



What do we know about Regional Haze in the MANE-VU Region?

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NH DES
**MANE-VU Board
Meeting**
June 7, 2007

Mid-Atlantic/Northeast Visibility Union

MANE-VU



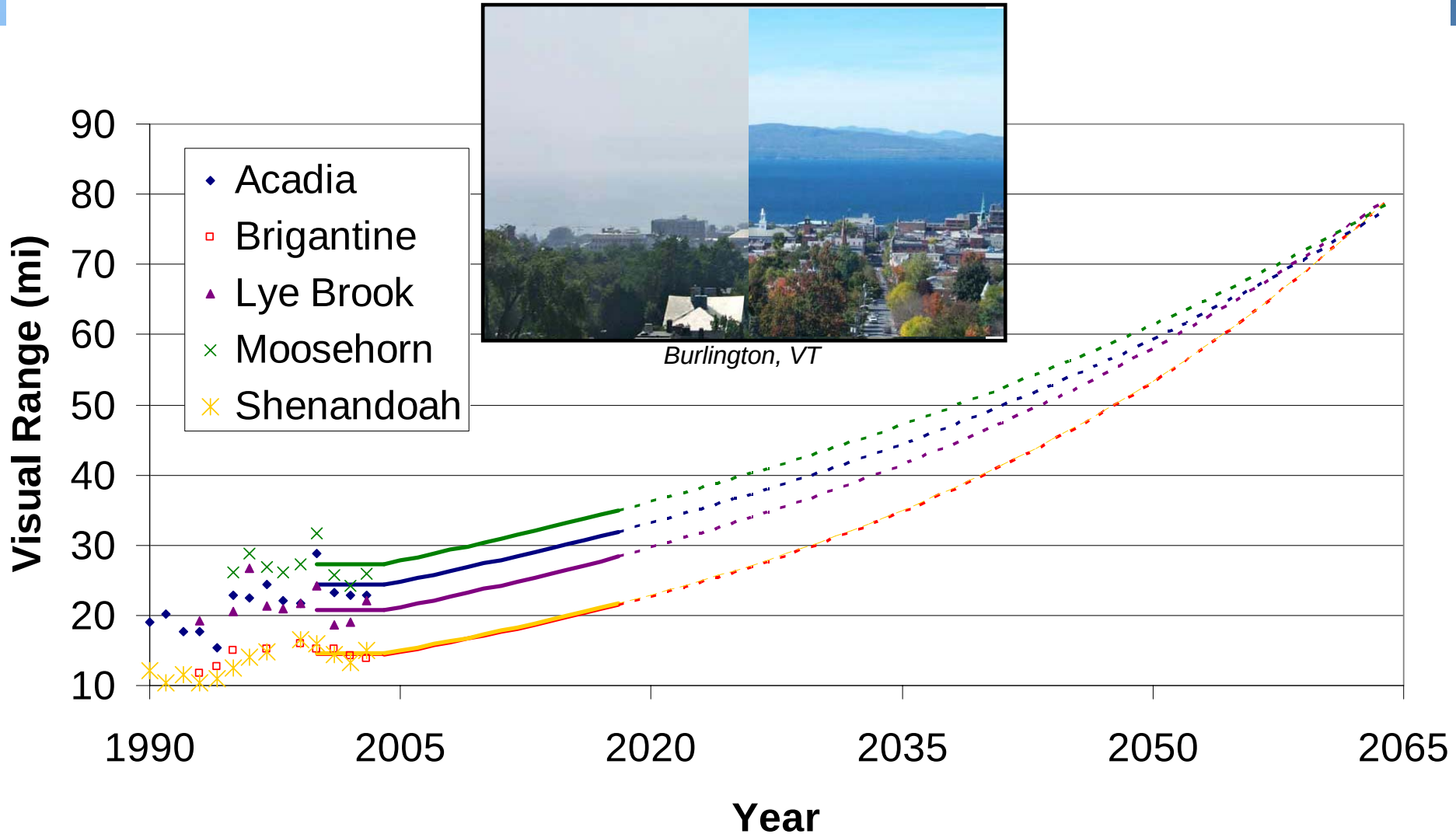
The Drivers: CAA §169A

“...prevention of any future, and the remedying of any existing, impairment of visibility in... which impairment results from manmade air pollution”

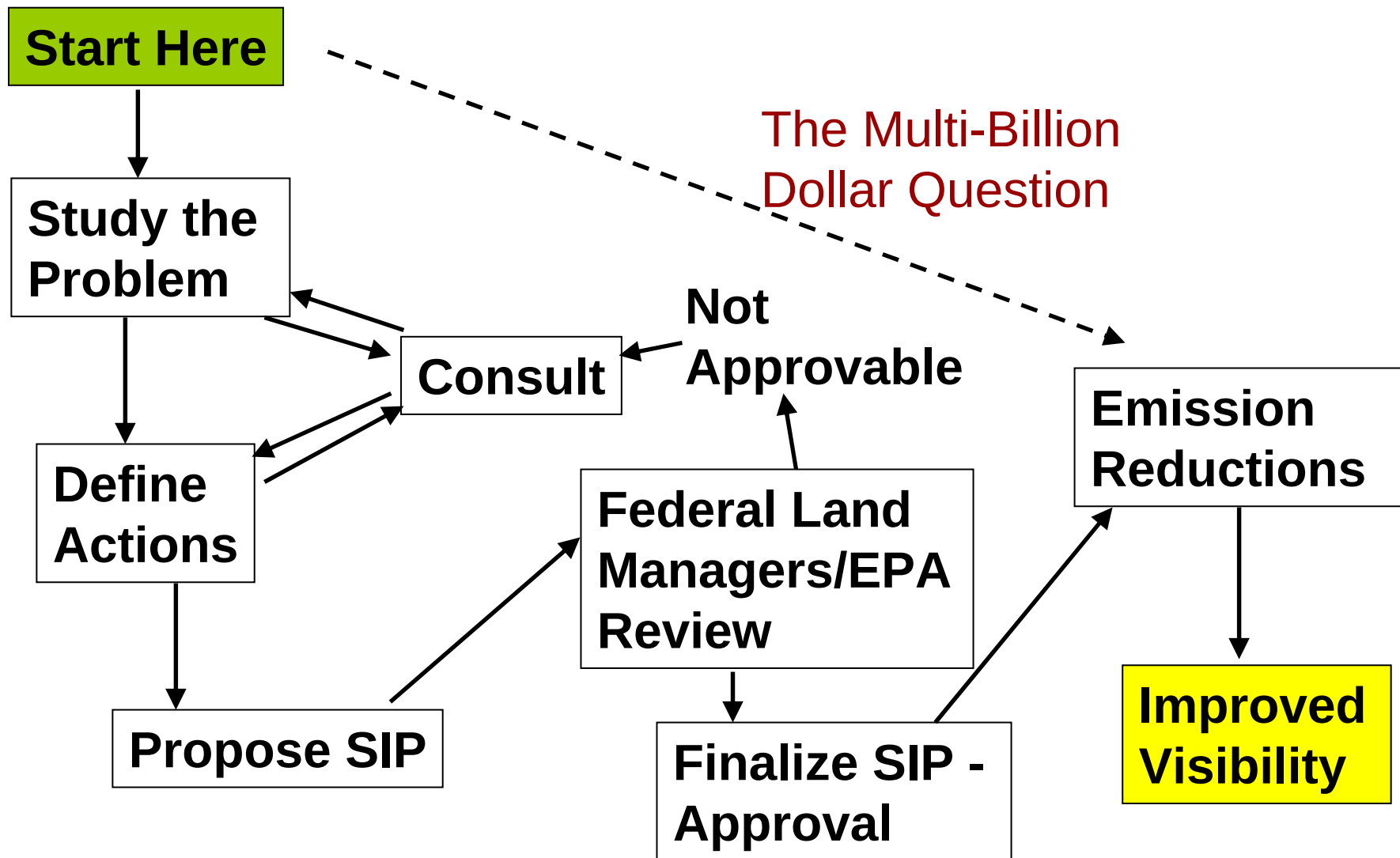
40CFR §51: The Regional Haze Rule

“...calls for States to establish goals and emission reduction strategies for improving visibility in all 156 mandatory Class I national parks and wilderness areas.”

Uniform Progress Goals (20% Worst Visibility Days)



The Process

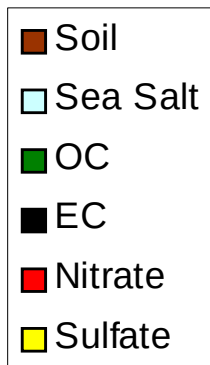


Study the Problem

1. What causes Haze in Class 1 Areas?
2. What regions contribute when it's worst?
3. What sources within these regions?
4. Identify range of control possibilities
5. Model possibilities – Do they work?

