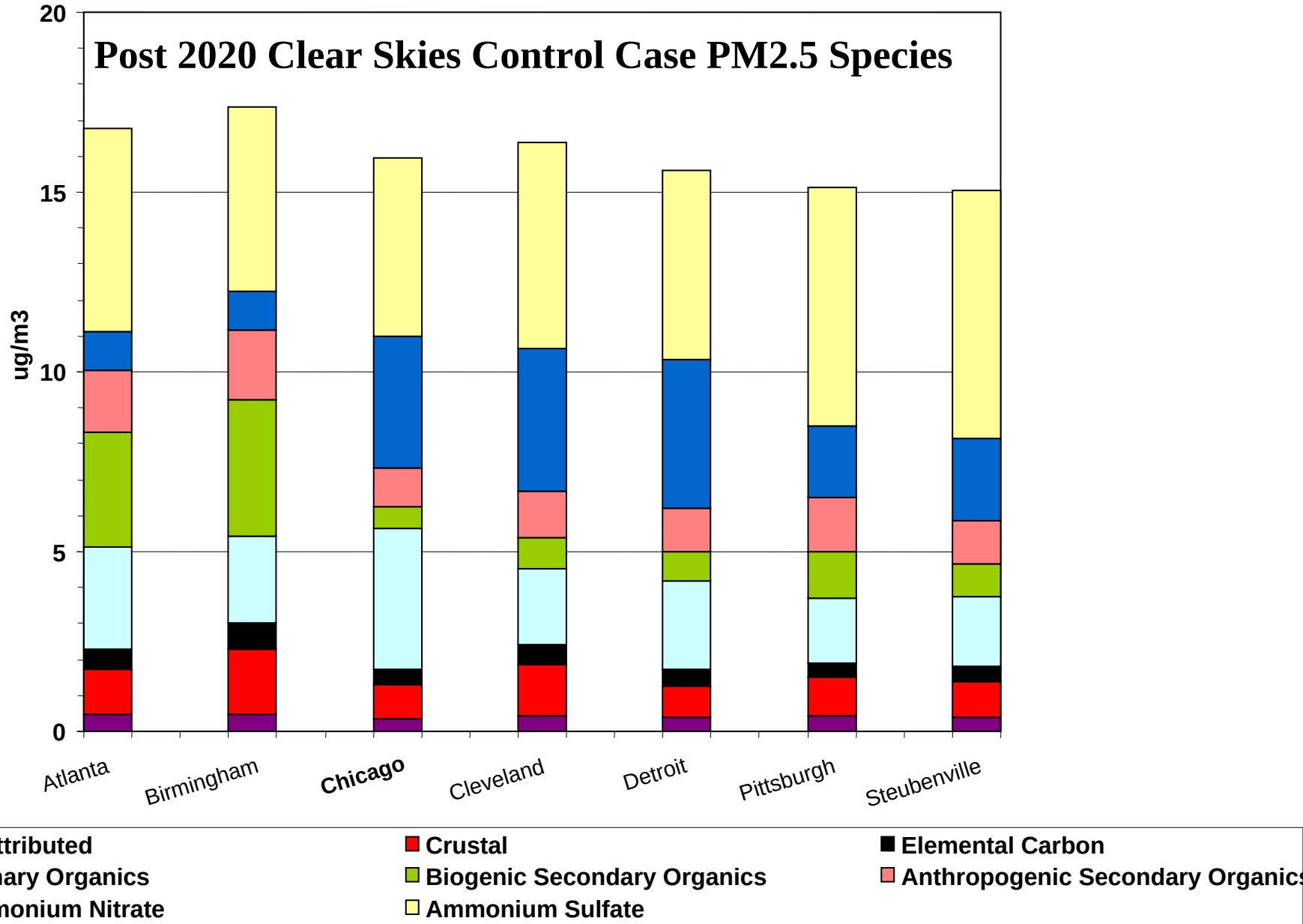
- Tier 2, HD Diesel, NOx SIP call, other programs
- Projected regional SOx/NOx reductions from Clear Skies Act, or regional transport rule/regional haze programs
- Doesn't include SIP local/regional measures

Remaining Counties Likely to Exceed the Annual Fine Particle Standard with Clear Skies in 2020

(18 Counties)



What about residual problems?

