SO_2 Modeling Update

James Thurman, Ph.D.
U.S. EPA/OAQPS/AQAD/AQMG
2014 Region 4 Workshop
Atlanta, GA
thurman.james@epa.gov

Where we are now

- Initial Designations
  - Published August 2013 and effective October 2013
  - Based on violating monitors
  - 29 areas in 16 states
  - SIPs for these areas due April 2015
- Nonattainment area SIP guidance
  - Released April 23, 2014 as Steve Page memo to Regions
  - Policy, modeling, emissions limits guidance
- Data Requirements Rule
  - Proposed rule published May 13, 2014 in FR
  - Large sources characterize air quality via modeling or monitoring
  - Modeling TAD & Monitoring TADs issued to aid states

SO_2 SIP modeling guidance

- Appendix A of SIP guidance memo
- Offers guidance on:
  - Model selection
    - AERMOD or other approved Appendix A model depending on application
    - Alternative model must be justified
  - Modeling domain
    - Sources to explicitly model vs. represent via background
      - Screening, significant concentration gradient criterion
    - Receptors (attainment must be shown throughout domain)

SO_2 SIP modeling guidance

- Offers guidance on:
  - Source characterization
    - Allowable emissions (Table 8-1 of App. W)
    - Stack heights and GEP policy
  - Meteorological data
    - Representativeness
    - NWS, site-specific and upper-air
  - Background concentrations
  - Running AERMOD and implications on design value calculations
  - Documentation

SO2 SIP Guidance vs. other pollutants' SIP Guidance

- SO_2 guidance differs from that of ozone and $PM_{2.5}$
- SO_2 uses allowables or PTE, 5 years of NWS or at least one year of site-specific data, and the absolute model results at all receptors are used for NAAQS evaluations
- Ozone and PM use actual and projected emissions, one year of met data, photochemical grid modeling, and relative response factors for NAAQS evaluations

Data Requirement Rule TADs

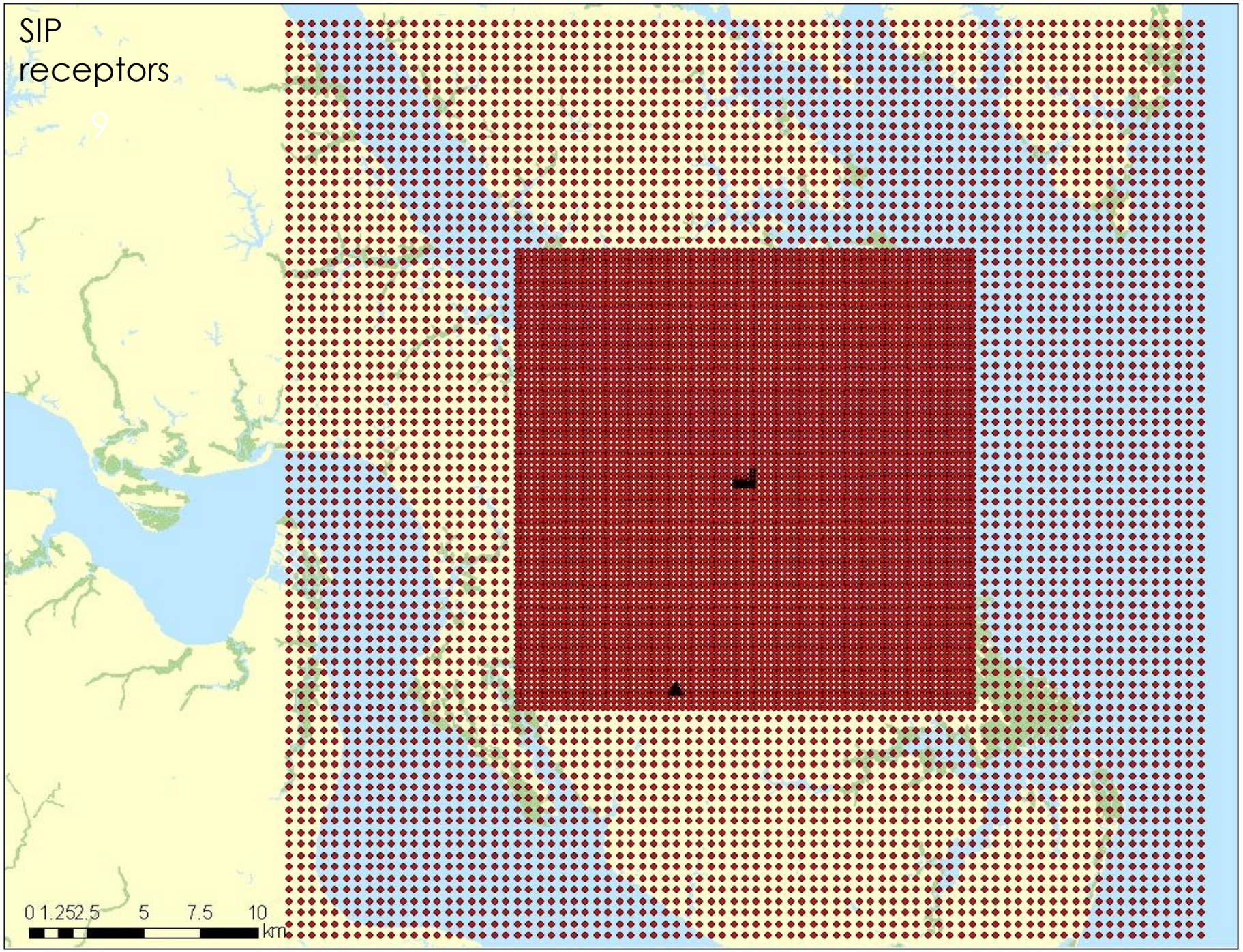
- Initial draft modeling and monitoring TADs released May 2013
- Revised versions released December 2013 with revisions based on comments received on the May drafts
- May be revised based on proposed DRR public comments
- Monitoring TAD offers recommendations on monitoring siting including the use of modeling
- Modeling TAD offers recommendations on modeling to act as a surrogate for monitoring