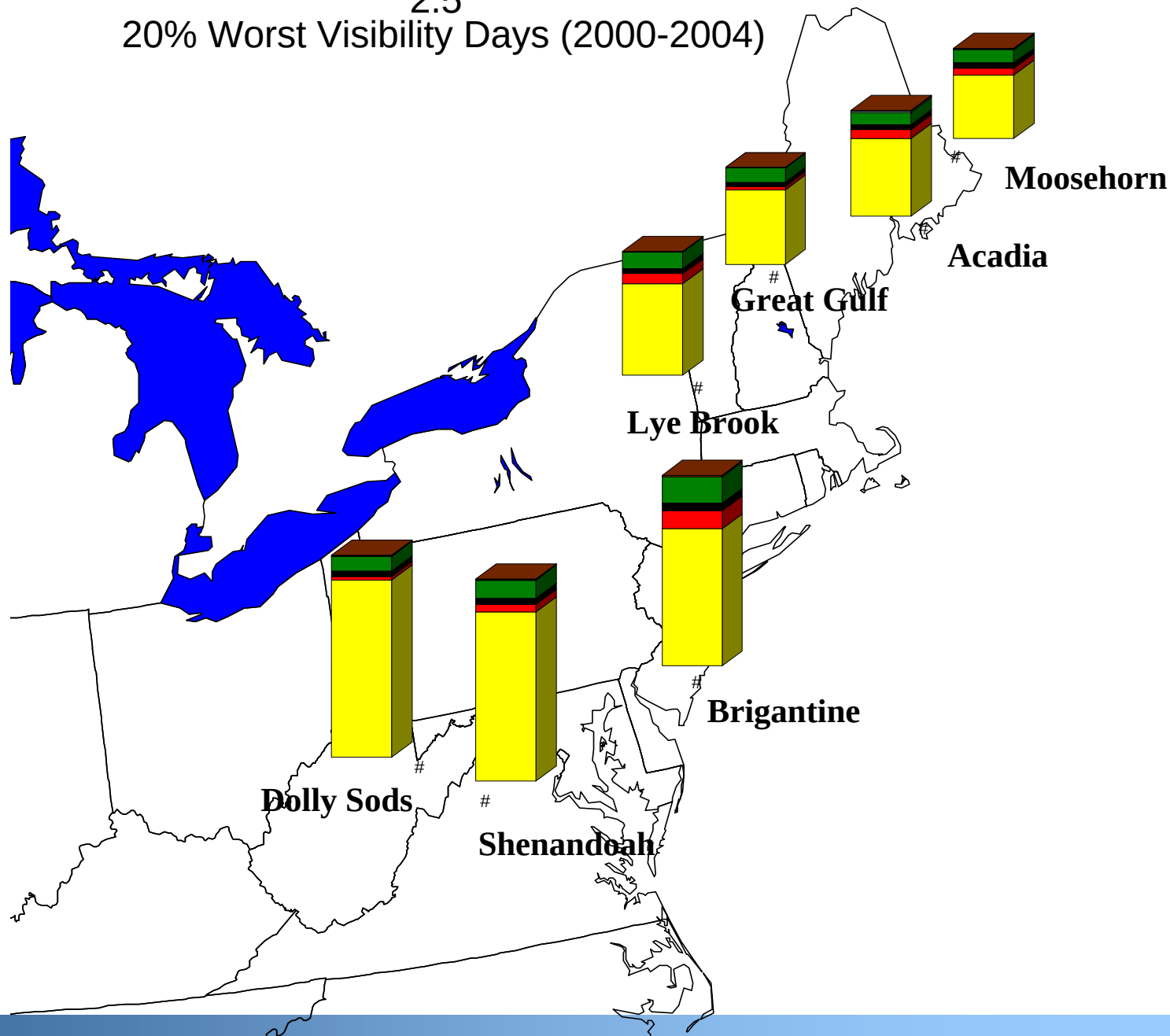
Contributions to PM_{2.5} Extinction at 7 Sites

20% Worst Visibility Days (2000-2004)

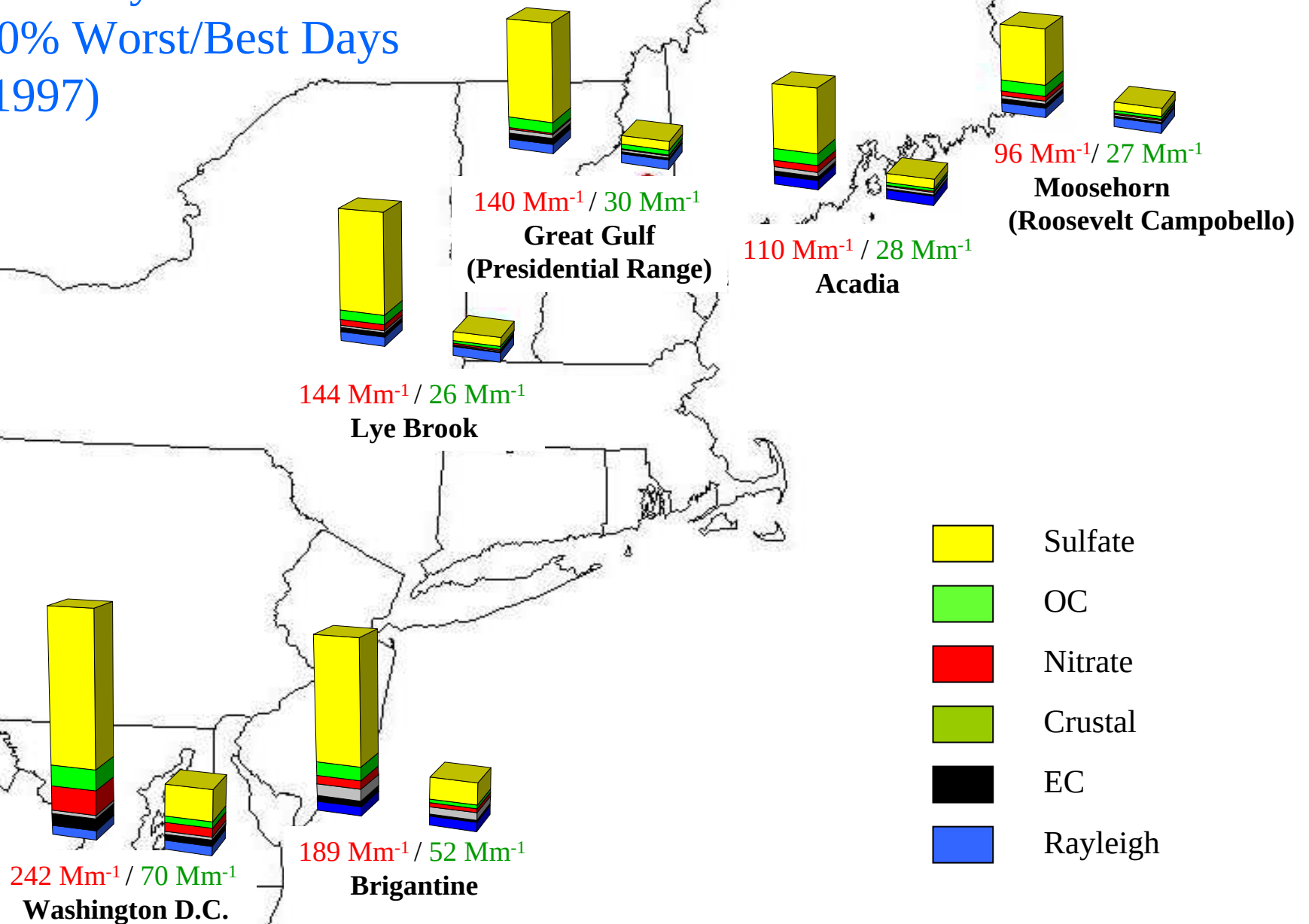


Extinction (Mm⁻¹)

