



**New Ozone NAAQS  
and  
Proposed Revised  
Nonattainment Boundary  
Recommendations**

**Department of Environment &  
Natural Resources  
Division Of Air Quality**

# Why are we here?

- **Get feedback on possible changes to the Metrolina ozone nonattainment area**



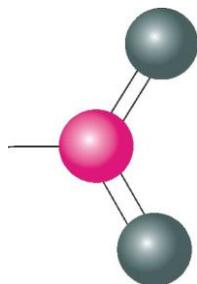
# What is Ozone?

- **Two types of ozone**
  - **Stratospheric ozone – Blocks UV radiation**
  - **Tropospheric ozone or low level ozone – causes lung irritation at higher concentrations**
- **Tropospheric ozone forms in the presence of “precursor pollutants” and sunlight**
  - **Highest in the summer**
  - **Power plants and motor vehicles are primary man-made source of precursors**
- **EPA establishes the National standards**

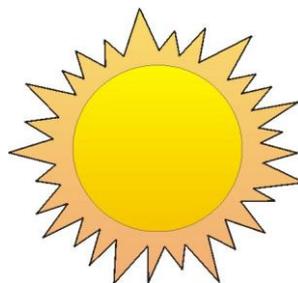
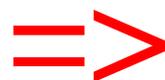
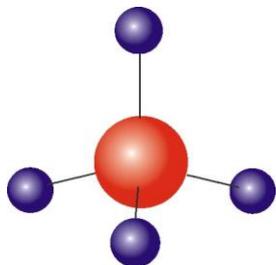


## Formation of Ground-level Ozone

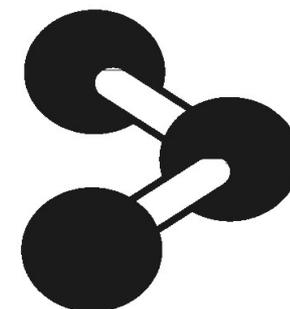
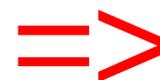
Oxides of Nitrogen (NO<sub>x</sub>)



- AND -



Strong Spring or Summer Sun  
(with low RH & light winds)



Ozone (O<sub>3</sub>)

Volatile Organic  
Compounds (VOCs)



# 2008 8-hour Ozone Standard

- Promulgated March 2008
- 75 parts per billion (ppb)
  - Based on the 3-year average of the annual 4th highest daily maximum 8-hour average
- Implementation delayed while EPA reconsidered the standard
- September 2011 – EPA announced it would not reconsider the standard
- Late September – EPA announced they will move forward with implementation of 75 ppb standard



# **New Ozone Standard Schedule**

- **Oct 28, 2011 – NCDAQ submitted revised boundary recommendation**
  - **Recommended existing nonattainment boundaries for Metrolina area**
  - **Had little time to go through public process**
  - **Reserved right to further amend the recommendation**



# New Ozone Standard Schedule

- **Dec 2011 – EPA notified Governor that they intend to support designating Metrolina area nonattainment**
  - Stated they would work with NC on appropriate boundary
- **Jan 2012 – NCDAQ holds public meetings about potential boundary options**
- **Feb 29, 2012 – Final State Boundary recommendations due**
- **May 31, 2012 – EPA under consent decree to designate areas nonattainment**



## What does Nonattainment mean?

- EPA label declaring that air quality does not meet the National standards
- Requires State to develop a plan demonstrating what control measures are needed to meet & maintain the standard
- Requires transportation conformity
- Requires new source review on new major industrial sources & major modification on existing sources



# **Process for Determining Nonattainment Boundaries**

- **Factors EPA says to take into consideration**
  - **Air Quality Data**
  - **Emissions Data**
  - **Population Density/Degree of Urbanization**
  - **Traffic/Commuting Patterns**
  - **Growth Rates**
  - **Meteorology**
  - **Geography/Topography**
  - **Jurisdictional Boundaries**
  - **Level of Control of Emission Sources**

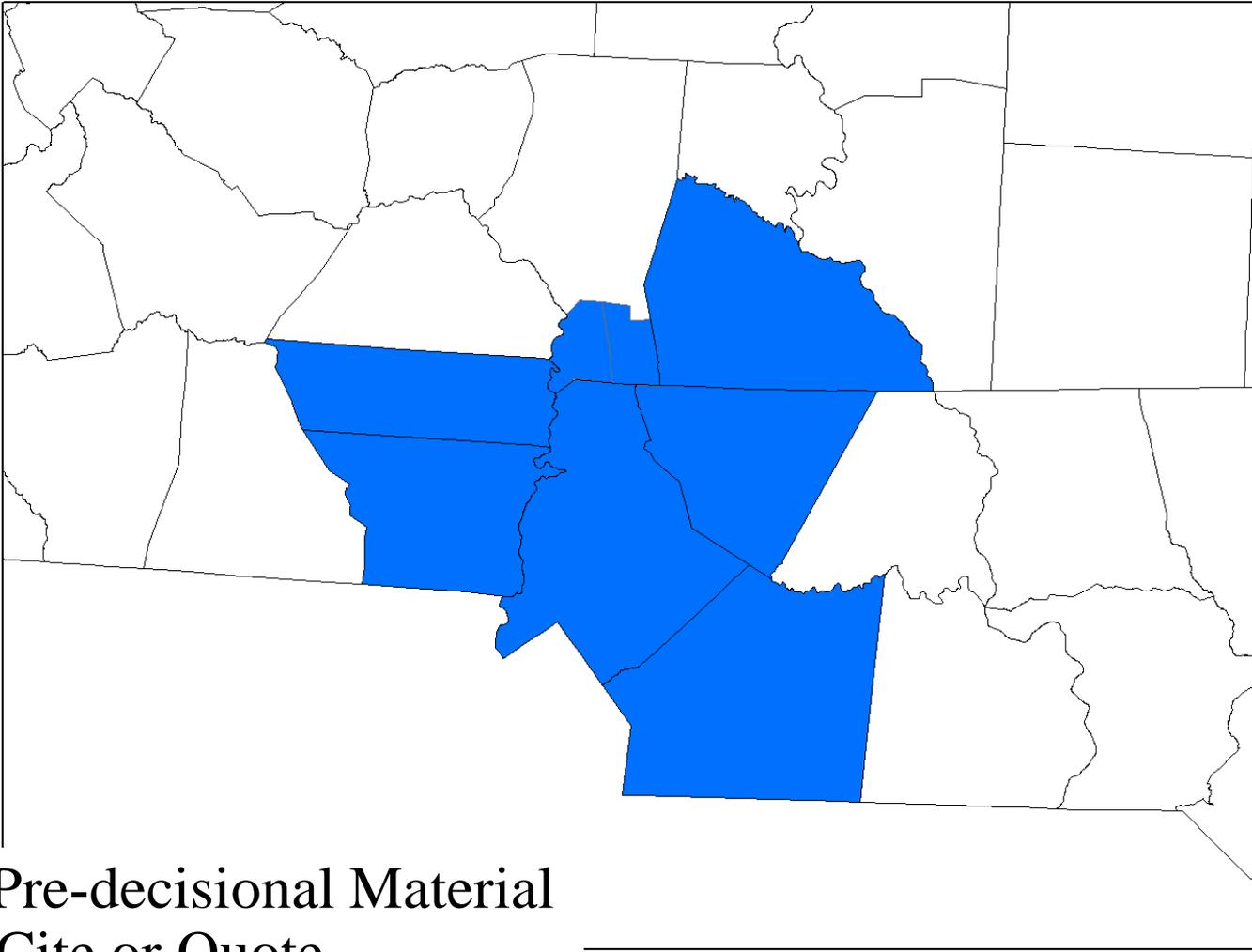


# **Potential Nonattainment Boundaries**

- **NCDAQ has developed various options**
- **Coordinate with other agencies impacted by nonattainment designations (NCDOT, NCDOA and NCDOC, Local Governments)**
- **Will be shared at various public meetings in Metrolina and any comments received will be taken into consideration**