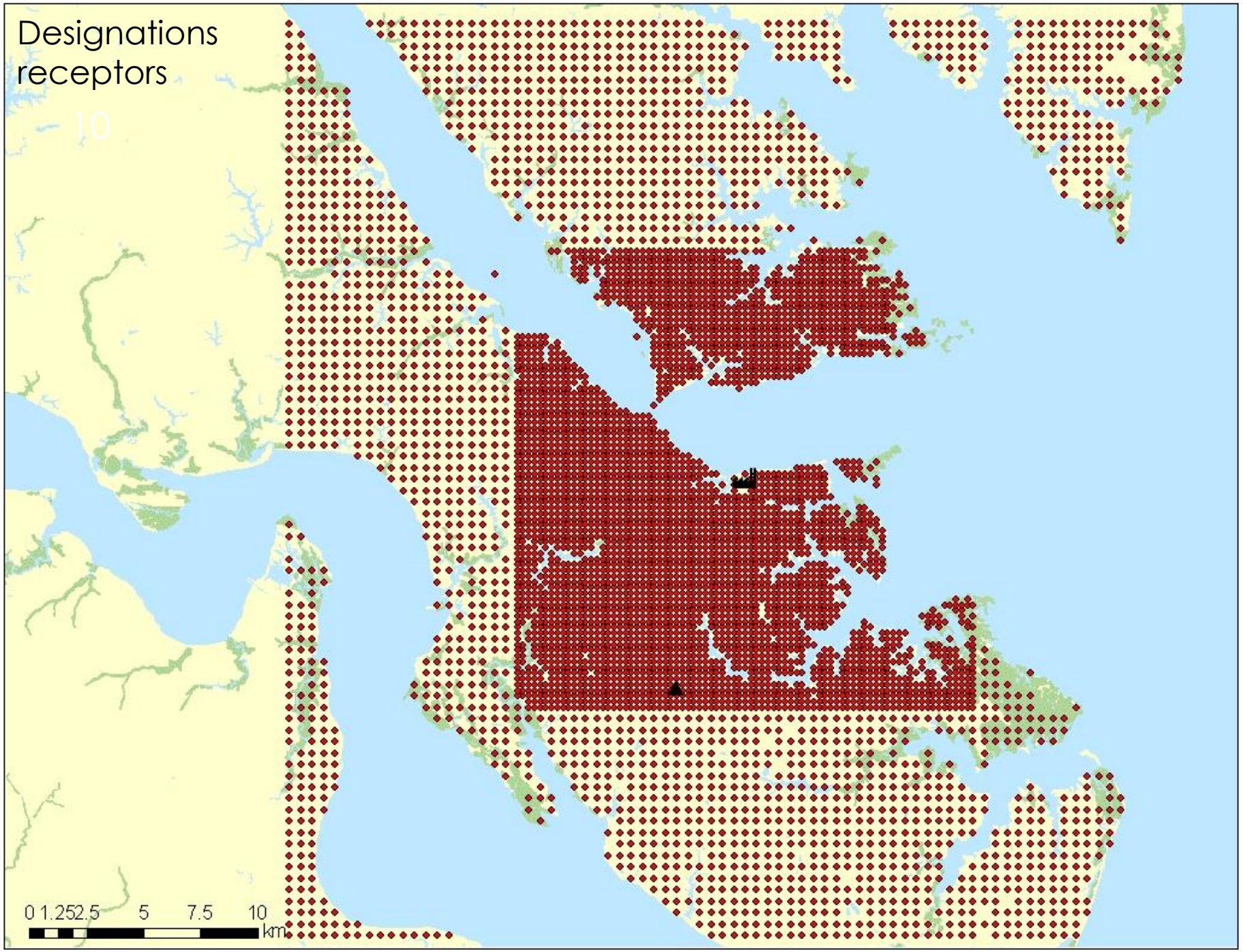
Modeling TAD

- Offers recommendations on modeling to act as surrogate for monitoring
  - Results can be used to designate area
- Recommendations
  - Model selection
  - Modeling domain and receptors
  - Sources to explicitly model vs. represented by background
  - Source characterization
  - Emissions inputs
    - Calculation of temporally varying emissions (most recent 3 years)
    - Allowables
  - Meteorological inputs
    - 3 years of data
  - Background concentrations
  - Documentation
  - Appendices with example calculations
  - Similar to SIP guidance with some exceptions