180
160
140
120
100
80
60
40
20
0

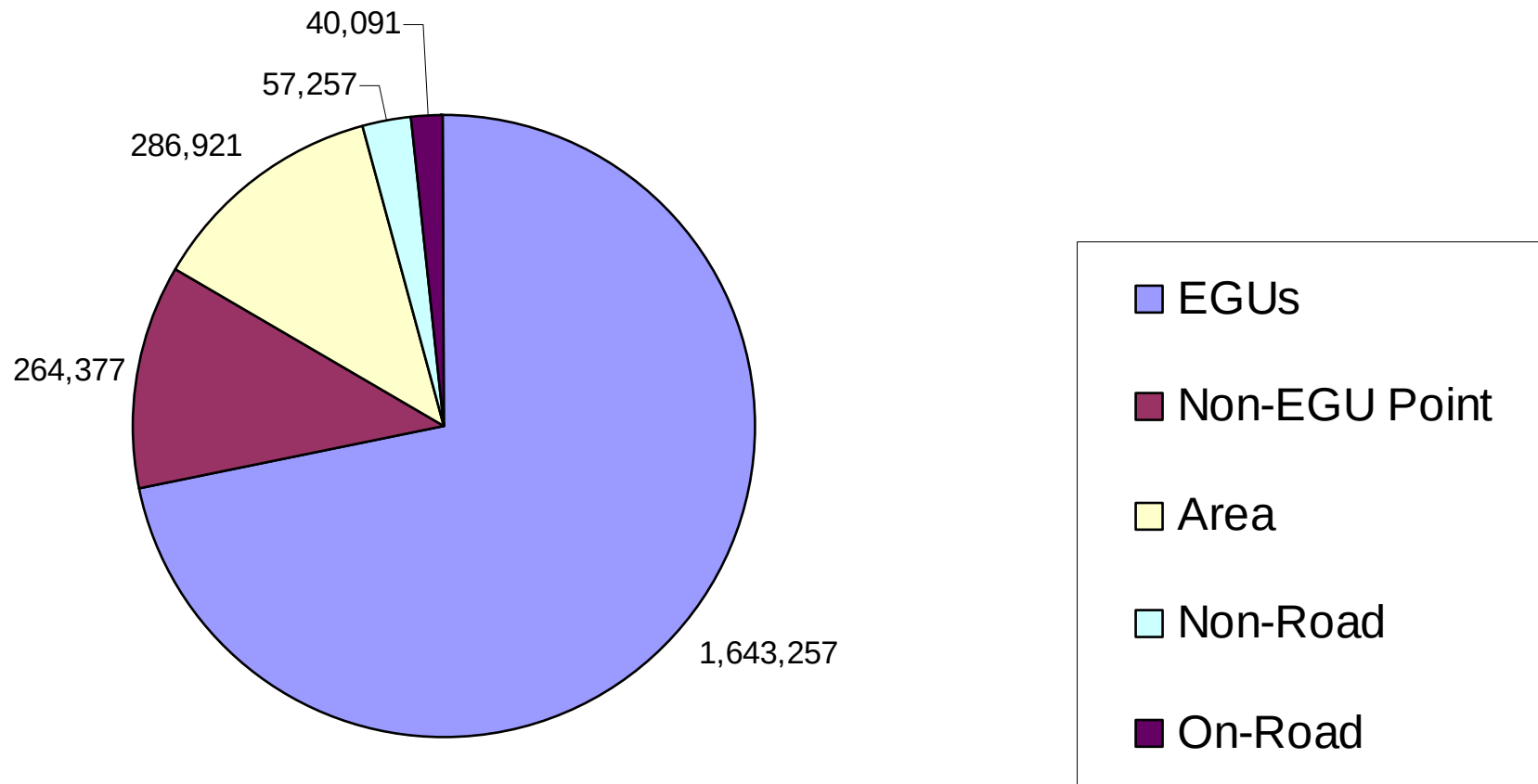


Visibility Conditions on 20% Worst/Best Days (1997)

