ADEM's SO_2 Increment Assessment for the Sipsey Wilderness

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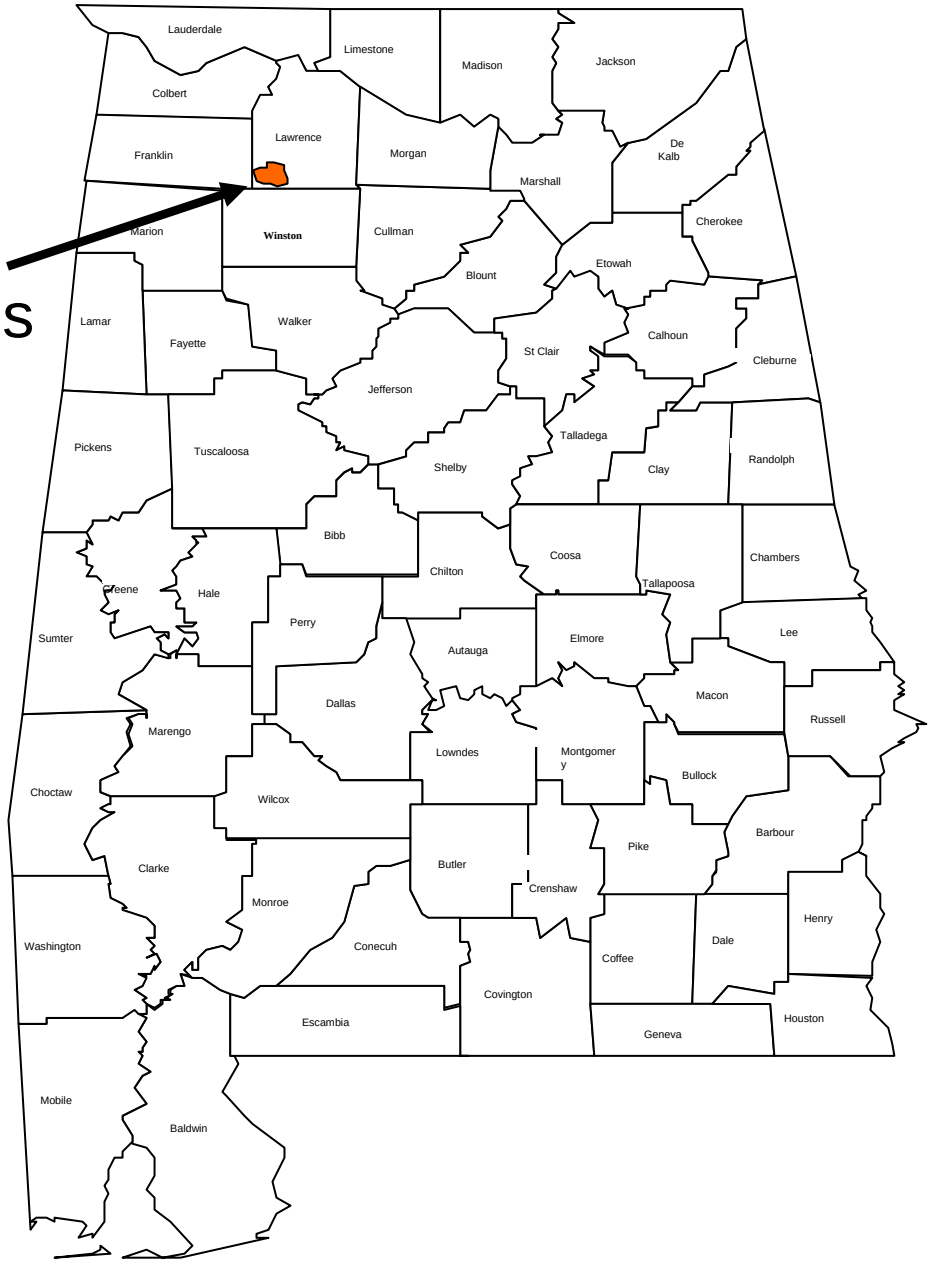
Overview

- Project initiation
- State of SO_2 emissions in Alabama
- Modeling Protocol
- Development of SO_2 Inventory
- Next steps
- Conclusions
- Schedule

Sipsey Wilderness



- Alabama's only Class I area within its borders
- Located within the Bankhead National Forest

Project Initiation

- In mid-2008, a PSD application was received by the department for a modification to an existing major source, located in northeast Alabama.
- The department did not require the facility to complete a Class I Increment analysis and suggested that they contact the FLM for direction concerning the AQRVs.
- Both the FLM and EPA Region IV commented on the lack of Class I modeling in the application.