## North Carolina's Recommendation Submitted October 28, 2011



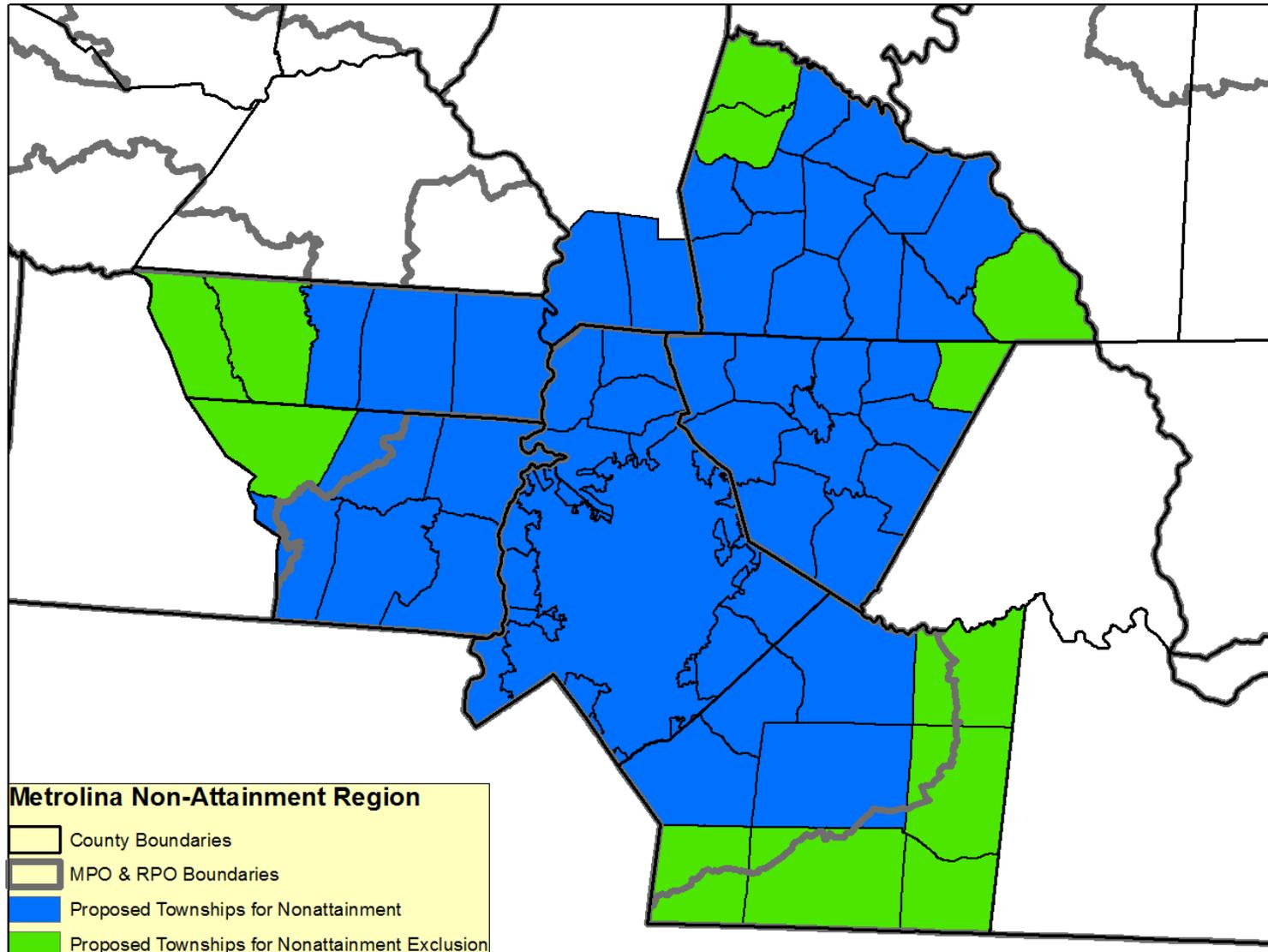
Draft – Pre-decisional Material  
Do Not Cite or Quote

# **Proposed Options for Boundaries**

**Using the various EPA factors, NCDAQ has identified townships for possible exclusion from the nonattainment area.**

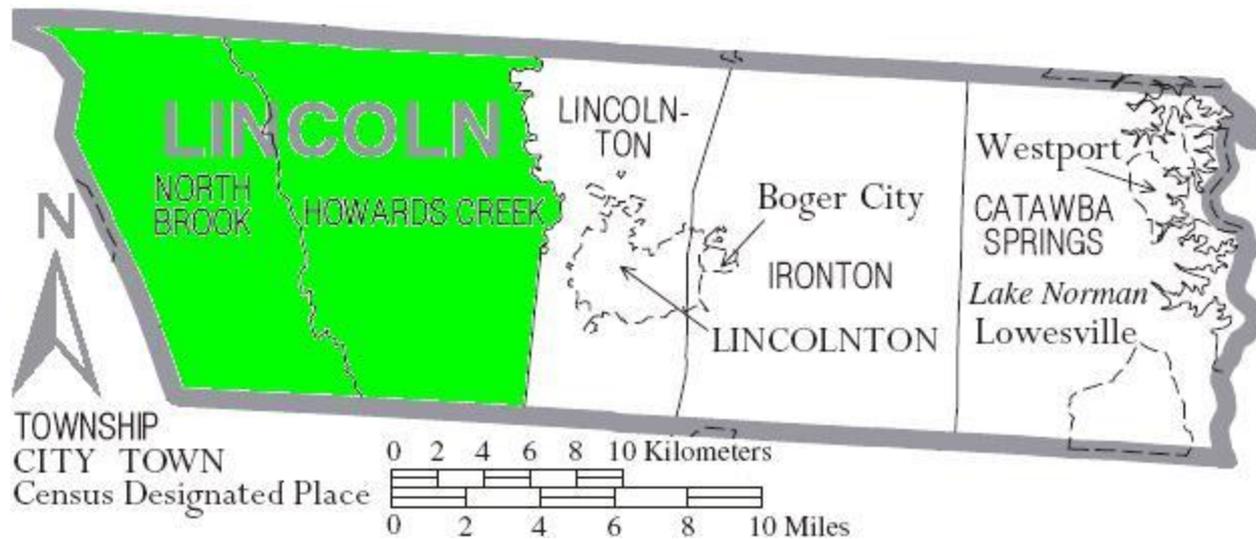
**We may exclude all, some, or none of the proposed townships based on your feedback!**