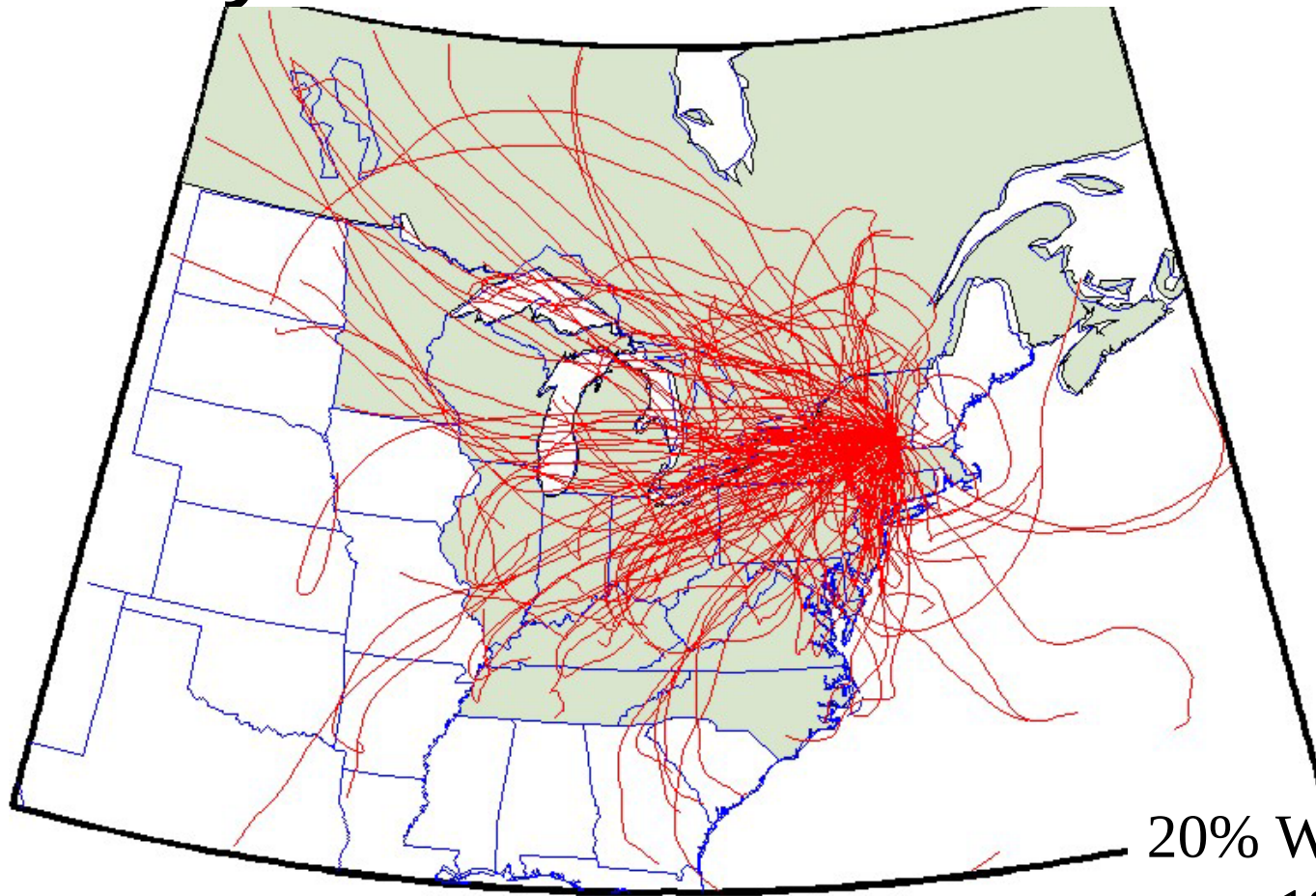


Sources Of SO₂

MANE-VU (w/o VA) 2002 SO₂ Emissions (tons/yr) by Sector

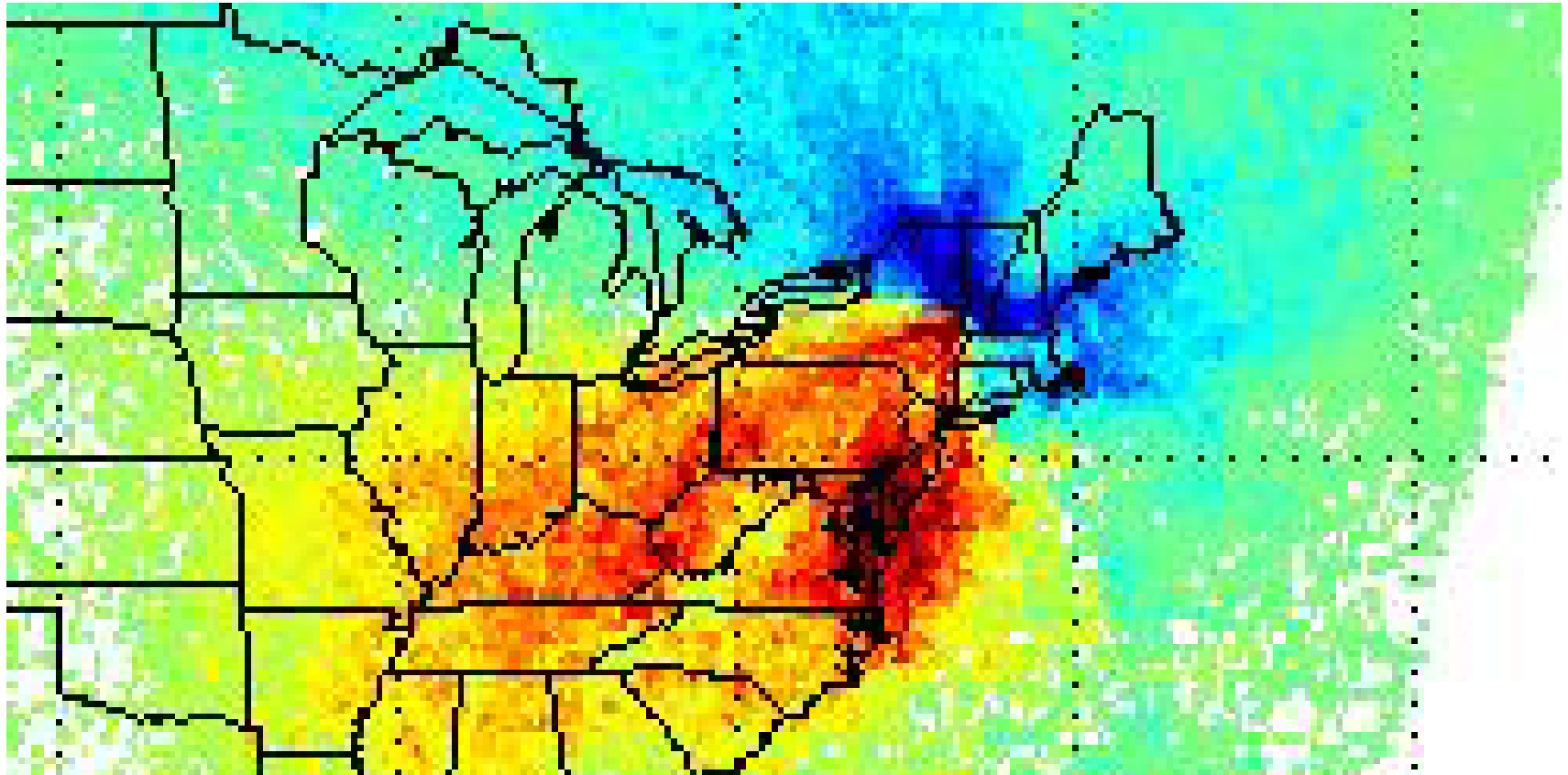


Trajectory Analysis for Lye Brook Wilderness Area



20% Worst Visibility
1997-1999

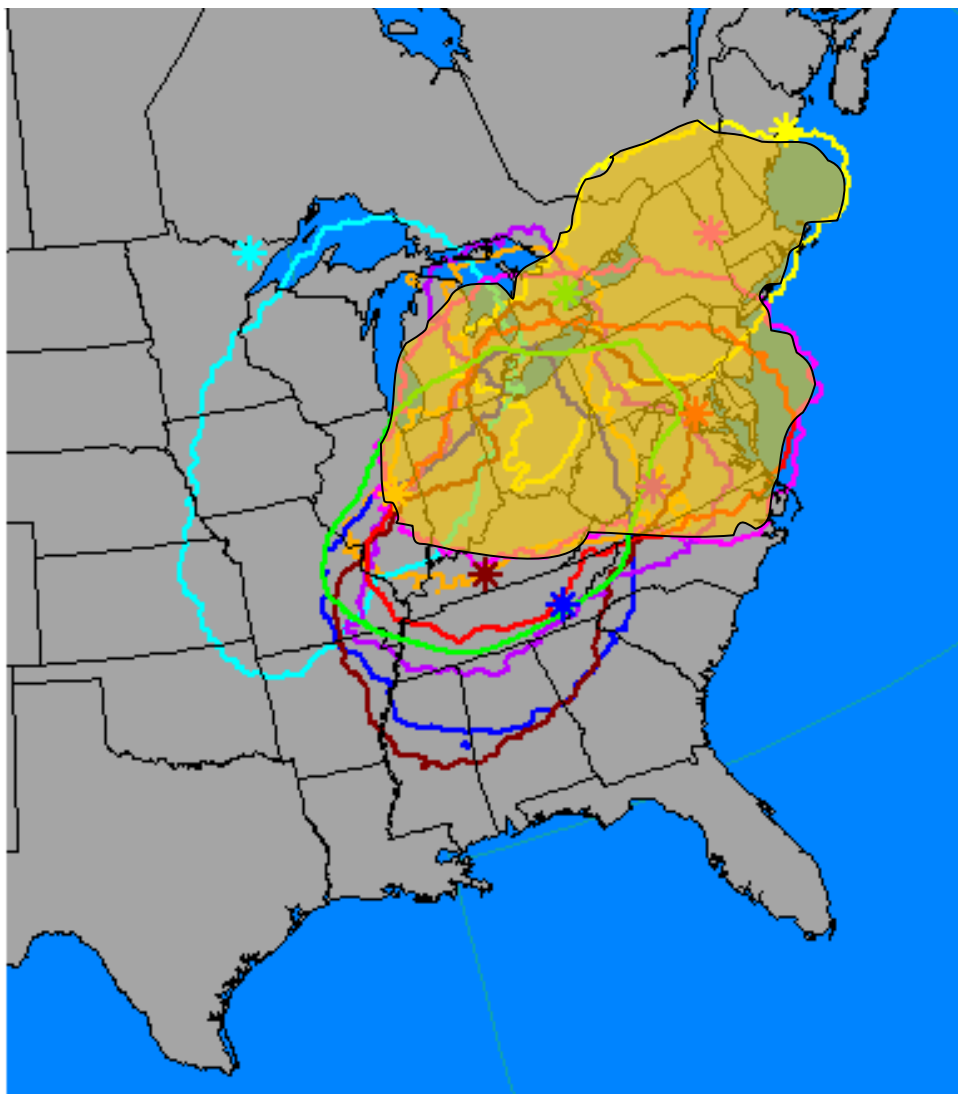
Lye Brook Cluster Weighted Probability



Source Apportionment Results Acadia & Lye Brook

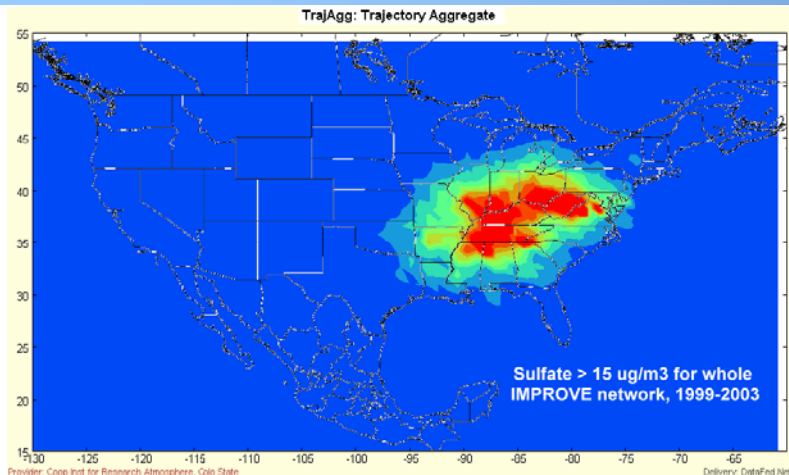
Upwind Probability Fields
($P > 0.001$) for
"Secondary Sulfate" Source(s)
at 9 Eastern Sites

- ✱ Boundary Waters, MN
- ✱ Bondville, IL
- ✱ Mammoth Cave, KY
- ✱ Great Smokey Mtns., TN
- ✱ Toronto, Canada
- ✱ James River Face, VA
- ✱ Washington, DC
- ✱ Lye Brook, VT
- ✱ Acadia, ME