Designations modeling vs. SIP & PSD modeling

Parameter	SIP/PSD	Designations
Emissions	Allowables	Most recent 3 years of actual temporally varying or allowables
Stack heights	GEP policy	Actual heights (actual emissions); GEP policy with allowables
Meteorology	5 years NWS; at least 1 year site-specific	Most recent 3 years NWS or site-specific data(concurrent with emissions); some allowances for use of older data
Receptors	Ambient air	Ambient air where monitors could be placed (i.e. no receptors over water bodies)


SIP
receptors
0 1.252.5 5 7.5 10
km


Designations
receptors
0 1.252.5 5 7.5 10
km

Documents

- Non-attainment area guidance
  - http://www.epa.gov/airquality/sulfurdioxide/pdfs/20140423guidance.pdf
- Modeling TAD
  - http://www.epa.gov/airquality/sulfurdioxide/pdfs/SO2ModelingTAD.pdf
- Monitoring TAD
  - http://www.epa.gov/airquality/sulfurdioxide/pdfs/SO2MonitoringTAD.pdf

Questions?

Region 4 Nonattainment Areas 2010 SO2 NAAQS

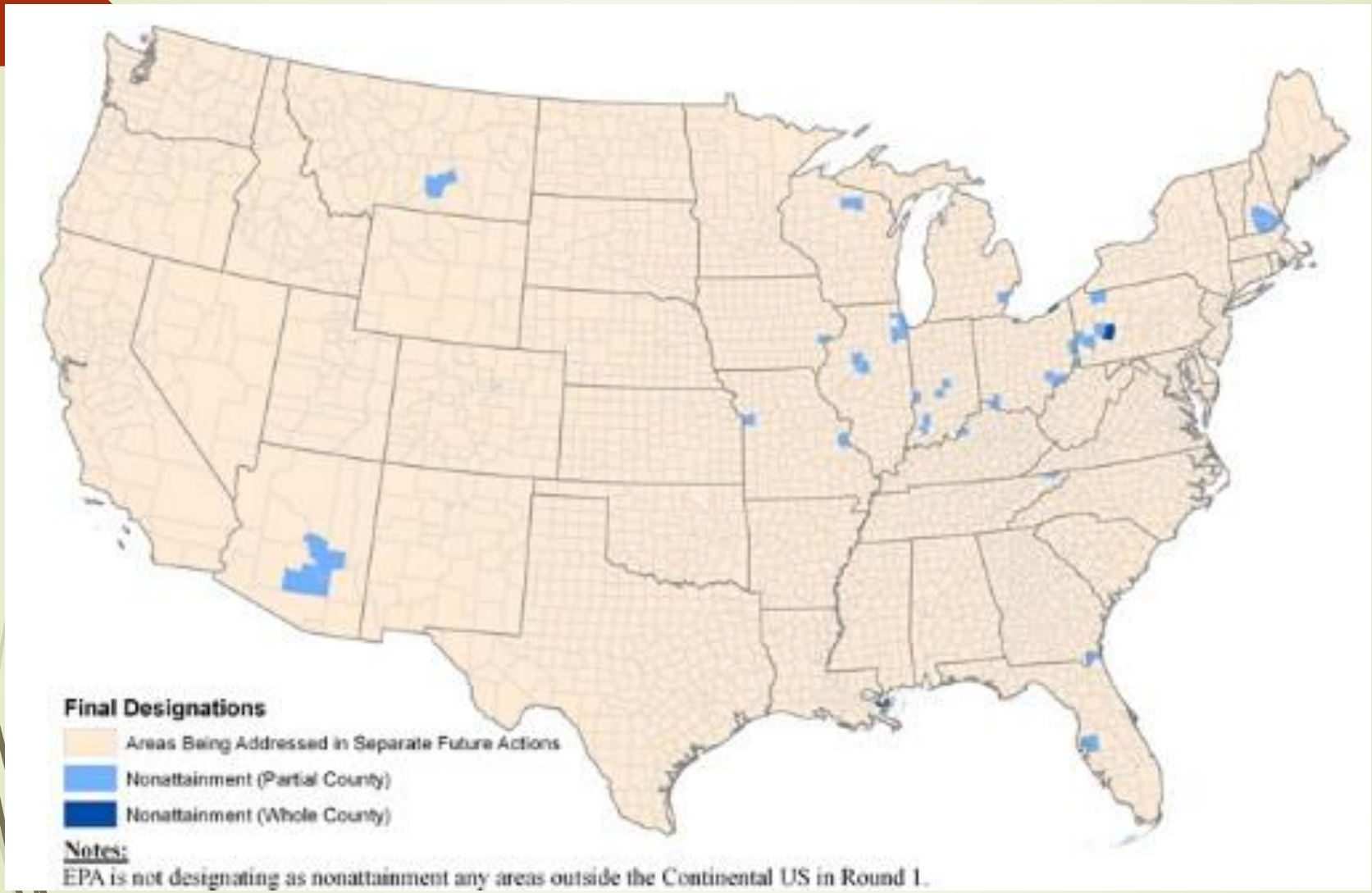
Contact: Rick Gillam

2014 Region 4 Modelers Workshop

November 3, 3014

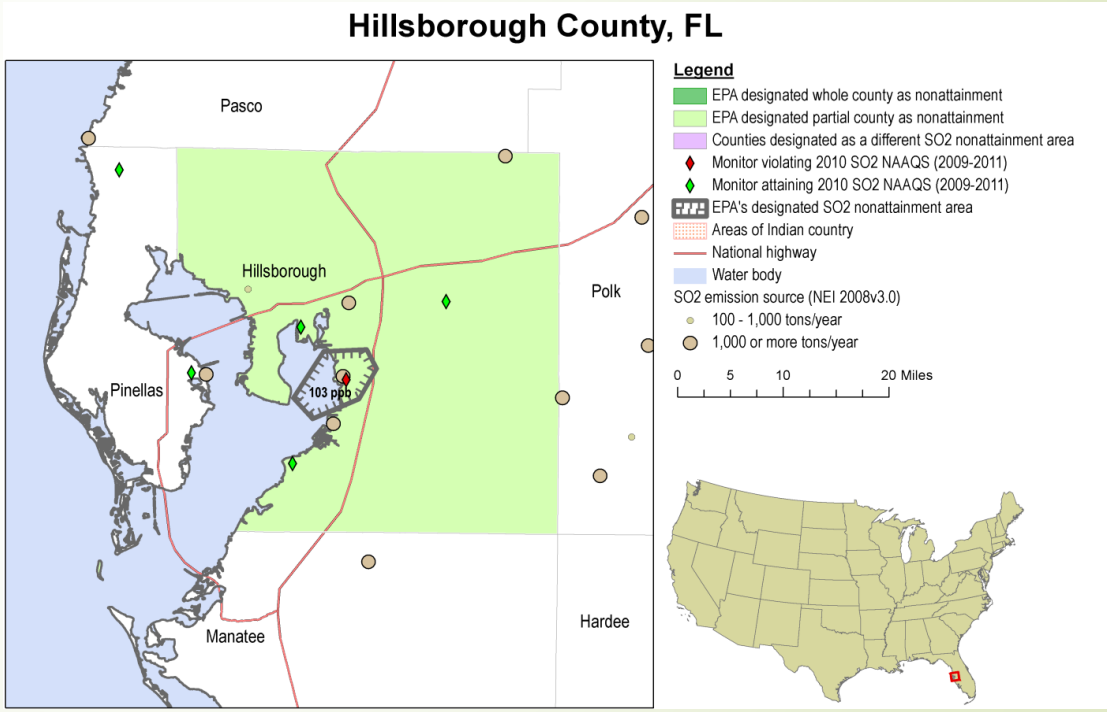
Initial Round of Designations

- EPA completed the initial round of designations for the 2010 SO2 NAAQS on July 25, 2013
- 5 Areas designated nonattainment in EPA Region 4
  - 2 Areas in Florida
    - Hillsborough County, FL
    - Nassau County, FL
  - 2 Areas in Kentucky
    - Campbell-Clermont Counties, KY-OH
    - Jefferson County, KY
  - 1 Area in Tennessee
    - Sullivan County, TN


Final Designations
Areas Being Addressed in Separate Future Actions
Nonattainment (Partial County)
Nonattainment (Whole County)
Notes:
EPA is not designating as nonattainment any areas outside the Continental US in Round 1.