# Townships Considered for NAA Exclusion



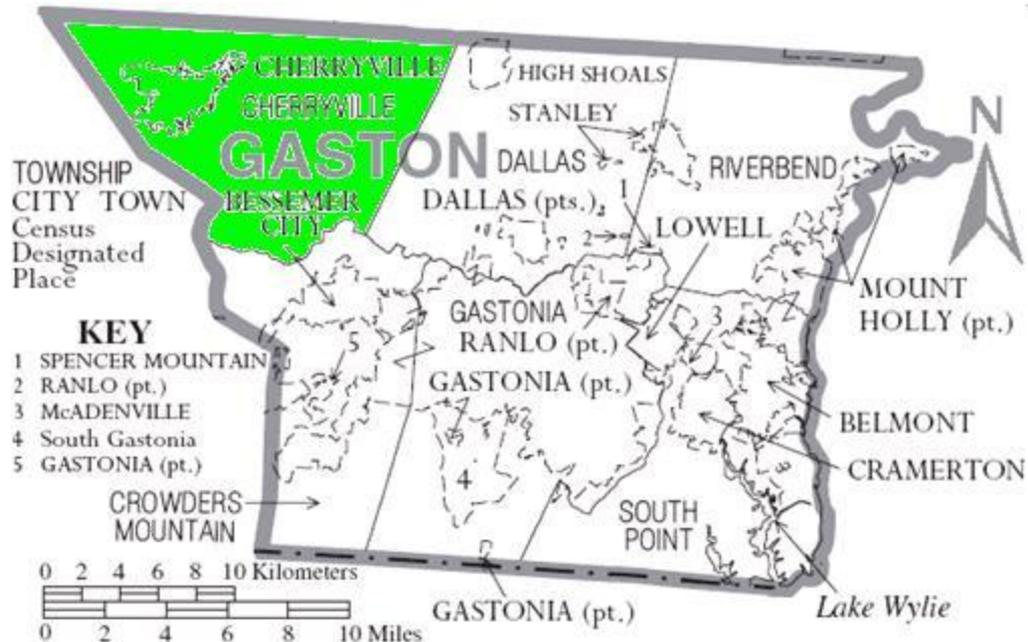
# Lincoln County

- North Brook and Howards Creek townships



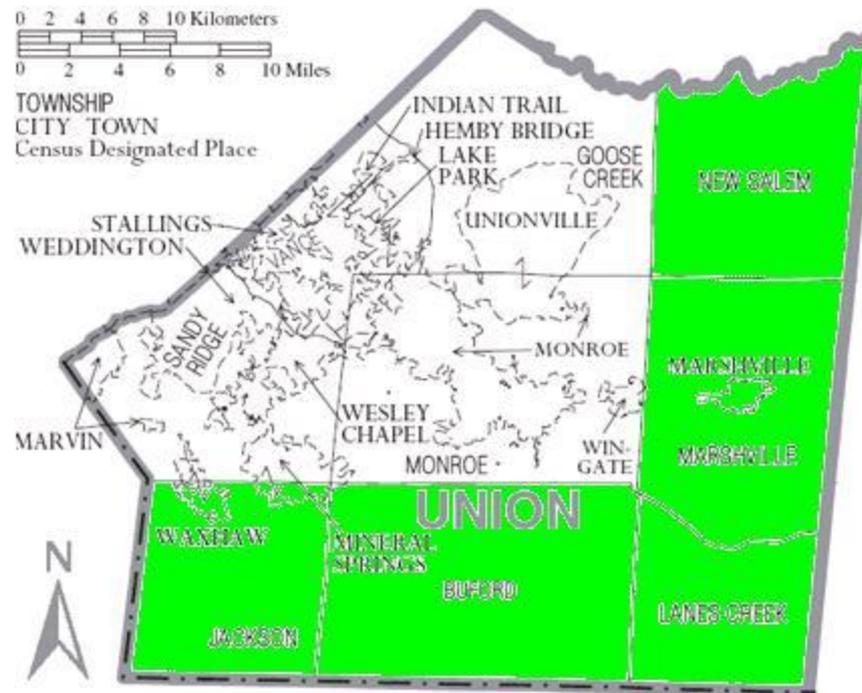
# Gaston County

- Cherryville Township (northwest part of county)