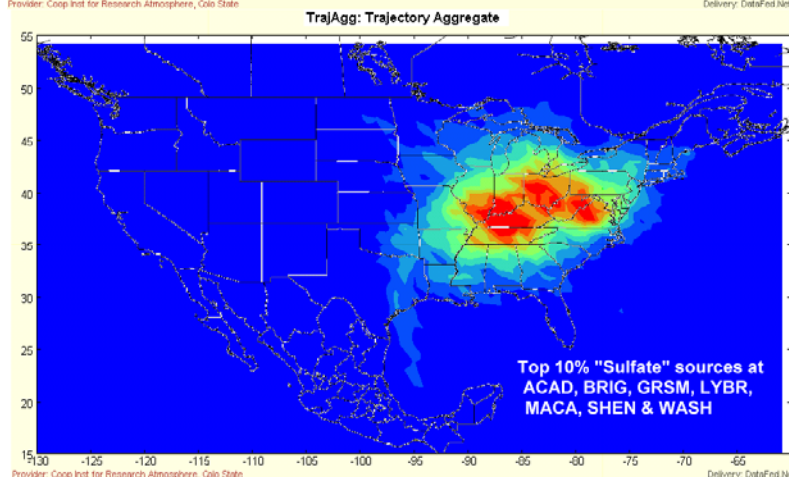


Geographic Source Regions

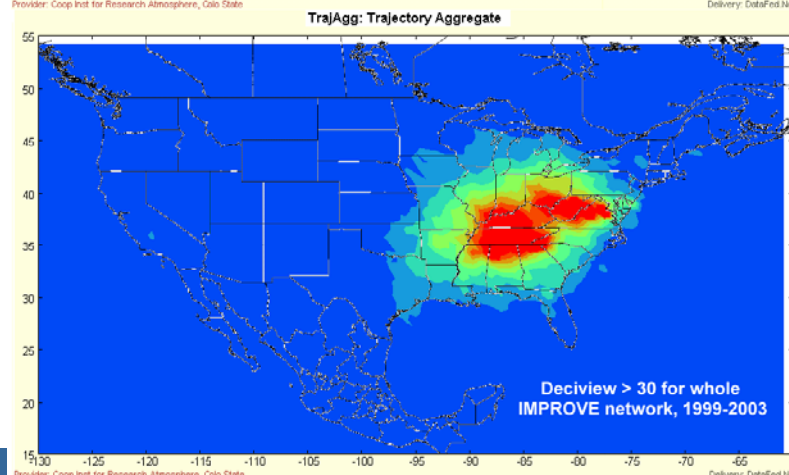
High Observed Sulfate



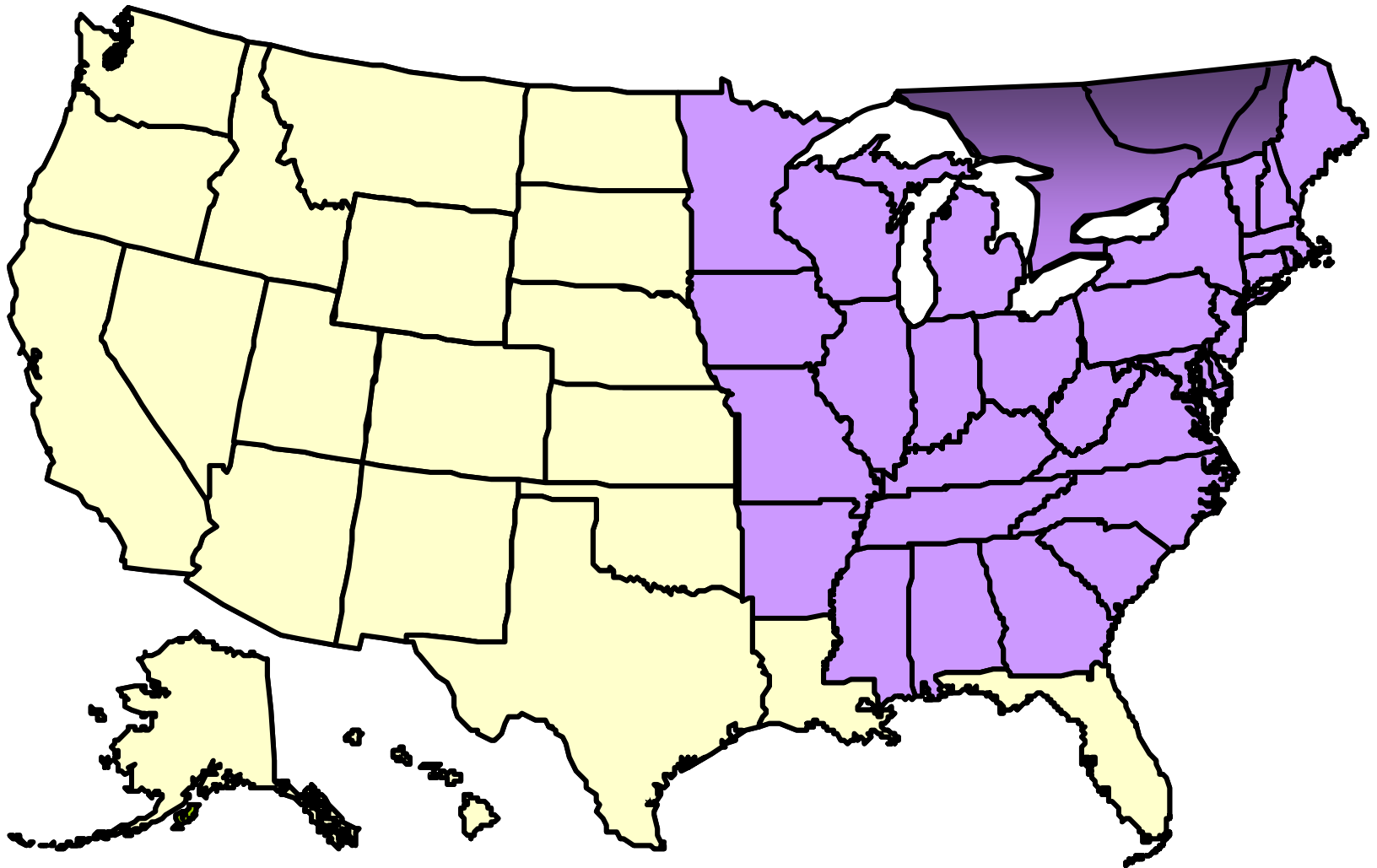
“Coal Combustion” Sources



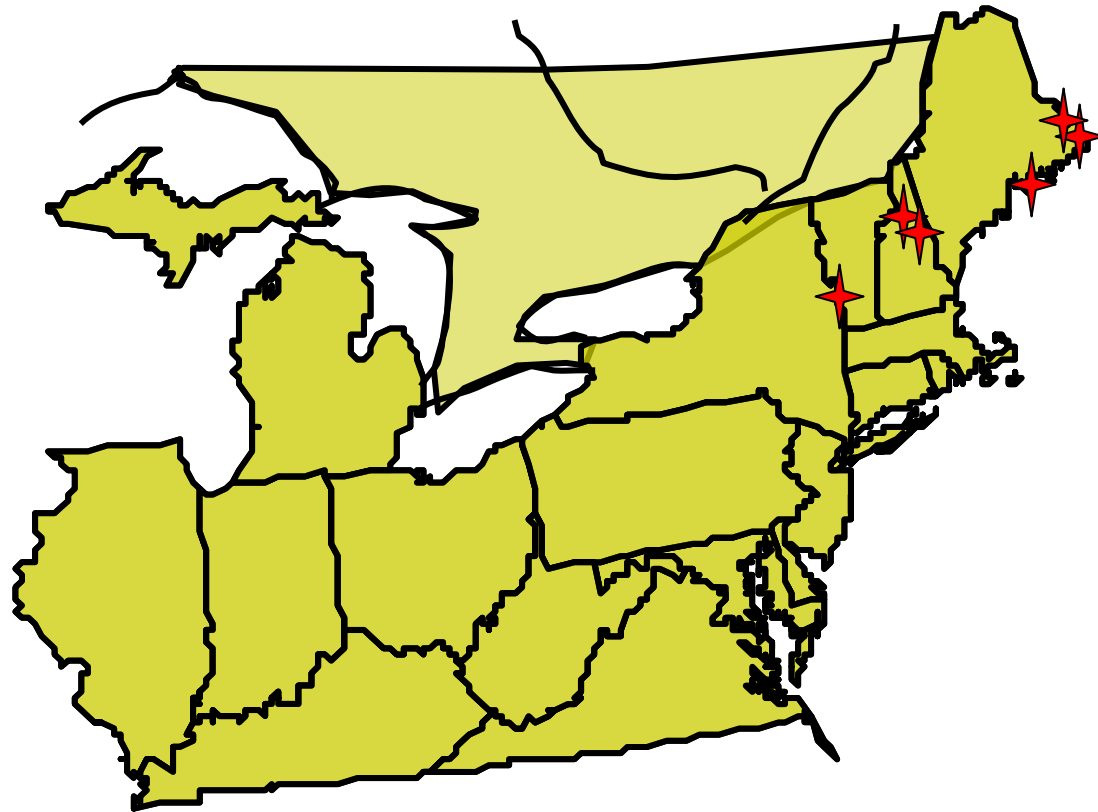
Poor Observed Visibility



Preliminary Source Region of Influence

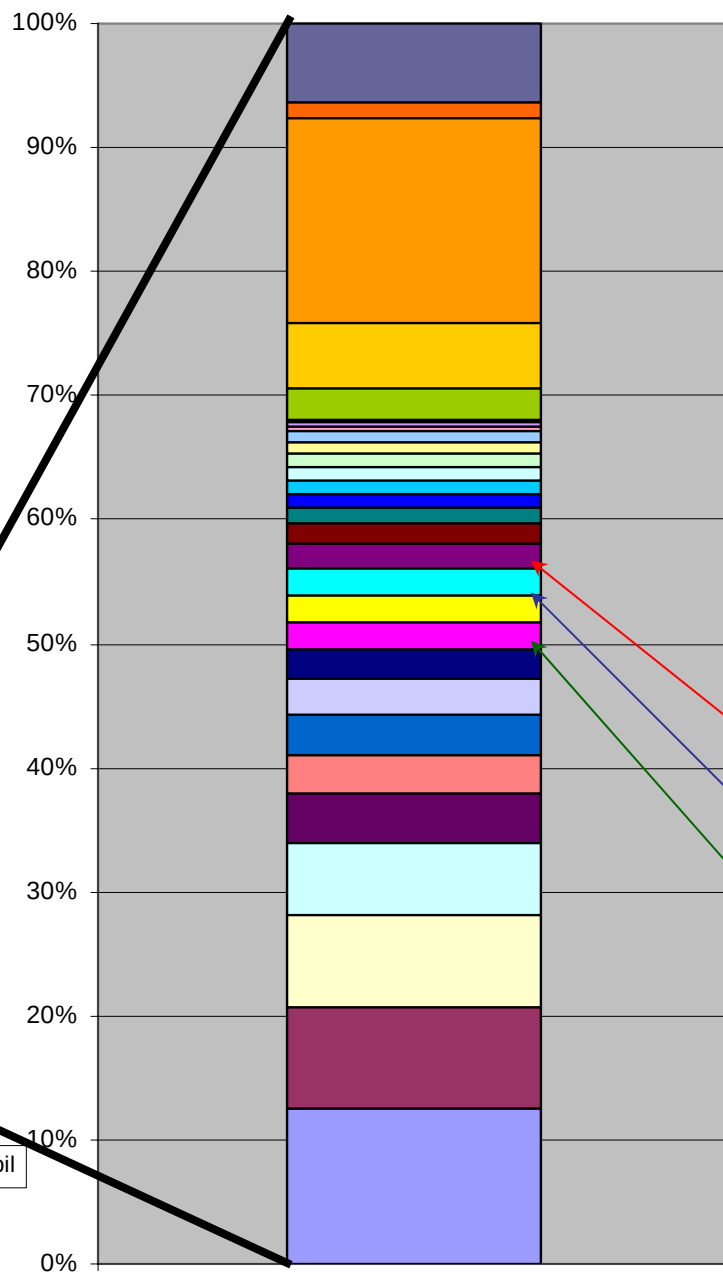
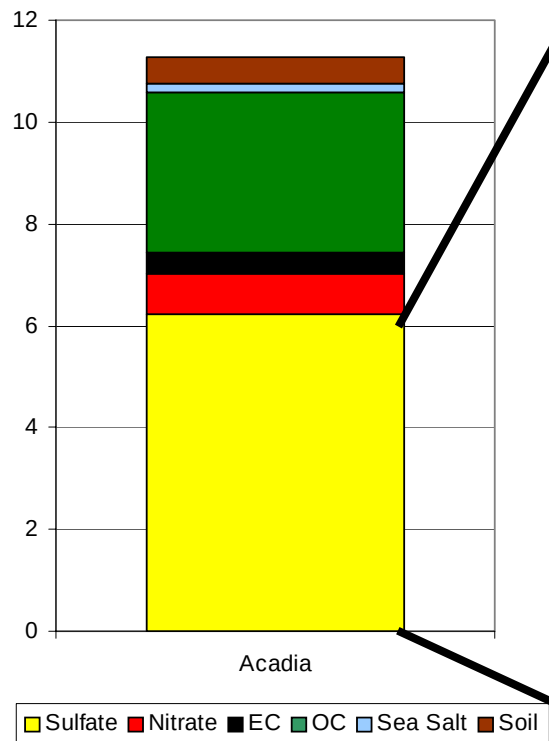