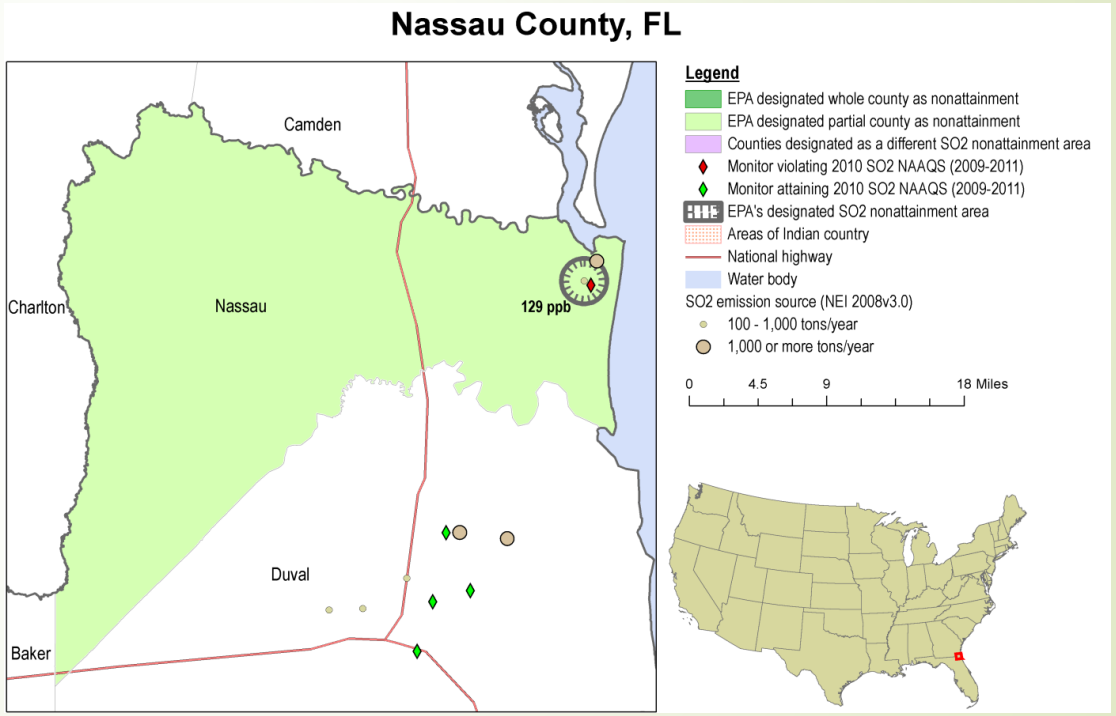
Hillsborough County, Florida

- Partial County Boundary established by FDEP using AERMOD Modeling
- One violating monitor with a 2009-2011 DV = 103 ppb
- One major source within the boundary with appox 3000 tpy SO2 emissions



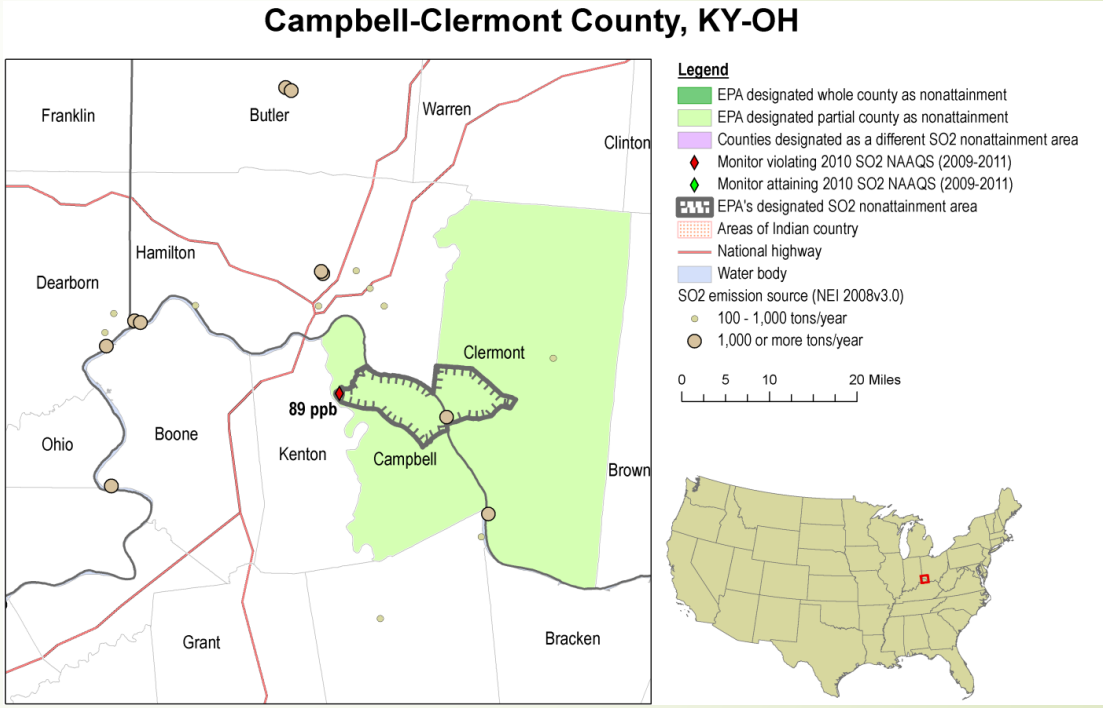
Nassau County, Florida

- Partial County Boundary established by FDEP using AERMOD Modeling
- One violating monitor with a 2009-2011 DV = 129 ppb
- Two major sources within the boundary with appox. 4300 tpy and 900 tpy SO2 emissions