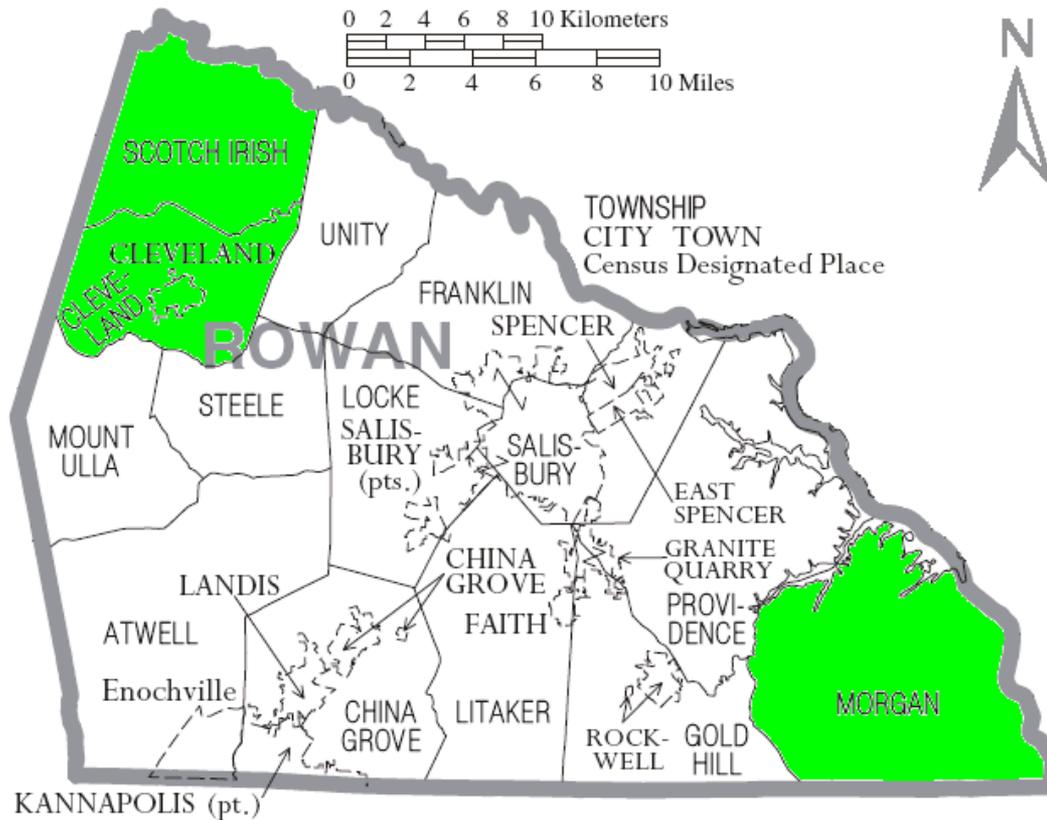
# Union County

- New Salem, Marshville, Lanes Creek, Buford, and Jackson townships



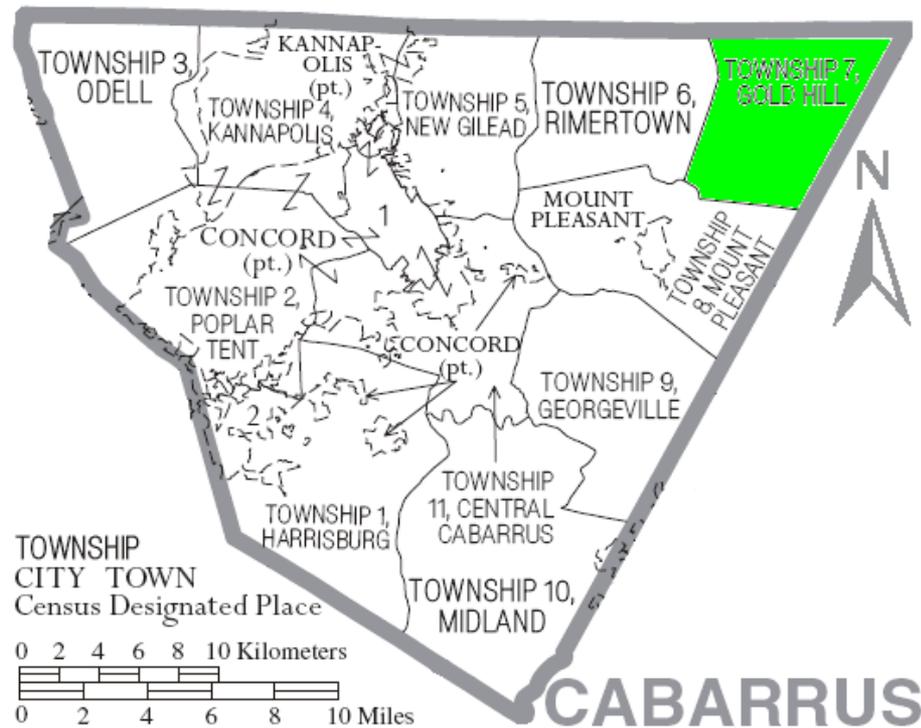
# Rowan County

- **Scotch Irish, Cleveland, and Morgan townships**

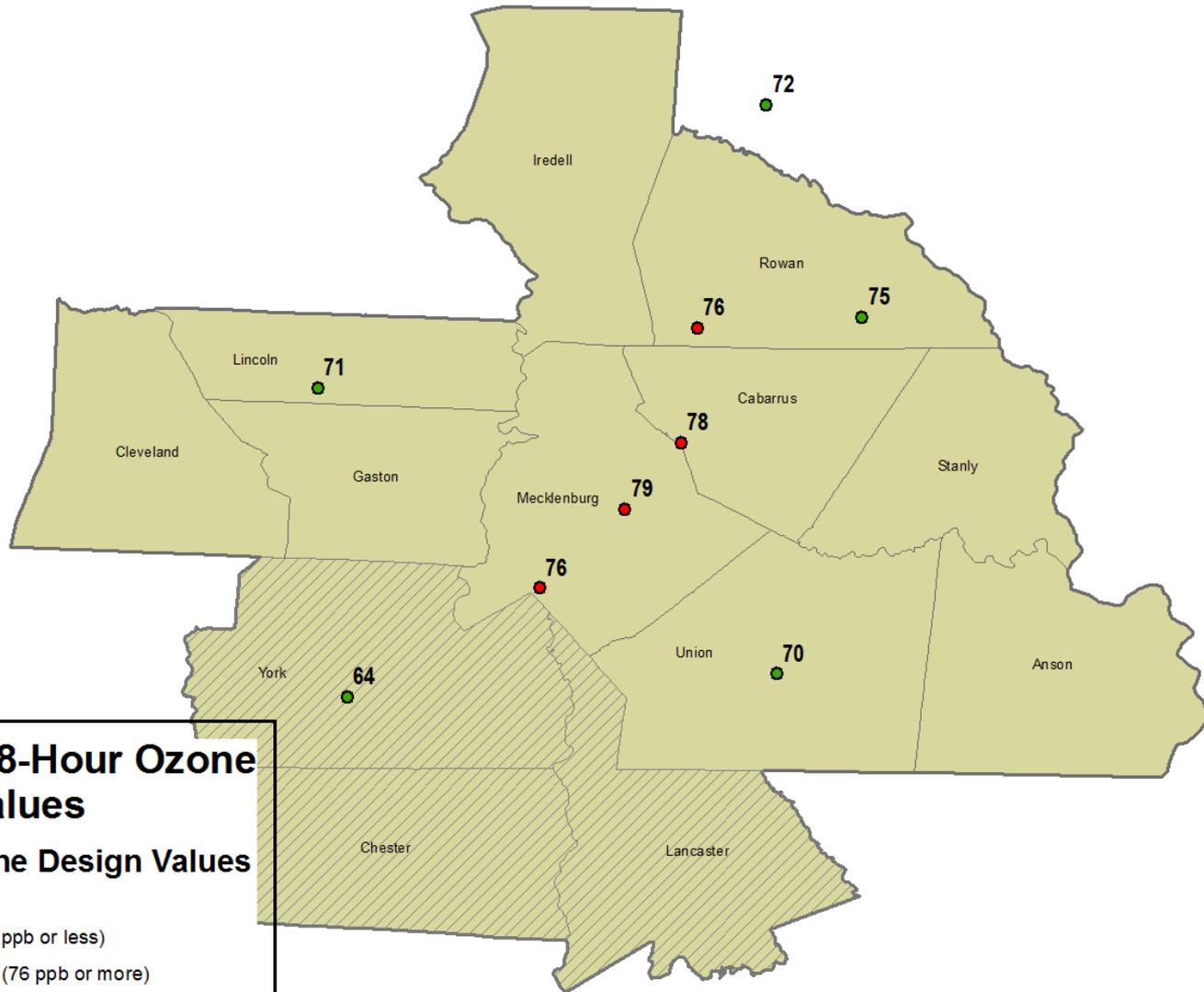