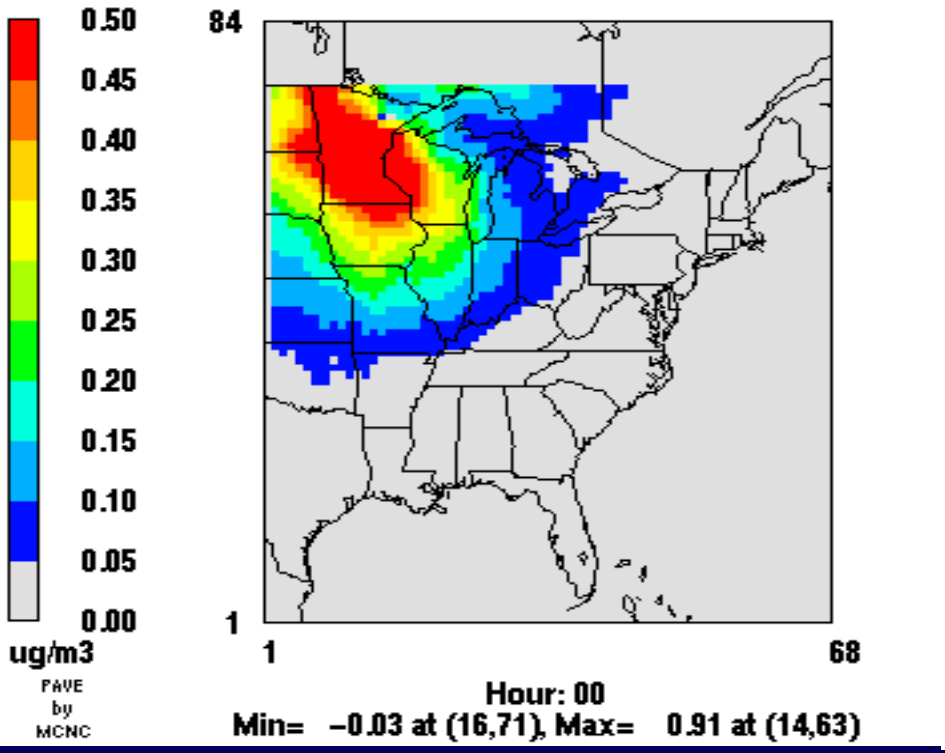


The Role of NOx in Multi-Pollutant Control Strategies

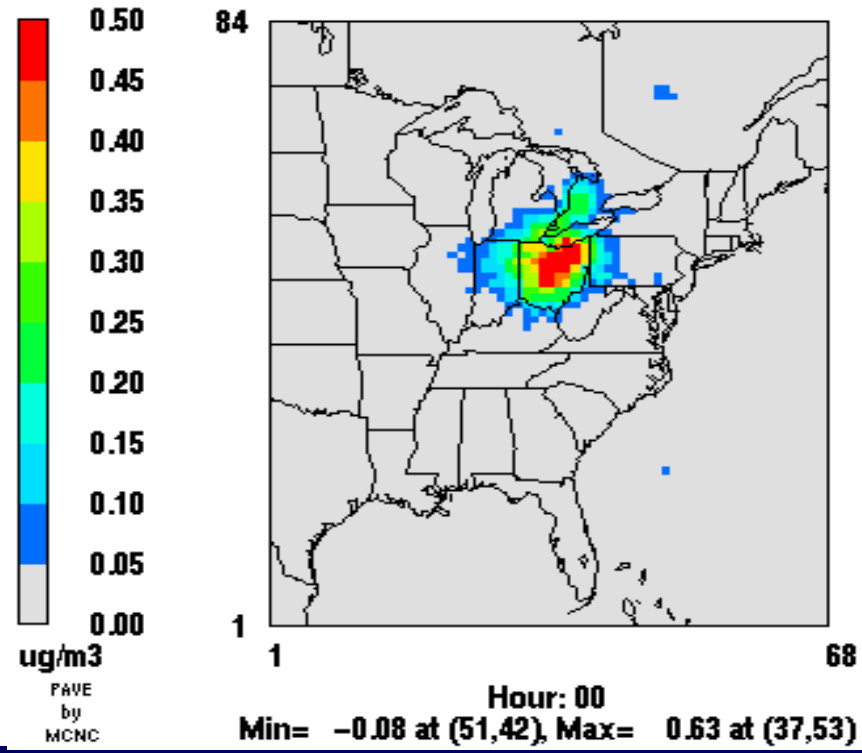
- **Issue:**
  - Given the science of sulfate and nitrate formation, it is theoretically possible that nitrate increases will occur when SO2 emissions are reduced
- **We performed a "scoping" analysis to quantify**
  - Modeled an available, though somewhat dated, 2020 Base Case and two point source emissions reduction scenarios: SO2 only and SO2 + NOx --- approximately what is in Clear Skies for 2020
- **Findings**
  - SO2 emissions reductions will cause nitrate increases that are large enough to matter
  - Increases are largest in the North; but effects also clearly evident in the South