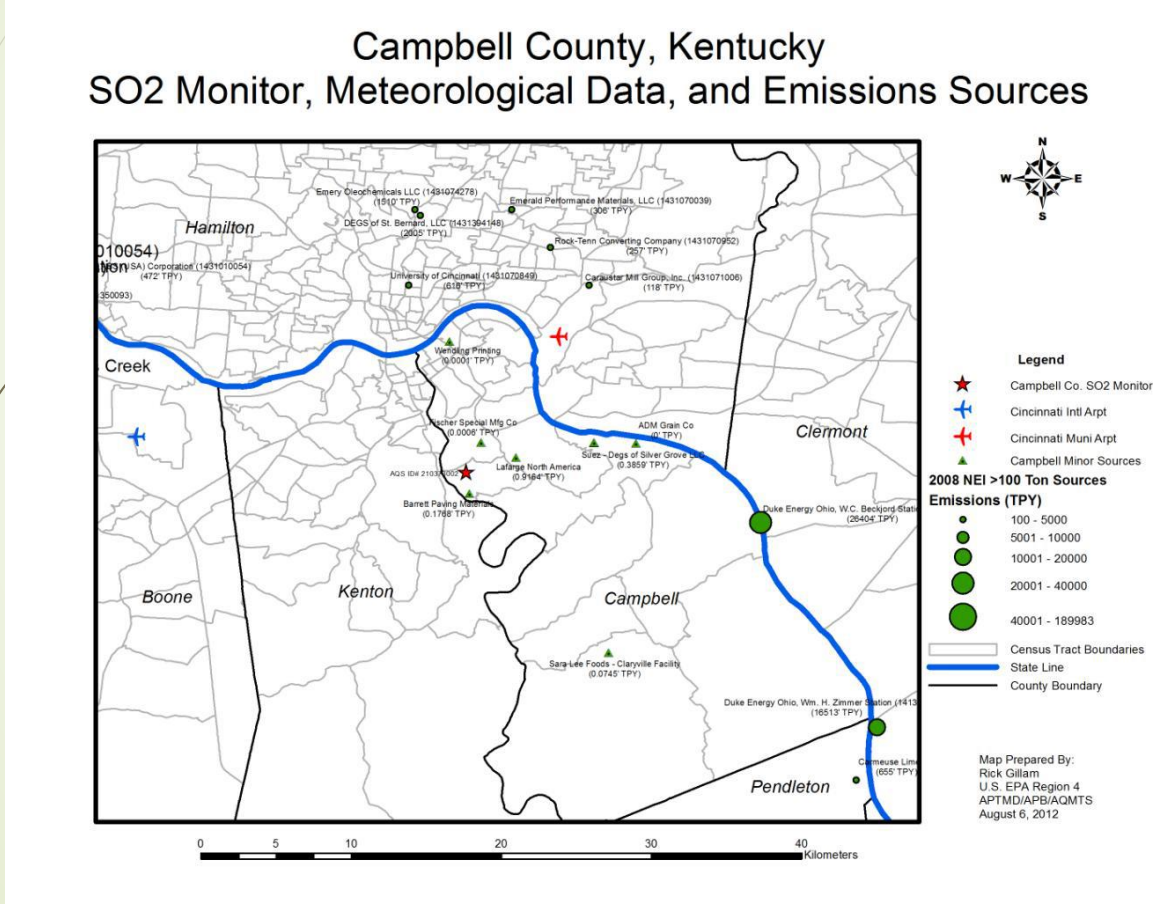


Campbell-Clermont, Kentucky-Ohio

- **Partial Counties Boundary established by EPA to capture the violating monitor and the primary emissions source**
- **One violating monitor with a 2009-2011 DV = 89 ppb**
- **One major EGU source within the boundary with over 90,000 tpy SO2 emissions in 2011 (CAMD data)**