# Cabarrus County

- **Gold Hill township**



# Metrolina Design Values

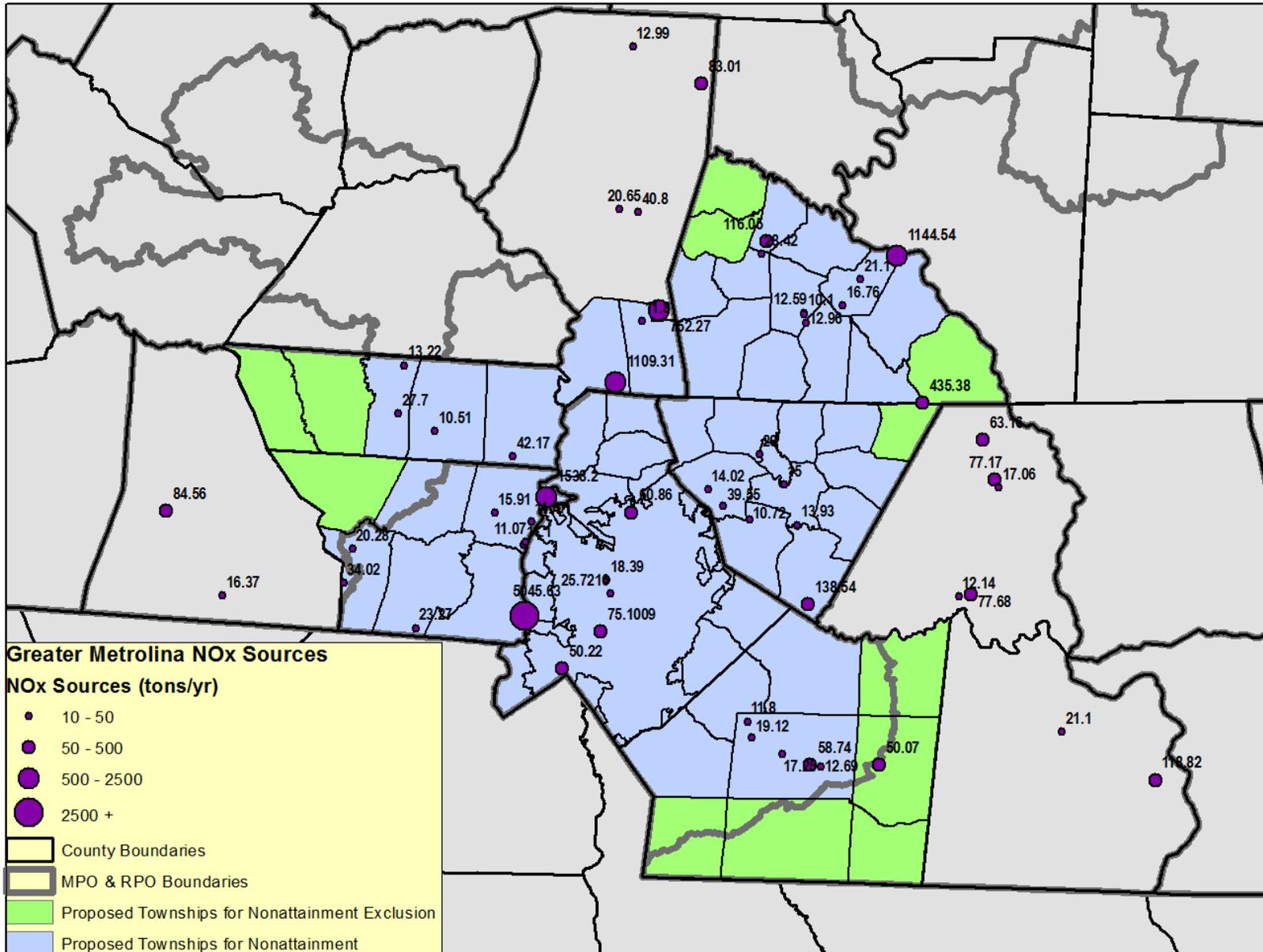


**Regional 8-Hour Ozone Design Values**  
**8-Hour Ozone Design Values**  
2009-2011

- Attaining (75 ppb or less)
- Nonattaining (76 ppb or more)