Project Initiation

- Modeling was subsequently performed that indicated the facility would trigger a comprehensive SO_2 Class I increment analysis.
- Based on massive reductions in SO_2 over the last three decades, ADEM does not believe that the Class I Increments are threatened, and are likely “expanded.”
- ADEM has proposed to complete a comprehensive Increment Analysis for the Sipsey Wilderness area to assess the state of the SO_2 Class I increments.

SO_2 Emissions in Alabama

- The vast majority of point source SO_2 emissions in Alabama are associated with Electric Generating Units (EGUs). (89% of all SO_2 is point & EGU is 82% of point source SO_2)

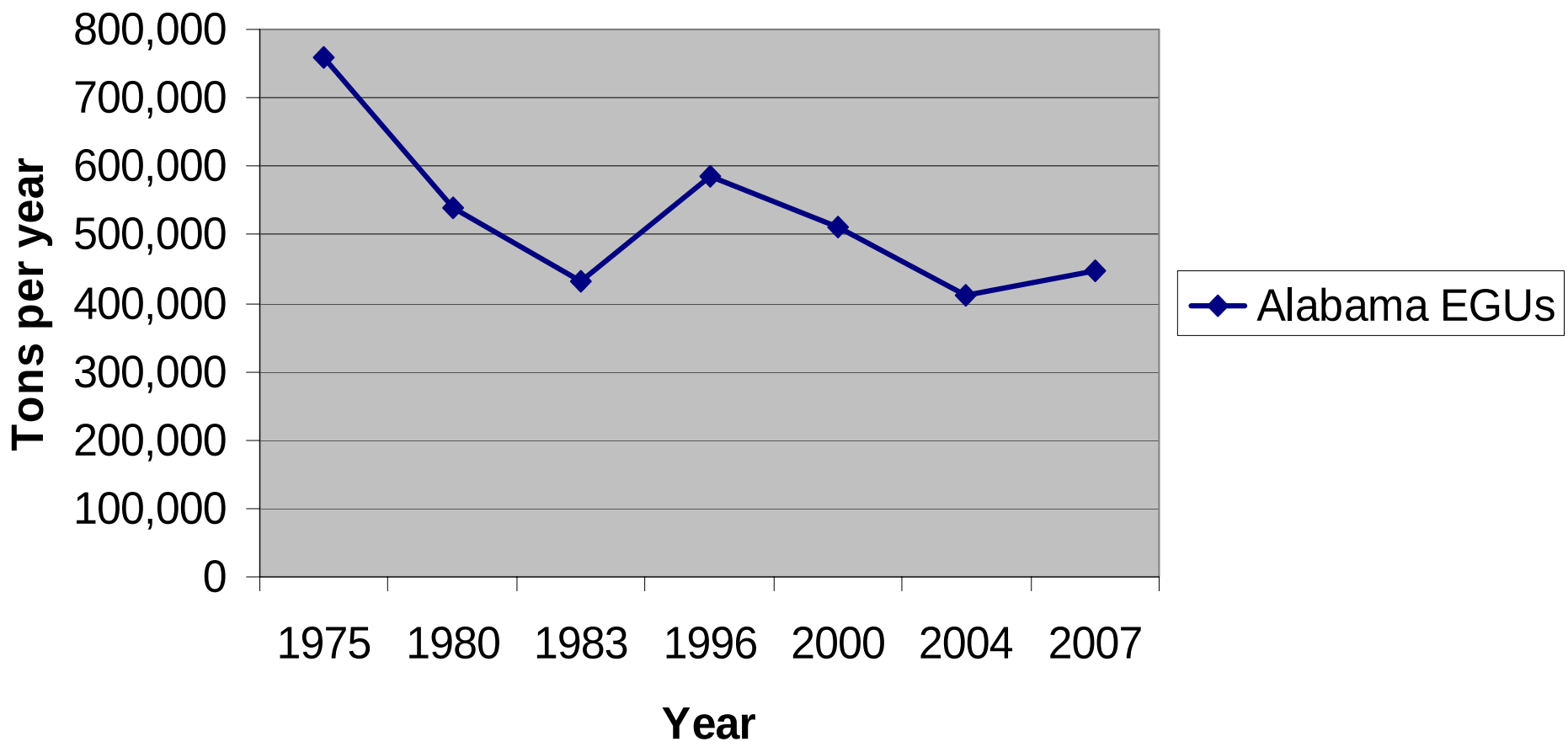
2002 Alabama SO_2 Emissions

Point	**544,309**	**89%**
EGU	***447,828***	***73%***
Non-EGU	***96,481***	***16%***
Total	**613,255**	

SO_2 Emissions in Alabama

- Since the mid 1970s, there have been extensive reductions in SO_2 emissions from EGUs in Alabama as a result of national and regional control programs, such as the Title IV Acid Rain Program and the CAIR.
    - Approximately 40% reduction from mid 1970s levels
- The vast majority of EGUs are “baseline sources,” which represents a decrease in emissions since the baseline date, effectively expanding the increments.
- These reductions have not traditionally been incorporated into increment analyses, due to the technical complexity of calculating emission rates to be incorporated into modeling.