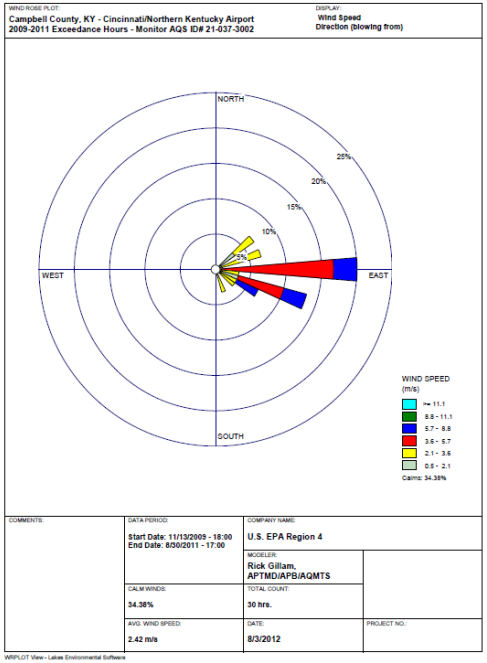


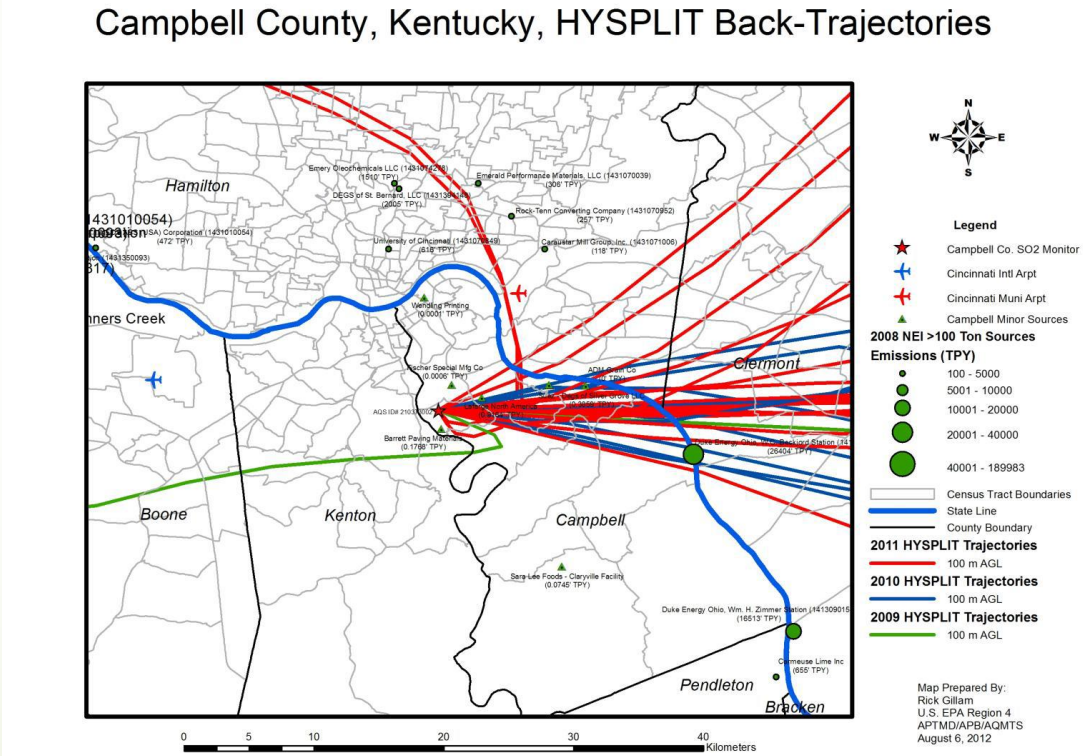
Campbell-Clermont, Kentucky-Ohio



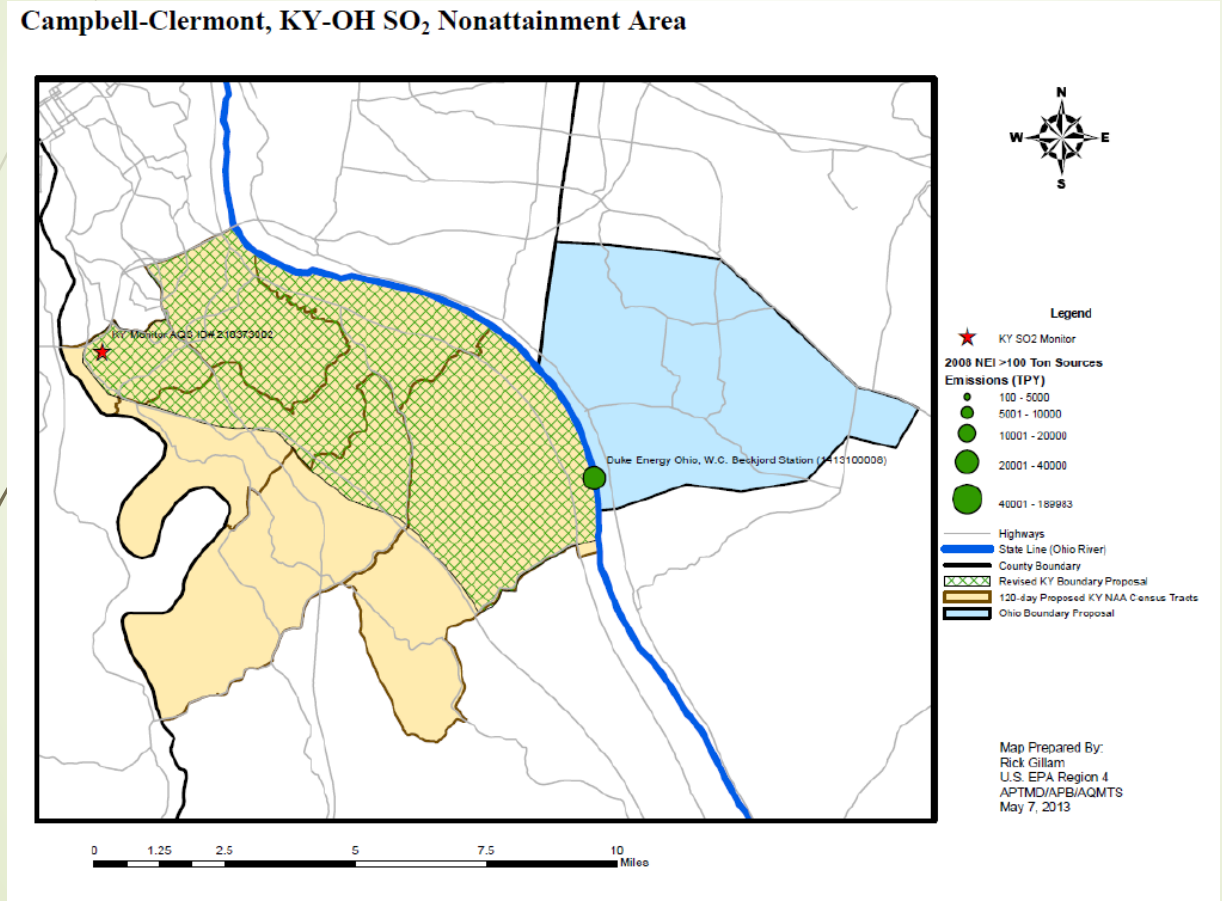
Campbell-Clermont, Kentucky-Ohio

Figure 6. Wind Rose of 2009-2011 hours exceeding the 1-hr SO_2 NAAQS at the violating monitor with wind data from the Cincinnati/Northern Kentucky Airport site.