Charlotte-Gastonia-Salisbury CSA

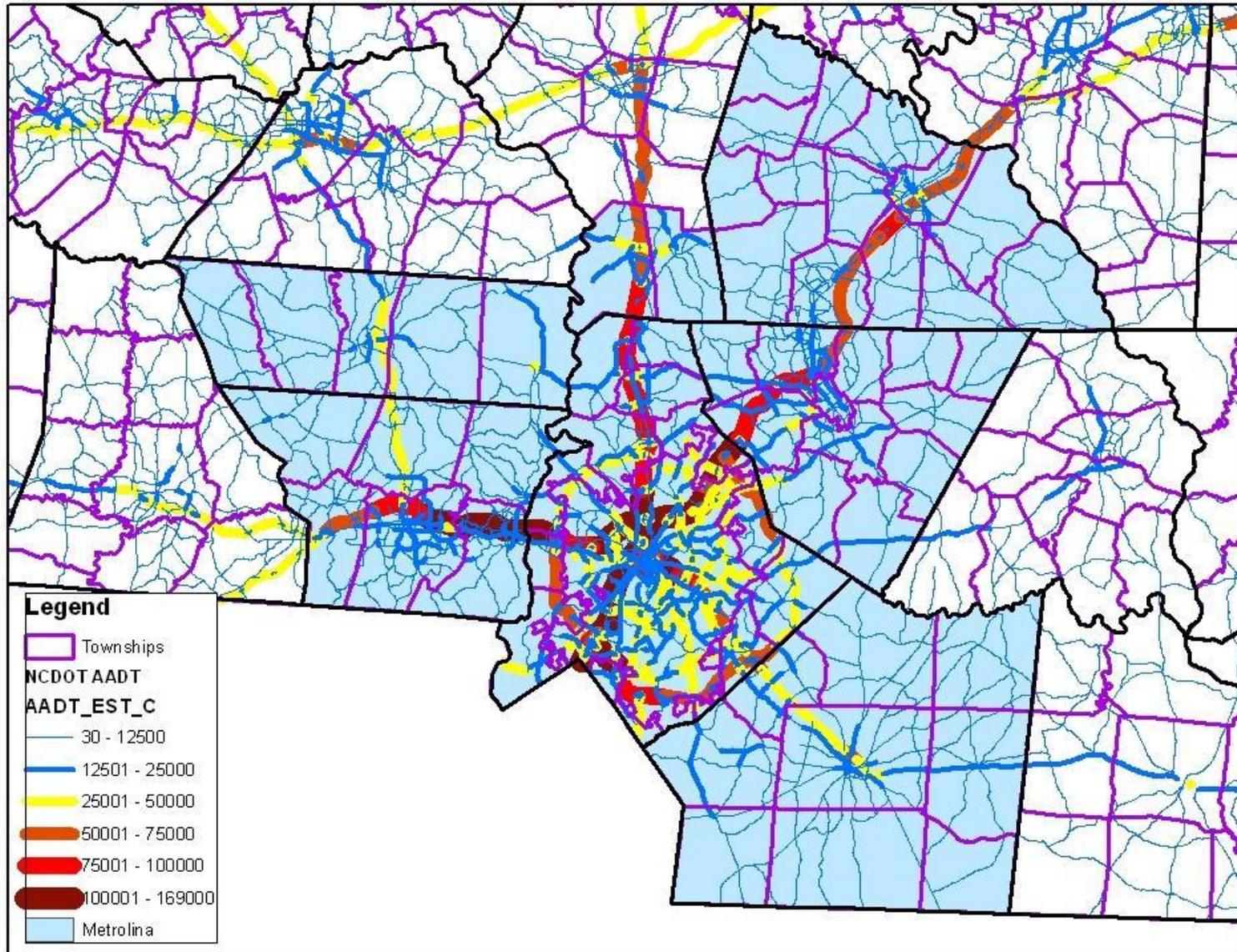
# NOx Point Sources



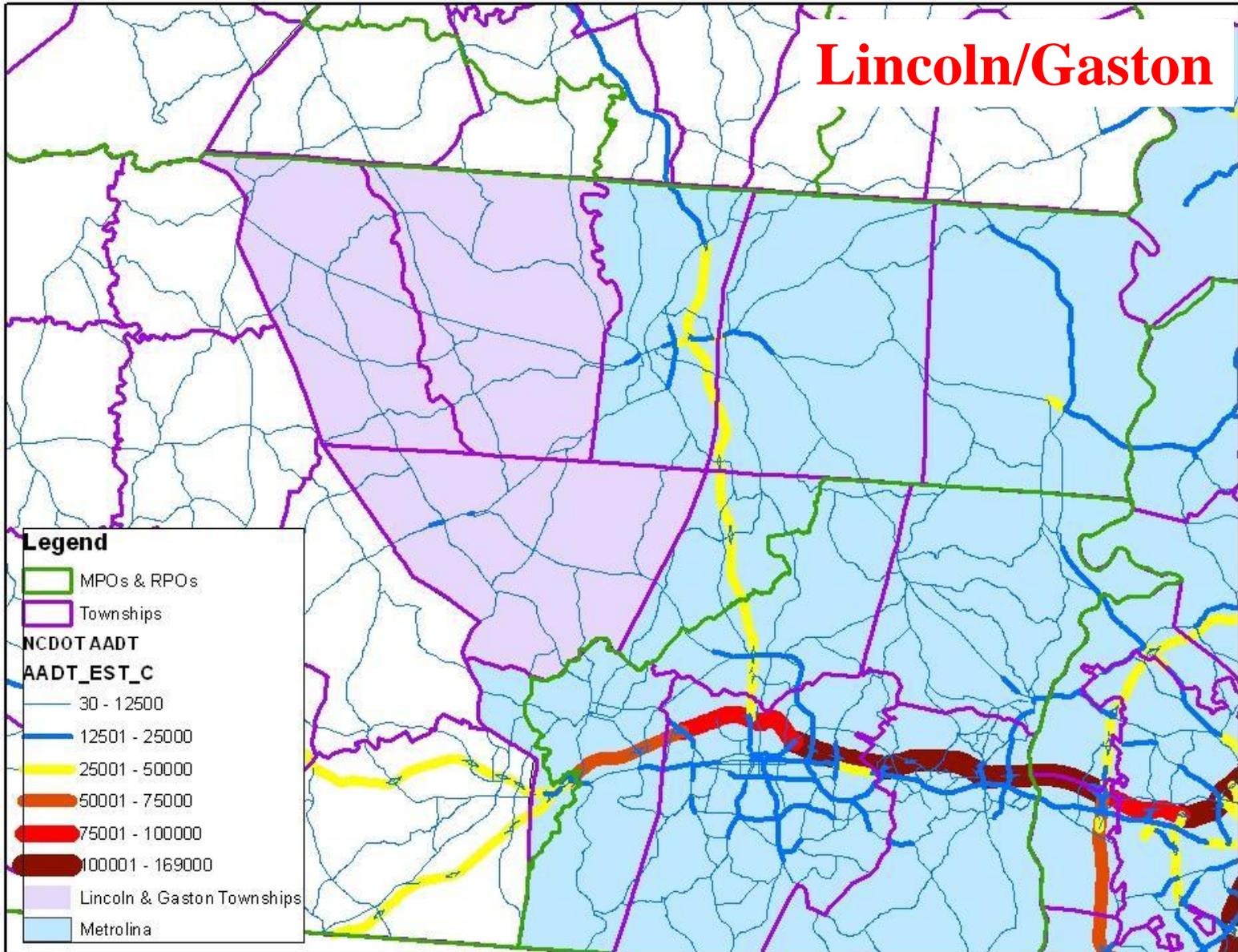
# Traffic Counts

Metrolina Average Annual Daily Traffic with Townships

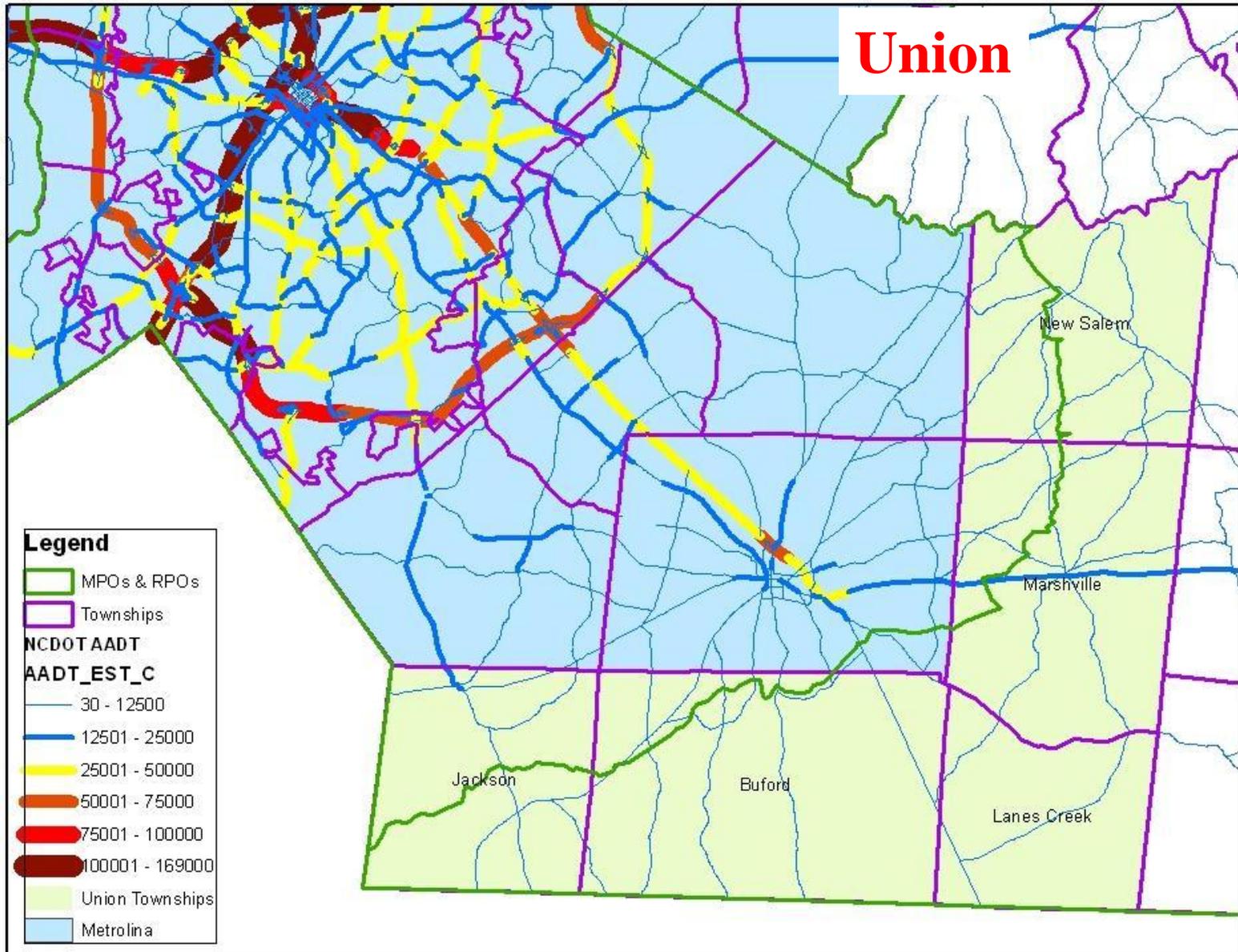