Tagged Species Modeling

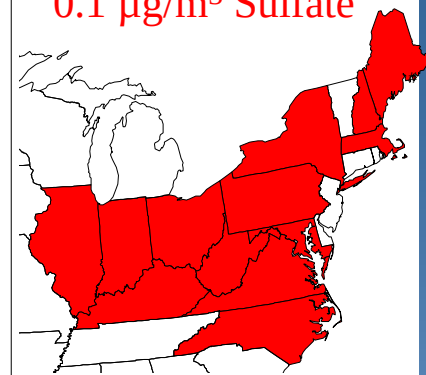


Acadia

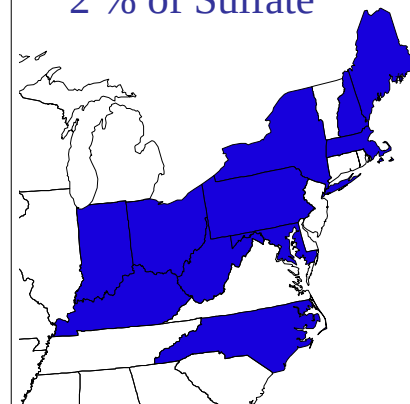
20% Worst Days



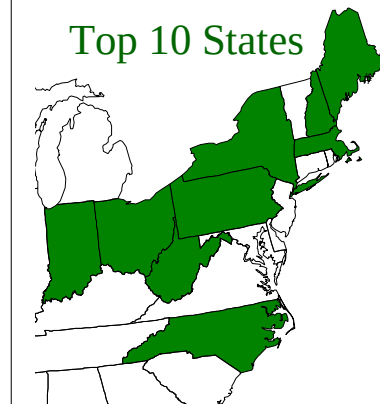
0.1 μg/m³ Sulfate



2 % of Sulfate



Top 10 States



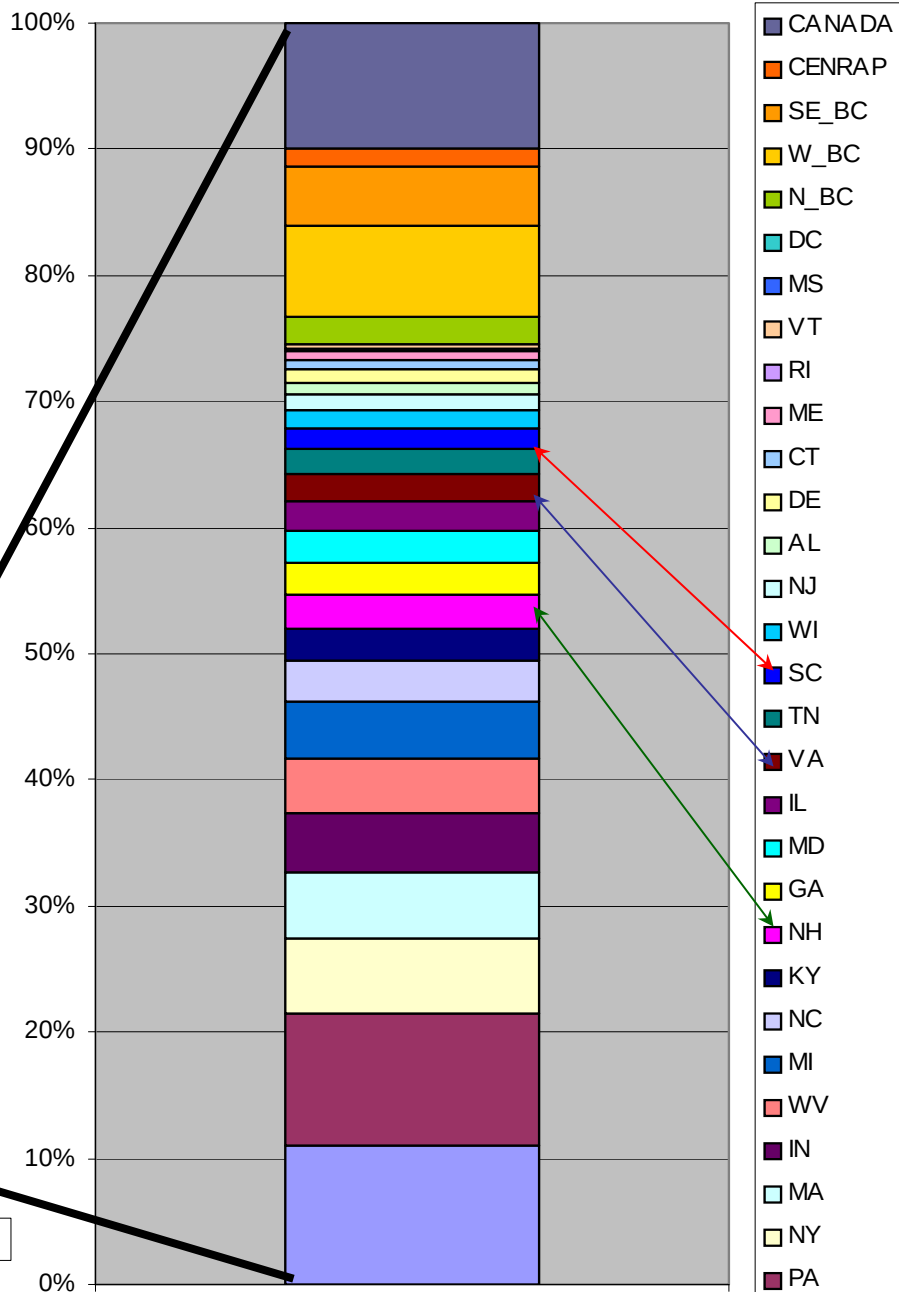
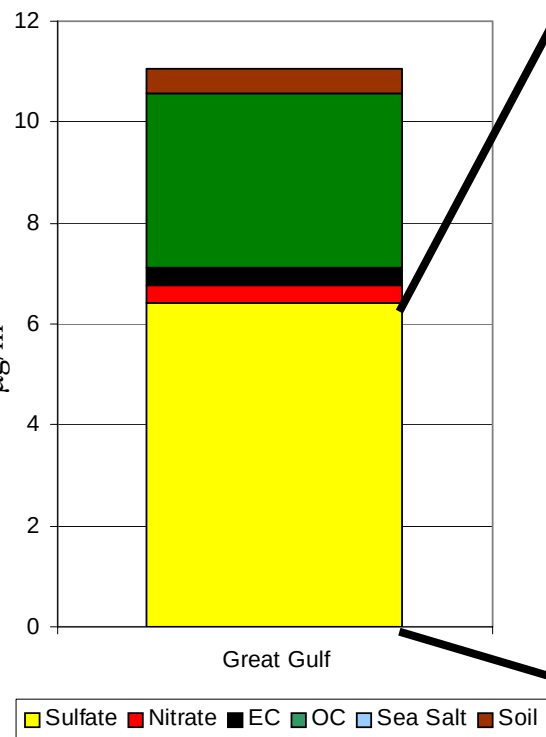
IMPROVE mass 00-04