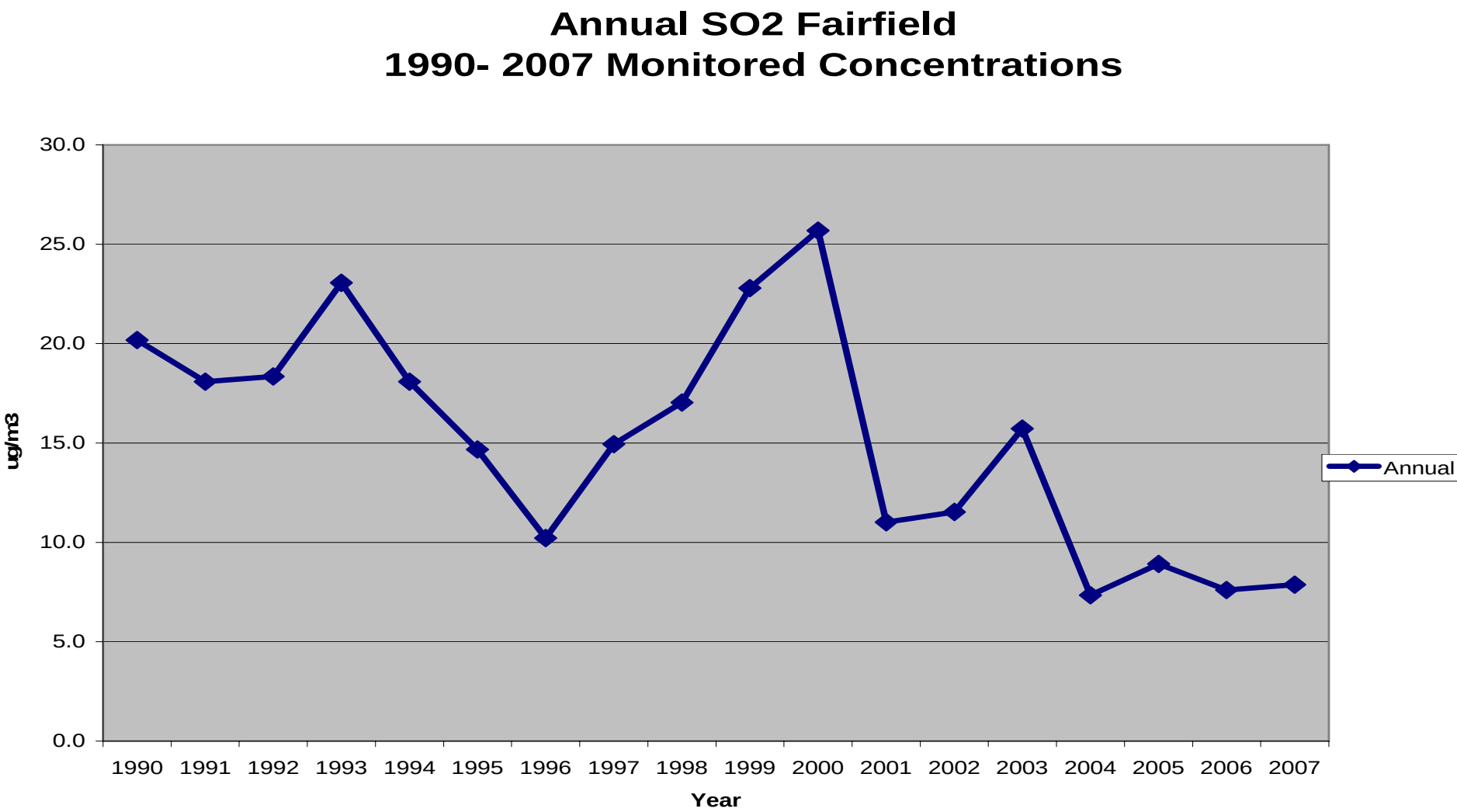
SO_2 Emissions in Alabama



SO_2 Emissions in Alabama

- Additionally, there have been reductions in other source sectors, most notably in mobile sources as a result of control programs and low sulfur fuels.
- In addition to known emissions reductions, the Regional Haze and Birmingham $PM_{2.5}$ SIPS will result in continued emissions reductions.
- Finally, reductions in SO_2 measured concentrations have continued to decrease at the only SO_2 monitor remaining in the state, located in downtown Birmingham, the most industrialized city in the state and heavily influenced by a variety of source types.

SO_2 Concentrations in Alabama



SO_2 Emissions in Alabama

- These factors, in combination, support ADEM's assertion that if the reductions in SO_2 emissions were properly factored into a Class I Increment Assessment, there would likely be a resulting expansion of the increments at the Sipsey Wilderness Area .

- So, the fun begins …

Modeling Protocol

- The first step was to establish the modeling methodology for the project.
- A modeling protocol was developed and shared with EPA Region IV and the FLMs for review and comment.
- Comments received were used to revise the modeling protocol, which has now been set.

Development of Emissions Inventory

- The key issue related to the project was what criteria would be established to distinguish which sources would be included in the SO_2 emissions inventory.

- All facilities within 200 kilometers of the Sipsey Wilderness will be included in the modeling subject to the following criteria:
  - Facility wide **potential** SO_2 emissions greater than 2D will be retained, where D is the distance to the Sipsey Wilderness, in kilometers.

Development of Emissions Inventory

- Potential emissions are being used in lieu of actuals based primarily on the difficulty of developing averaging period specific emission rates.
  - If a problem does arise, modeling can always be reaccomplished with more refined emissions estimates.
- For expanders, including reductions in emissions from EGU's since the baseline date, care is being taken in developing these emission rates to ensure that proper credit is taken.
- Additionally, ADEM has contacted the states of Georgia, Mississippi and Tennessee requesting stack parameters and emission rates for their sources within 200 km from Sipsey.