Source: NCDOT, 2010



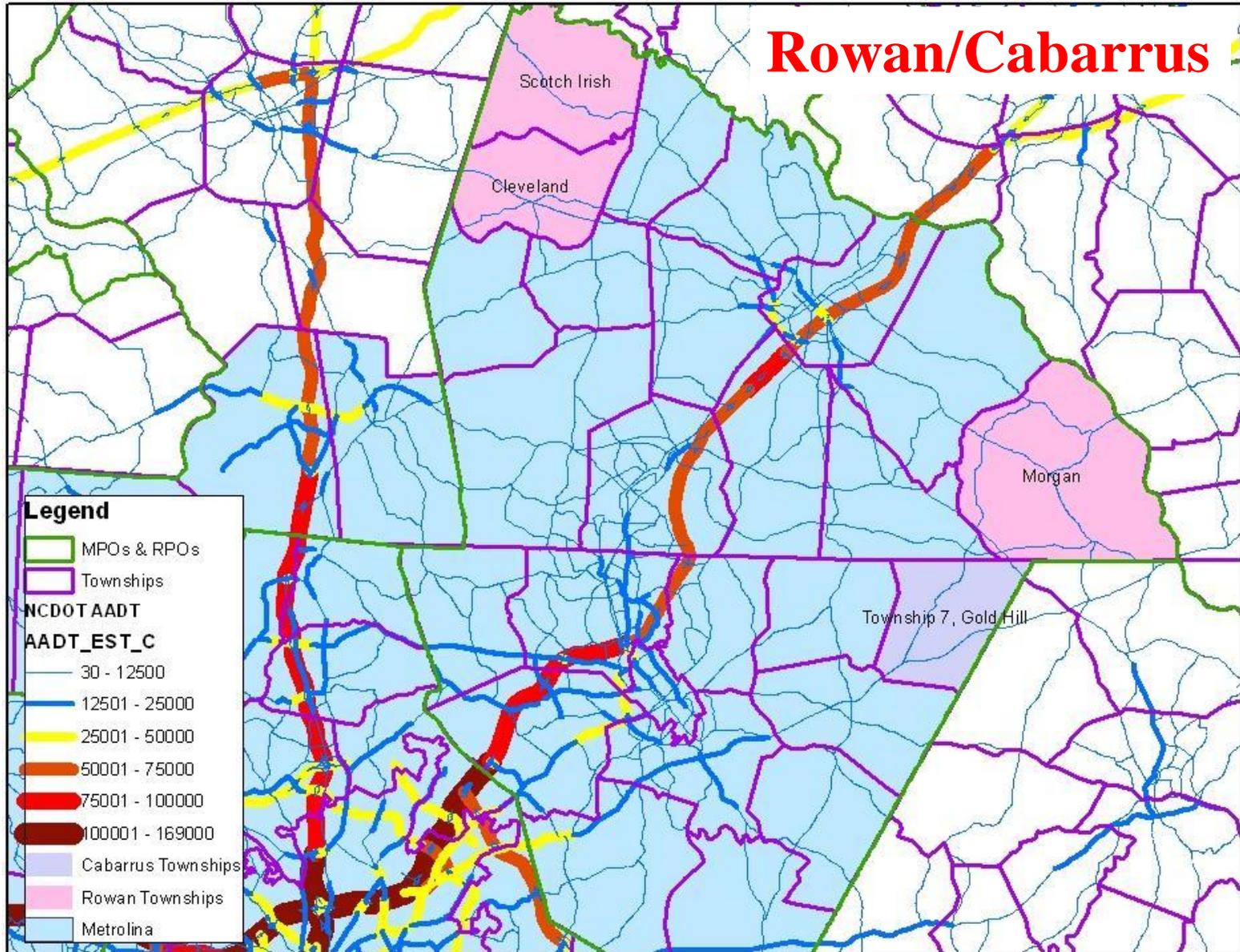
# Metrolina Average Annual Daily Traffic with Townships



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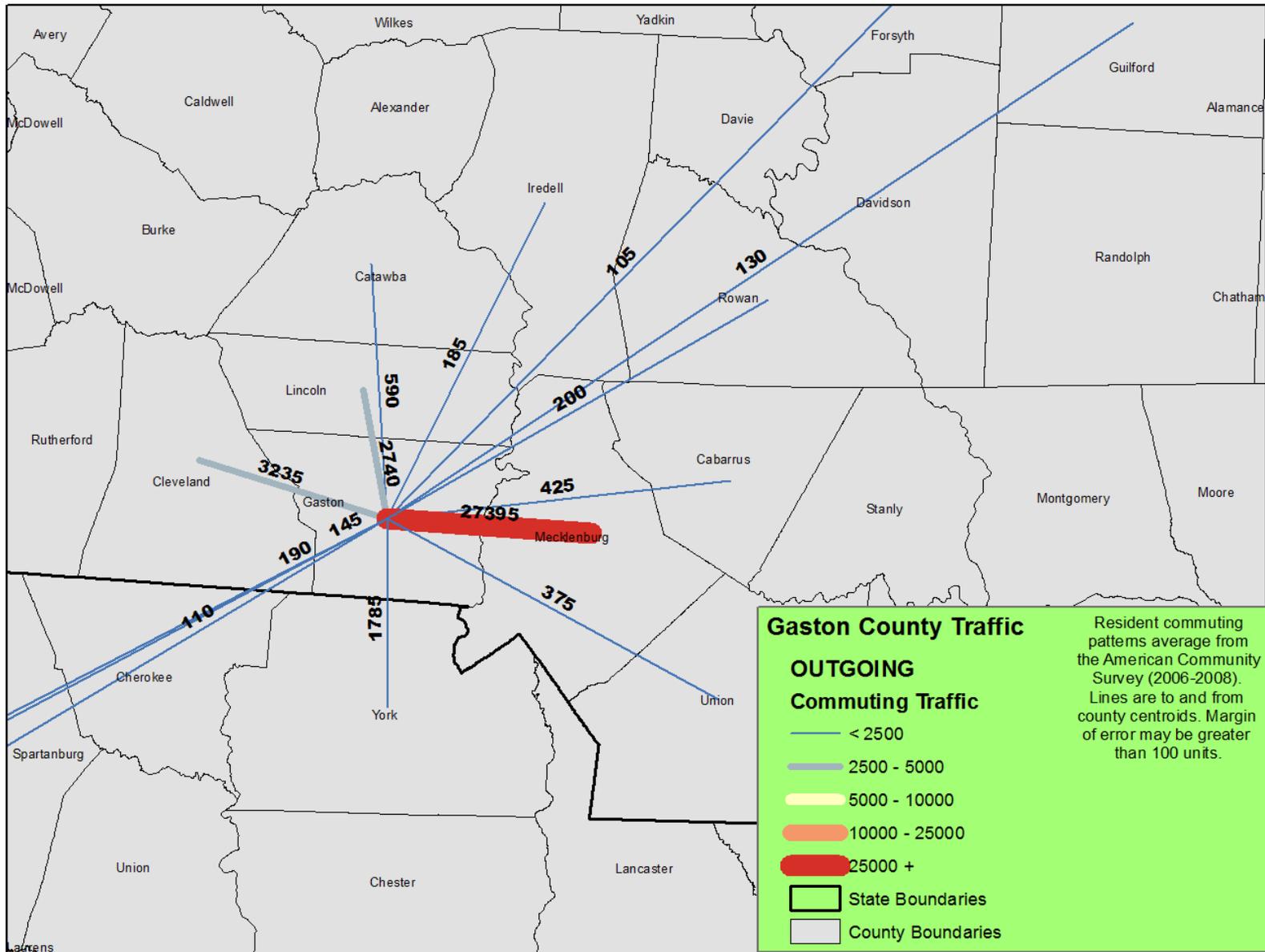
# Metrolina Average Annual Daily Traffic with Townships