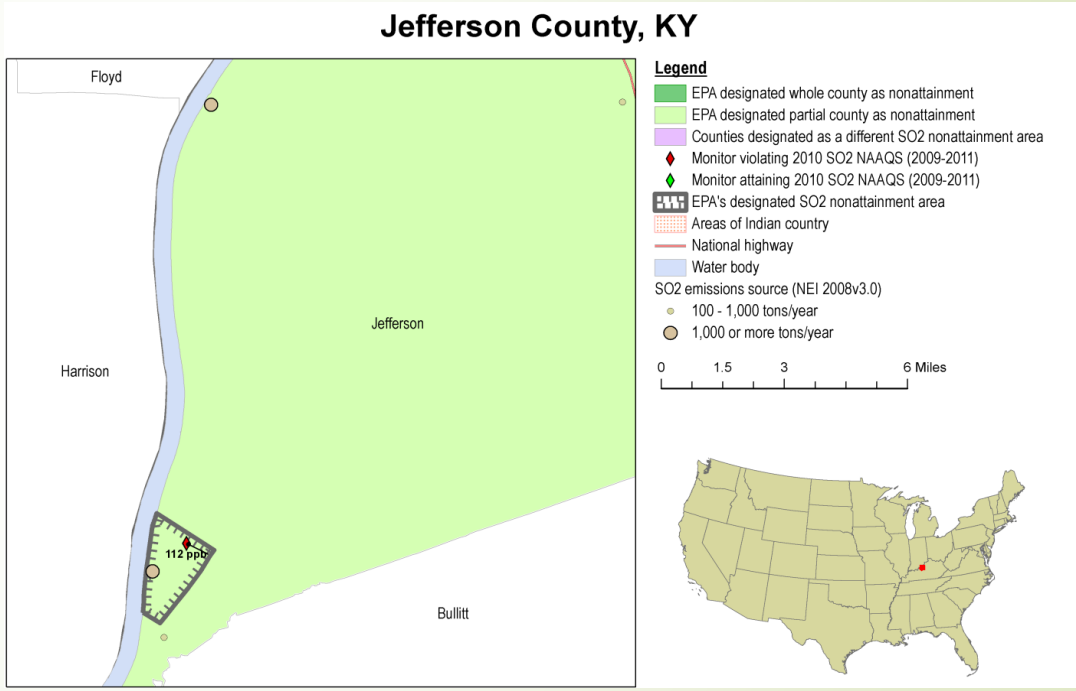


Campbell-Clermont, Kentucky-Ohio



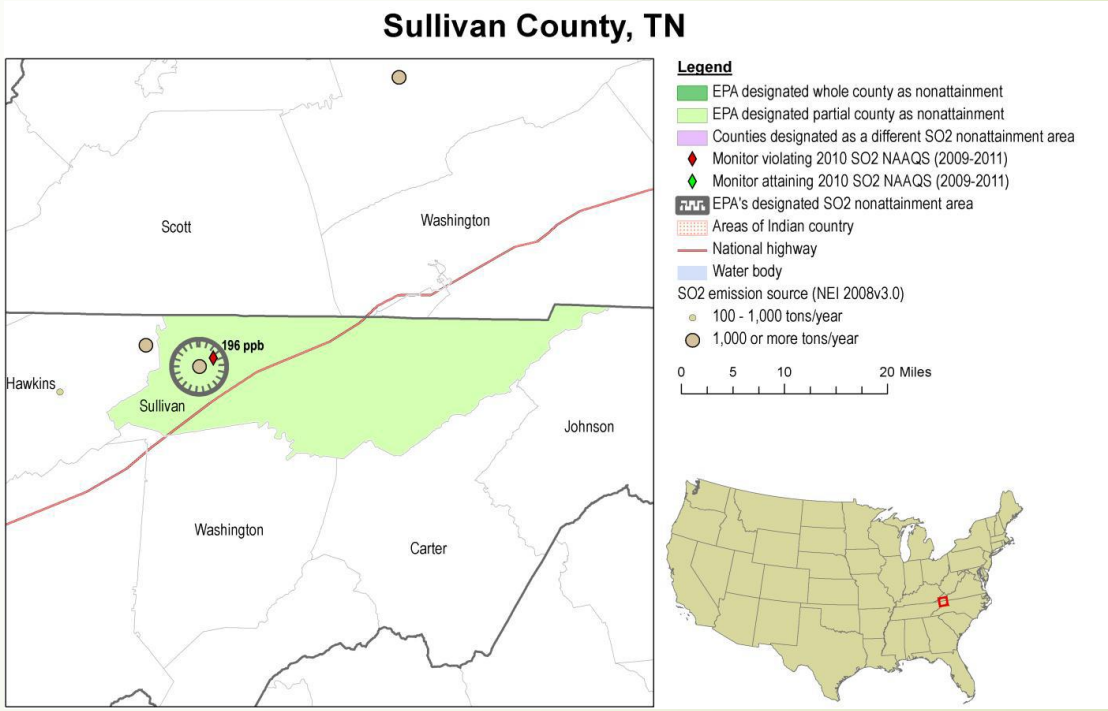
Jefferson County, Kentucky

- Partial County Boundary established by KYDAQ to capture the violating monitor and the primary emissions source
- One violating monitor with a 2009-2011 DV = 112 ppb
- One major EGU source within the boundary with over 28,500 tpy SO2 emissions



Sullivan County, Tennessee

- **Partial County Boundary established by TDEC to capture the violating monitor and the primary emissions source**
- **One violating monitor with a 2009-2011 DV = 196 ppb**
- **One major source within the boundary with over 21,900 tpy SO2 emissions**



Attainment Demonstrations Due April 4, 2015

Pointy Hair = EPA
Dilbert = States