REMSAD 2002 Contribution to Sulfate

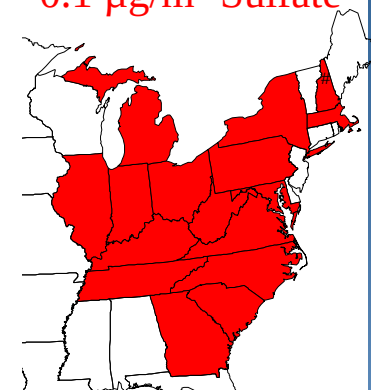
Threshold options

Great Gulf

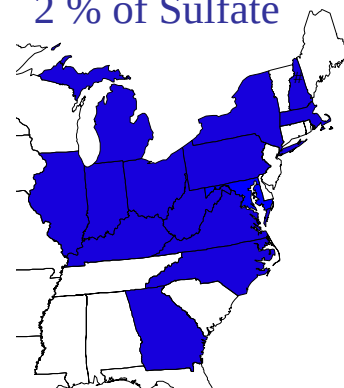
20% Worst Days



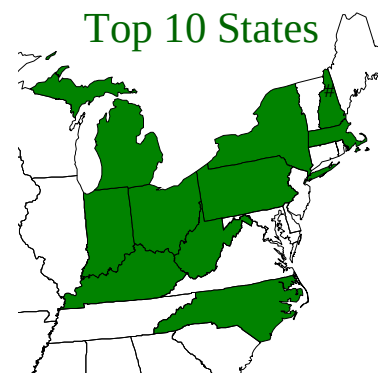
0.1 $\mu\text{g}/\text{m}^3$ Sulfate



2 % of Sulfate



Top 10 States



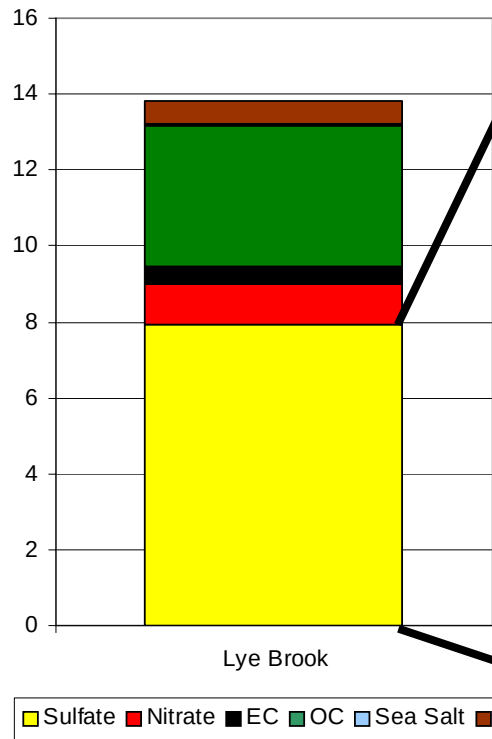
IMPROVE mass 00-04

REMSAD 2002 Contribution to Sulfate

Threshold options

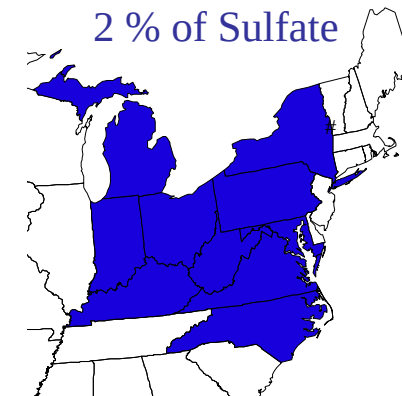
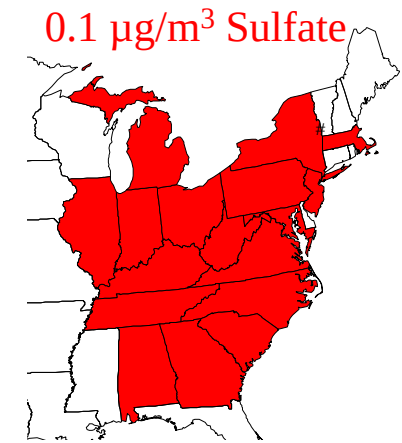
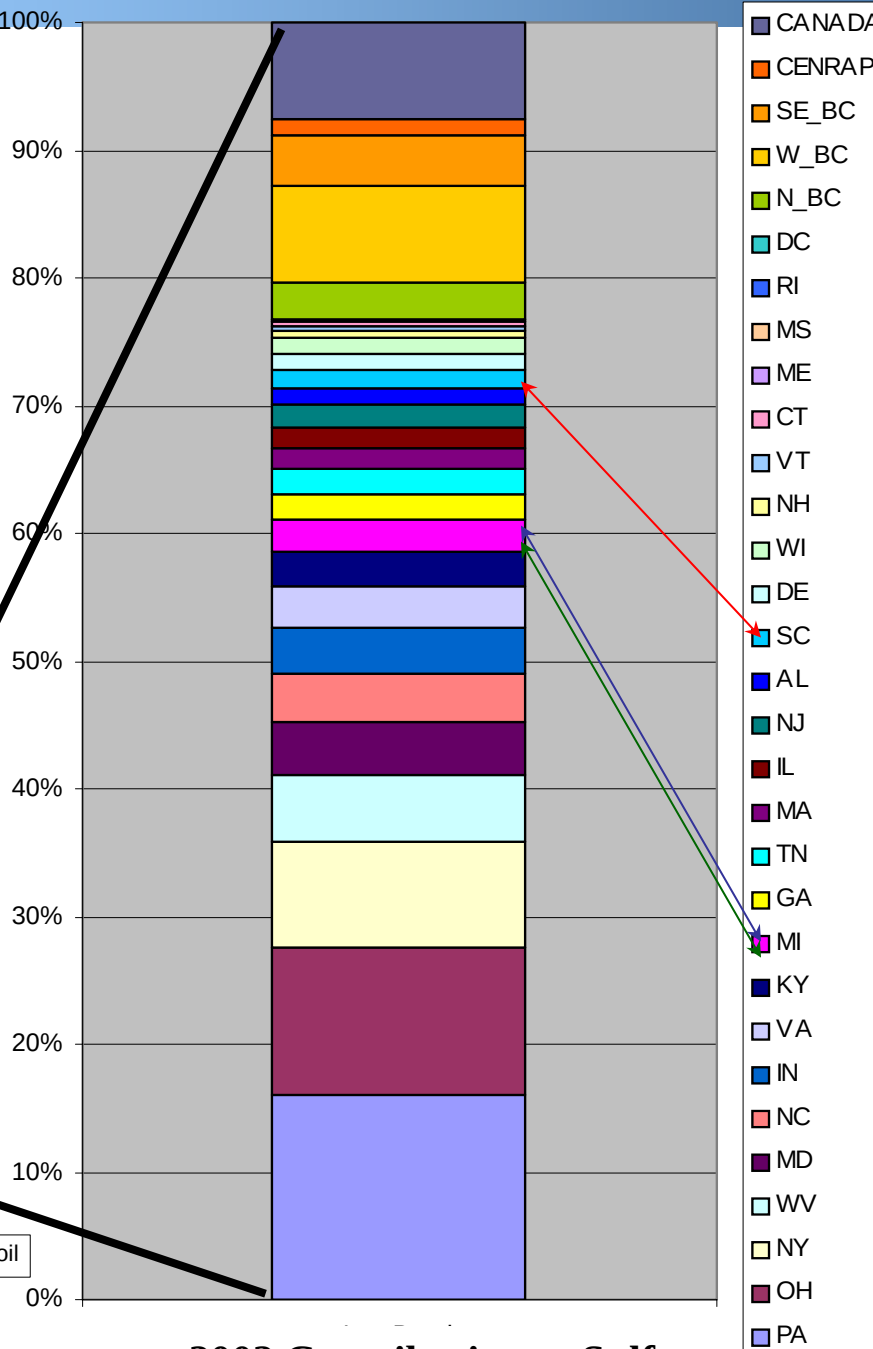
Lye Brook