Next Steps

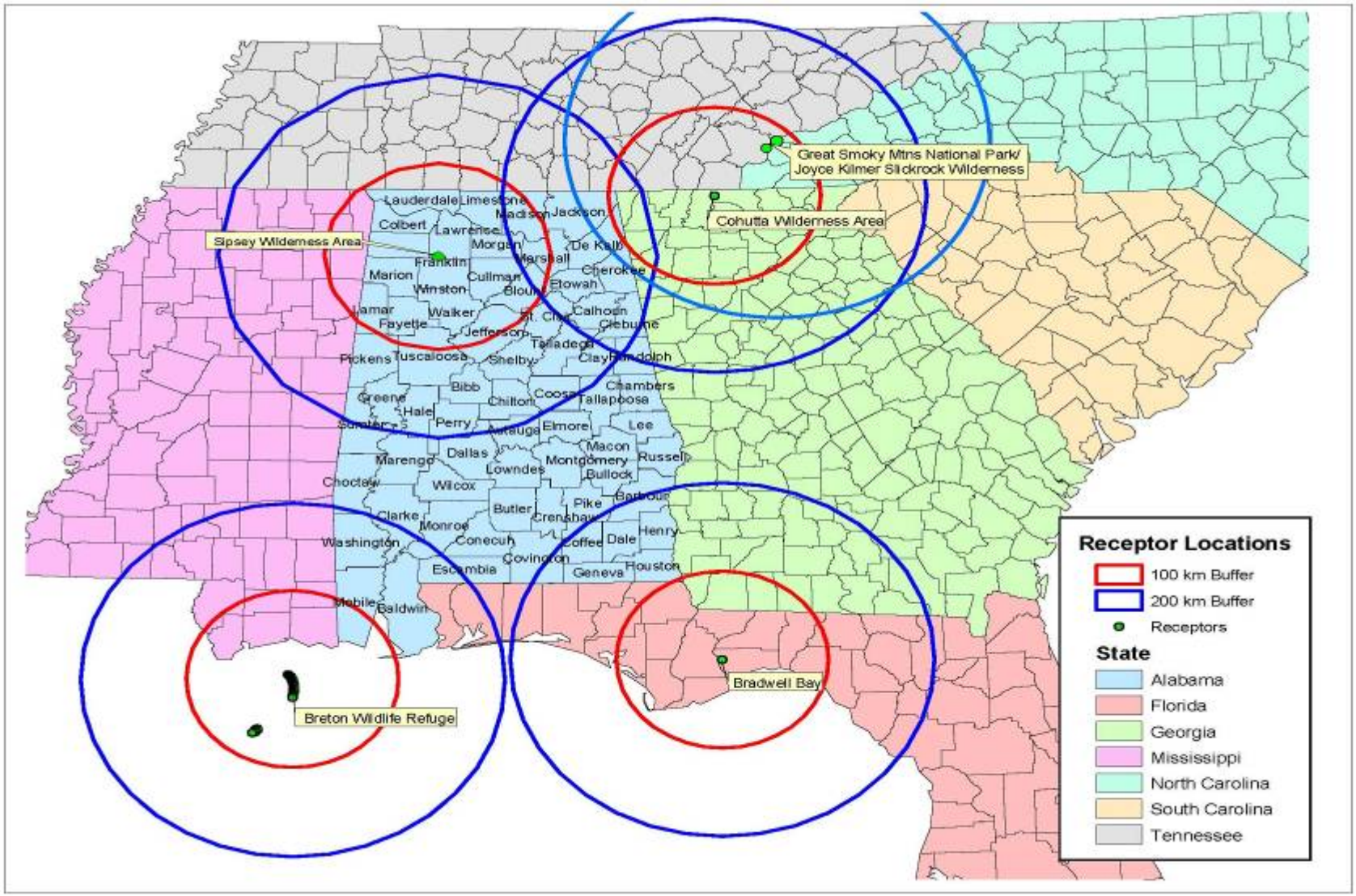
- After the inventory is developed, the CALPUFF modeling system will be used to estimate consumption. of the SO_2 Class I Increments.
    - Specifics include:

        CALPUFF Version 5.8

        CALMET Version 5.8

        CALPOST Version 5.6394
- CALMET will be run for 3 years of MM5 data (2001–2003) which was first used in VISTAS but was subsequently re-processed by Tim Allen (FWS).
- National Park Service receptors will be used for the analysis.

Sipsey 200km Radius



Conclusions

- While it is expected that this cumulative assessment will show expansion of the SO_2 Class I Increments, any predicted violations will be identified and resolved.

- This modeling is also intended to support future PSD activity in Alabama and its sister states, which may affect the Sipsey Wilderness.
    - Similar to the revised proposed FLAG guidance, new sources may be required to perform less extensive modeling.
    - The screening modeling estimates would simply be added to the current modeled concentrations to provide a conservative estimate of consumption.

Conclusions

- ADEM will continue to ask EPA to consider procedures similar to the FLM guidance which allow a source to “screen out” without modeling, based largely on the assumption that as emissions continue to decrease based on national and regional programs, Class I increments will be “expanded” across the eastern half of the U.S.

Schedule

- This project is divided into several tasks, covering in total approximately 1 year. This does not include time needed to resolve issues associated with predicted concentrations.

Task 1: Development of modeling protocol

COMPLETED

Task 2: Development of SO2 emissions inventory

CURRENTLY UNDERWAY EXPECTED LATE WINTER 2009

Task 3: Model Simulations and Post Processing

EXPECTED SPRING 2009

Task 4: Documentation of Results

SPRING/SUMMER 2009

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