Impact on Annual Average Particle Nitrate of SO2+NOx in 2010

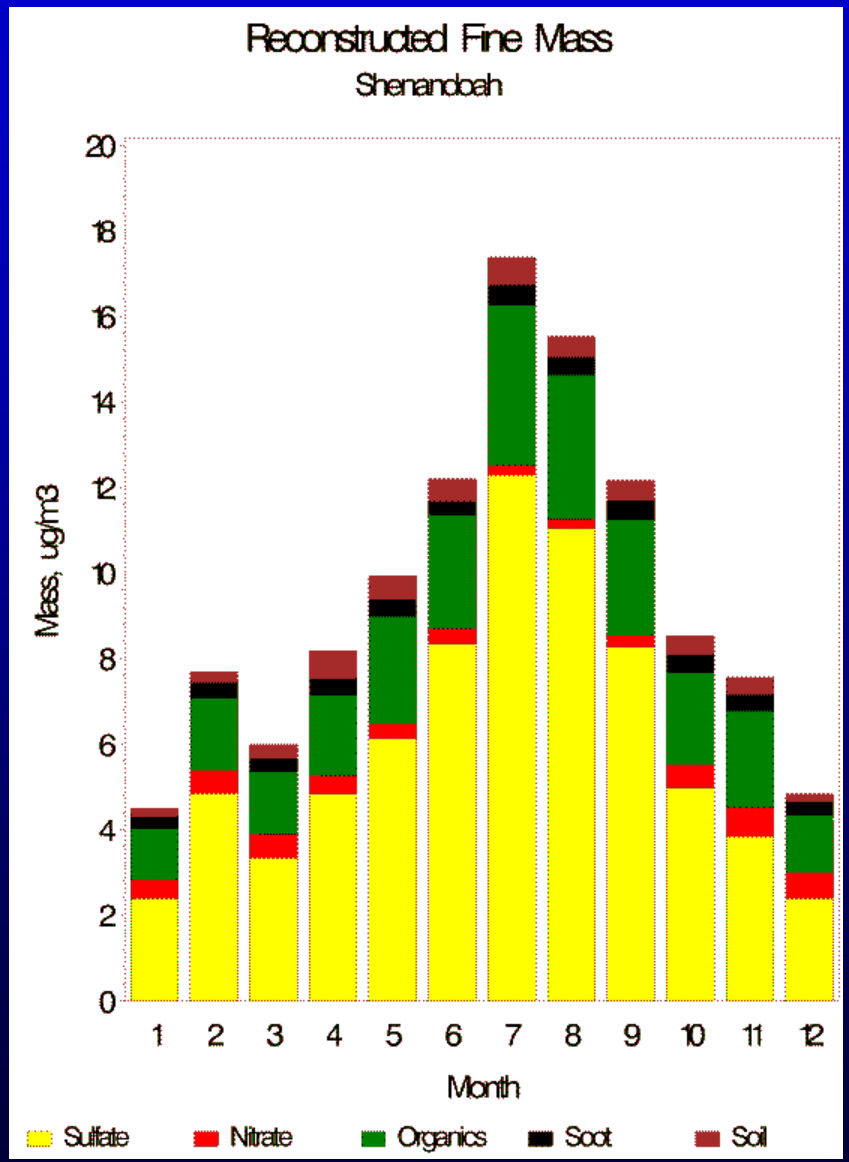
Minnesota

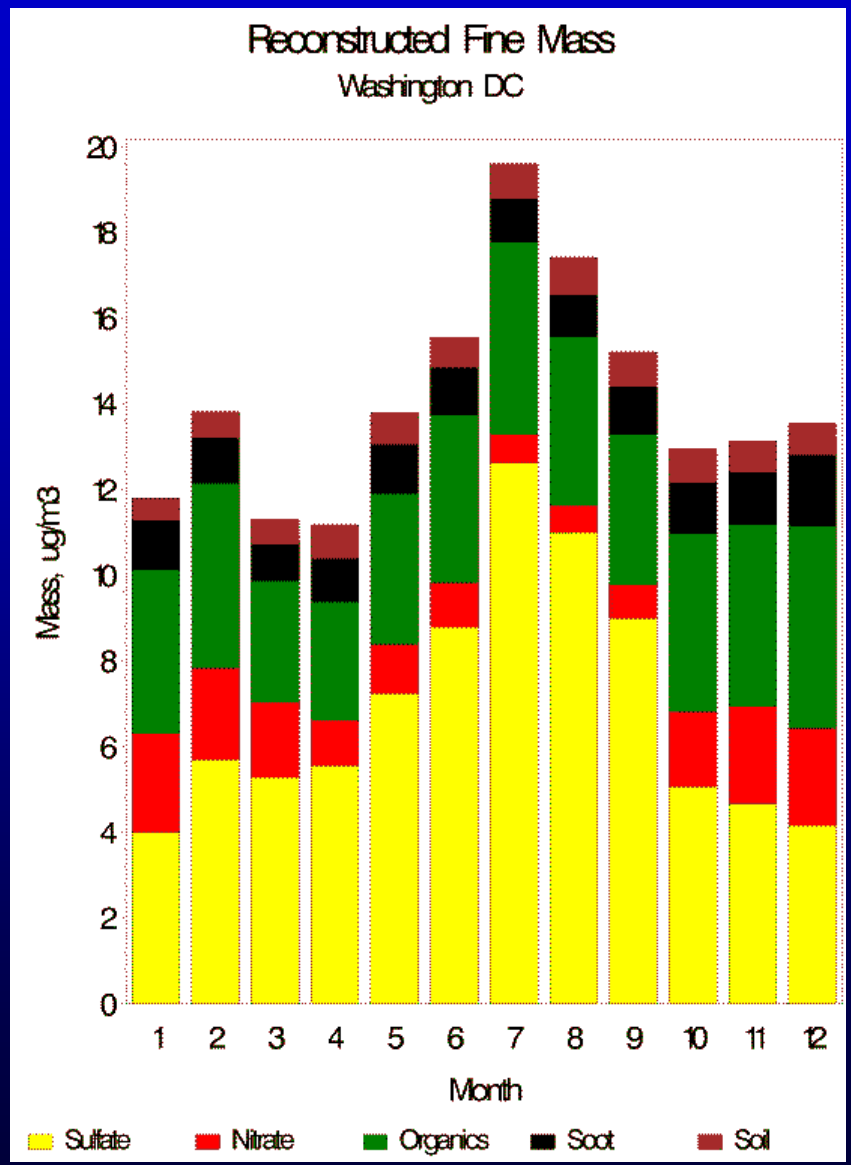


Ohio



Chemical Composition - Rural/Urban





Ammonia/PM Considerations

- Effectiveness of reducing anions (sulfate/nitrate) vs. cations (ammonium/acid)
  - i.e. emissions of SOx/NOx vs. NH3
    - chemistry only (Pandis results)
    - costs, availability of controls, numbers of sources
    - human exposure to PM mass
    - Potential health effects of resulting PM and gases (e.g. acid fog)