20% Worst Days



IMPROVE mass 00-04

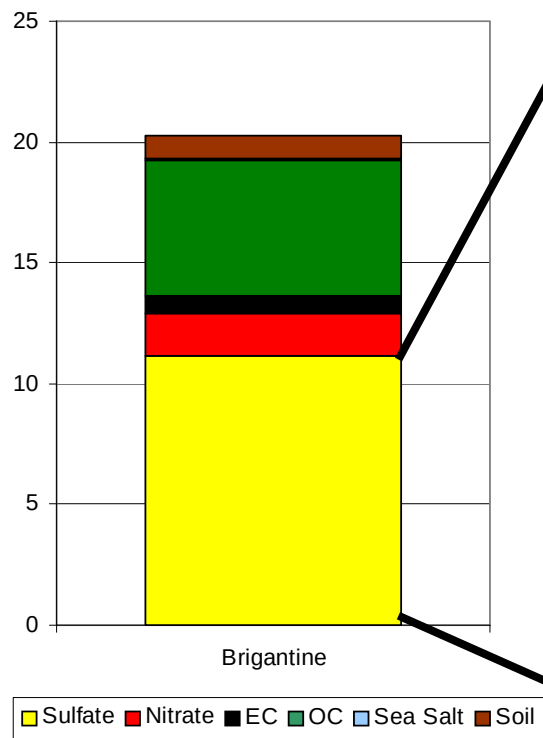
REMSAD 2002 Contribution to Sulfate



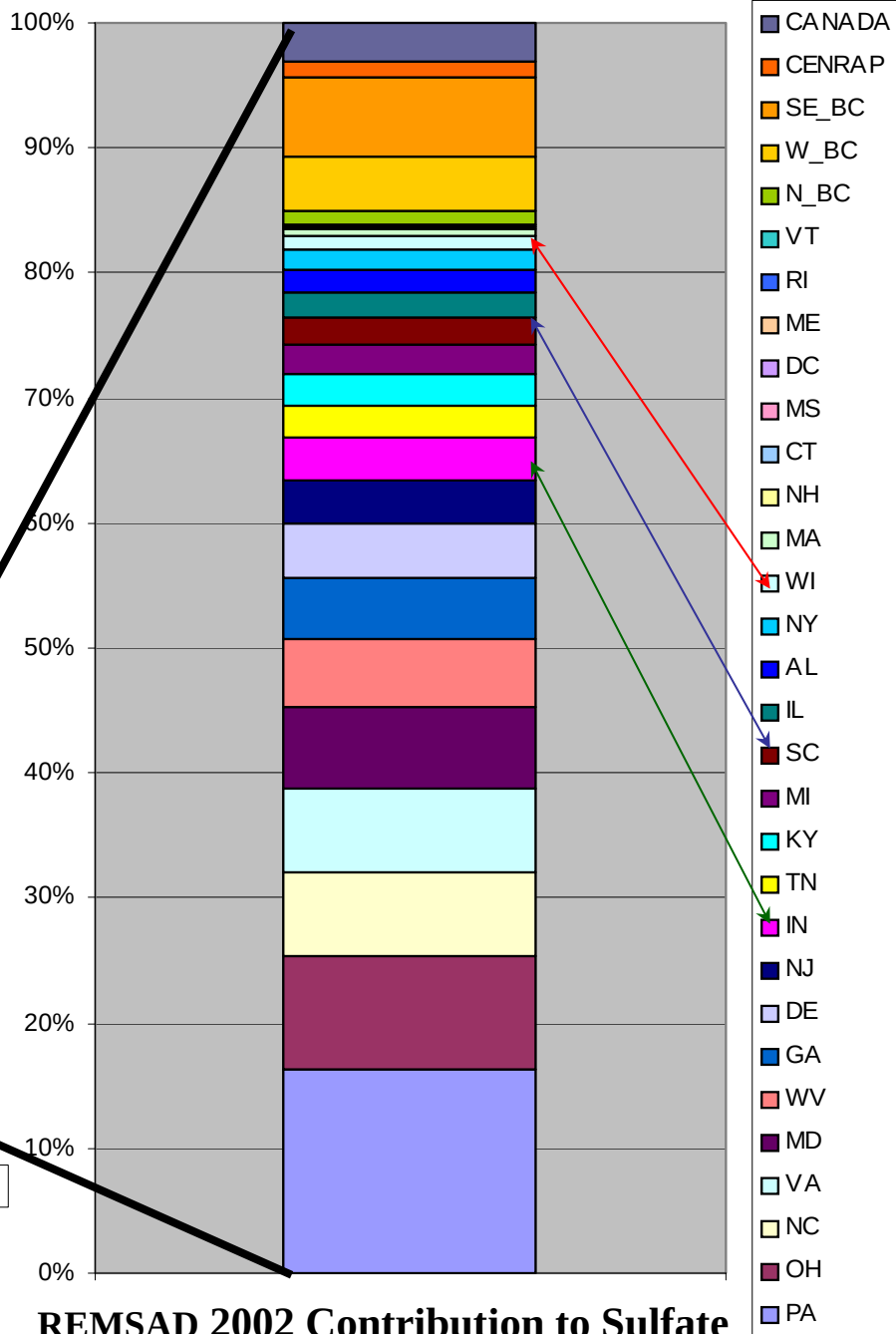
Threshold options

Brigantine

20% Worst Days

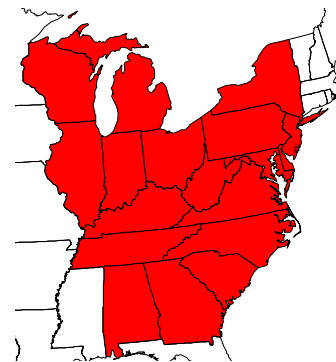


IMPROVE mass 00-04

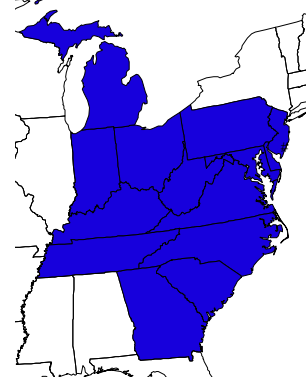


REMSAD 2002 Contribution to Sulfate

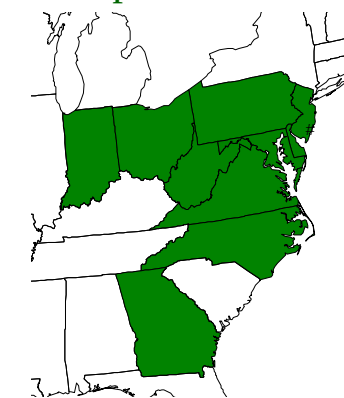
0.1 $\mu\text{g}/\text{m}^3$ Sulfate



2 % of Sulfate

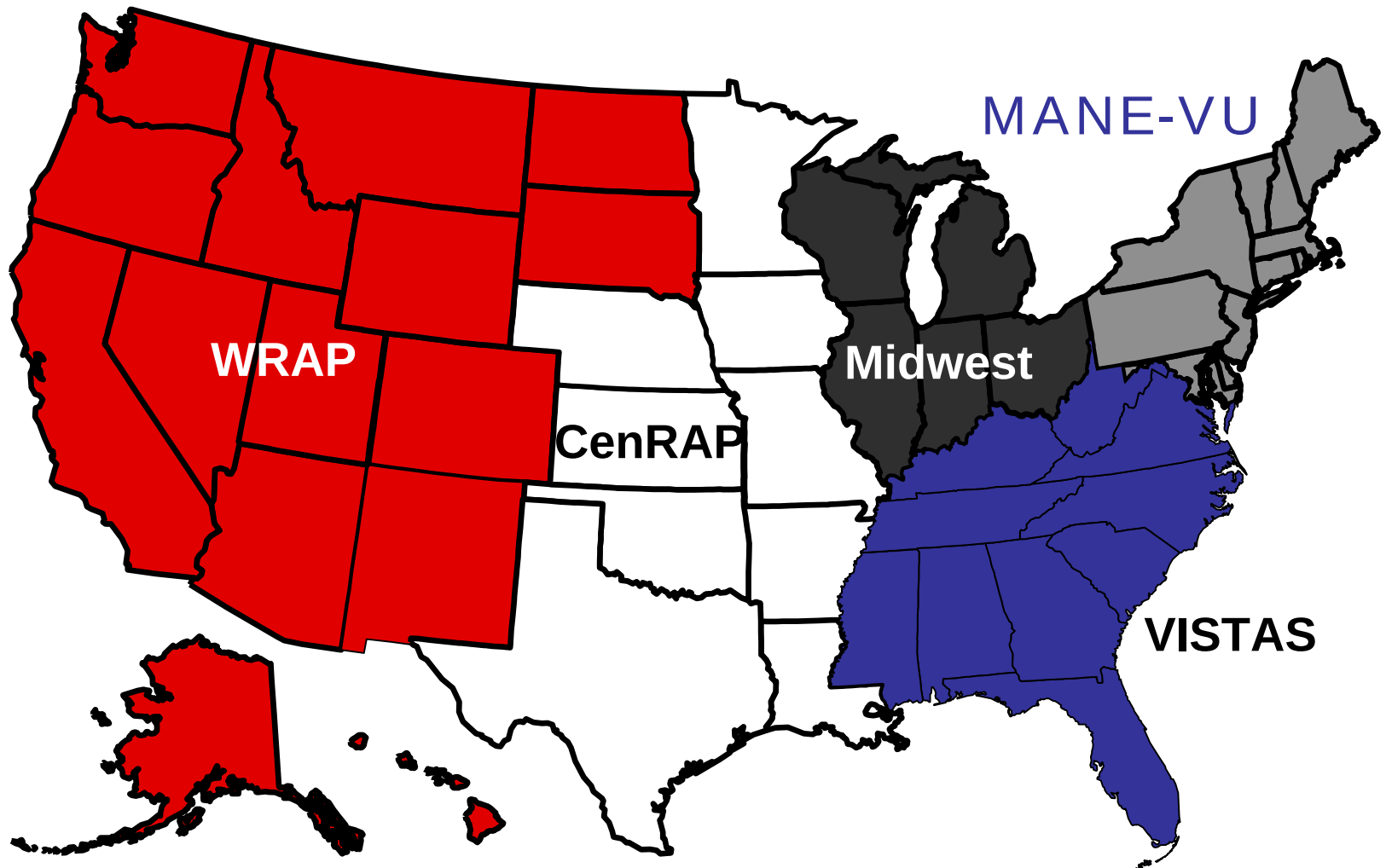


Top 10 States



Threshold options

Regional Planning Organizations



Next Define Action