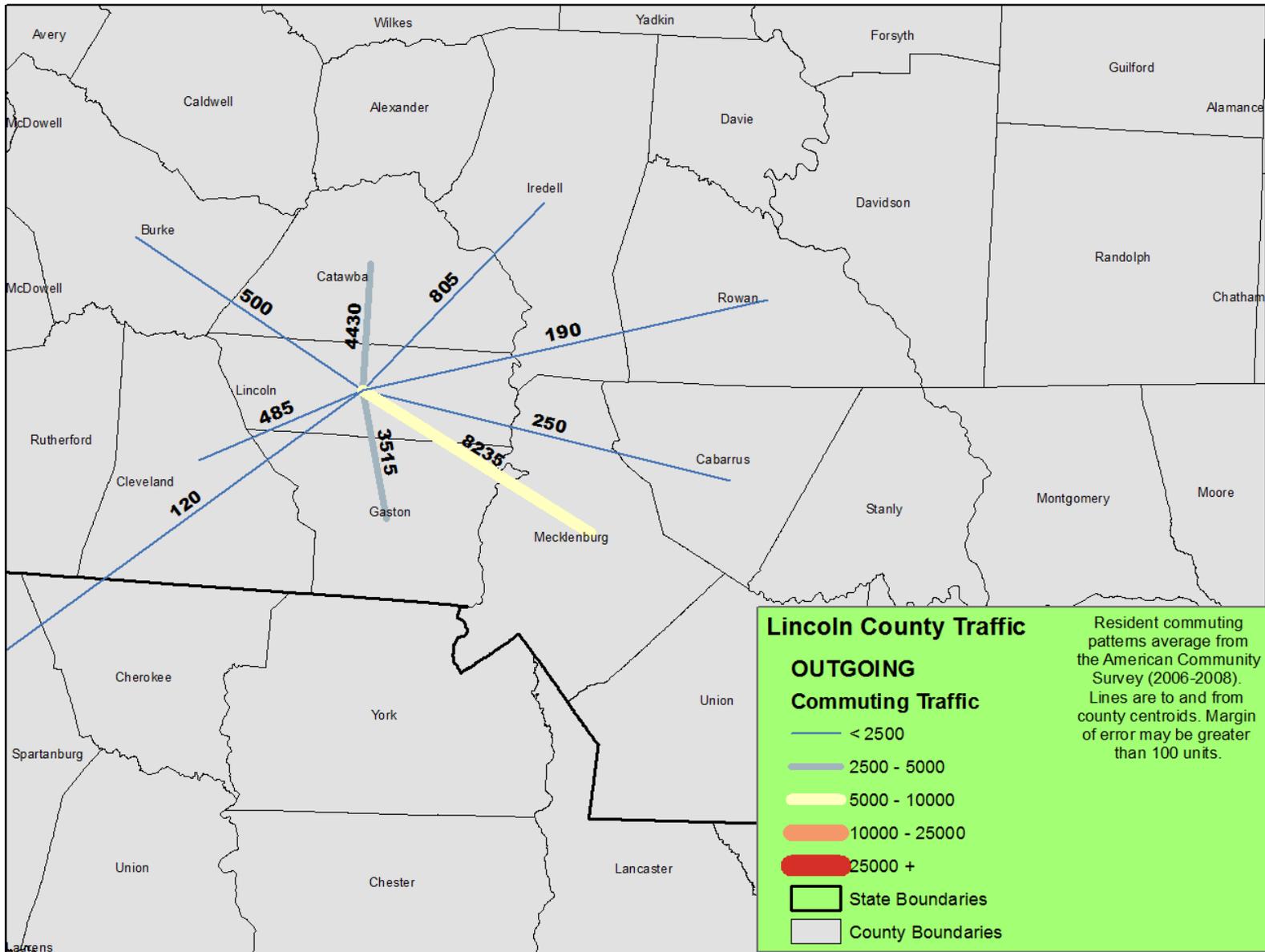
# Commuting Data

- **2006-2008 American Community Survey (ACS) by the US Census**
- **Only by county, so it is difficult to use this data for partial counties**
- **Only estimates**
- **Working to get more refined data from NC DOT**

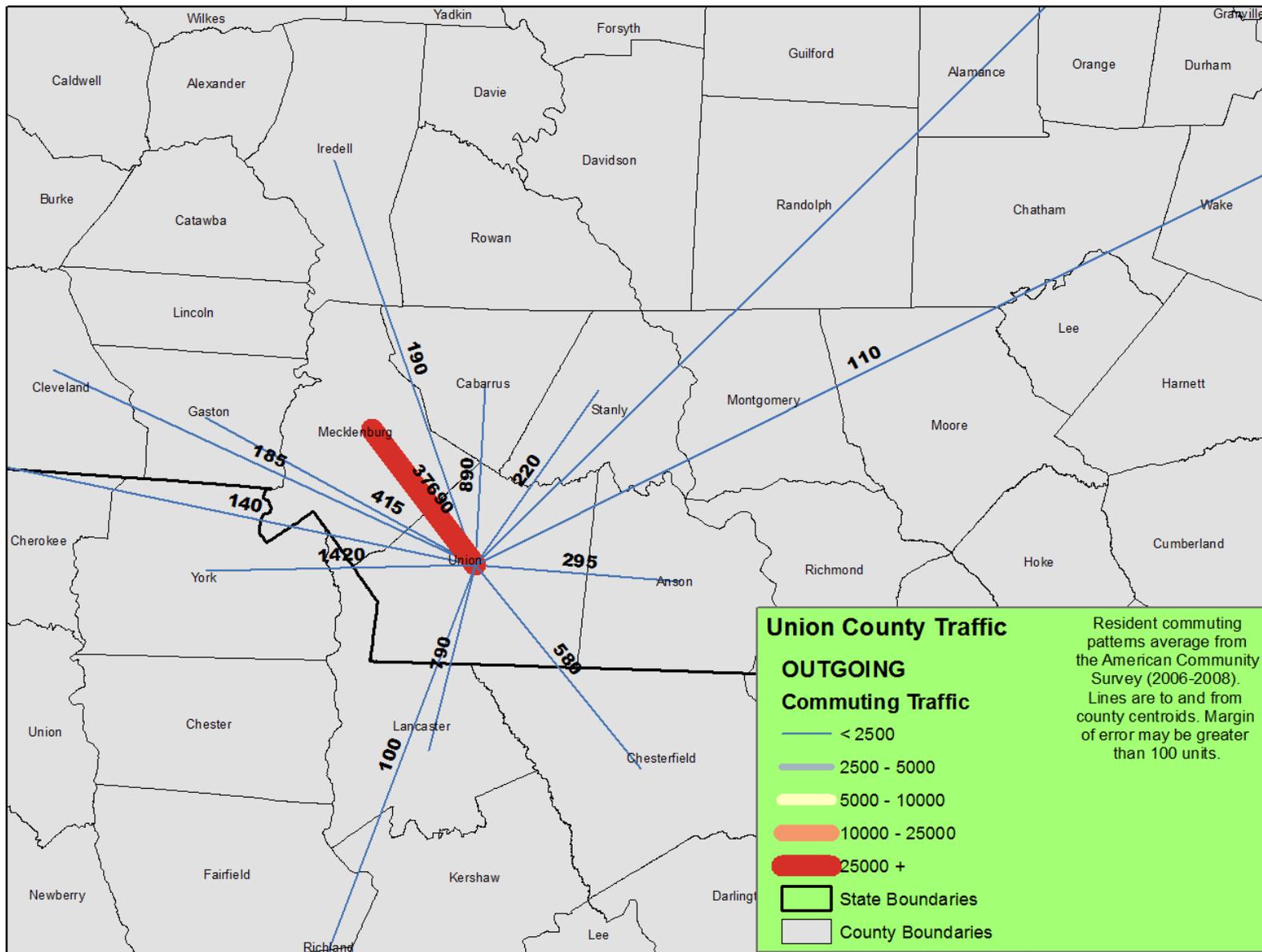
# Gaston County ACS Outgoing



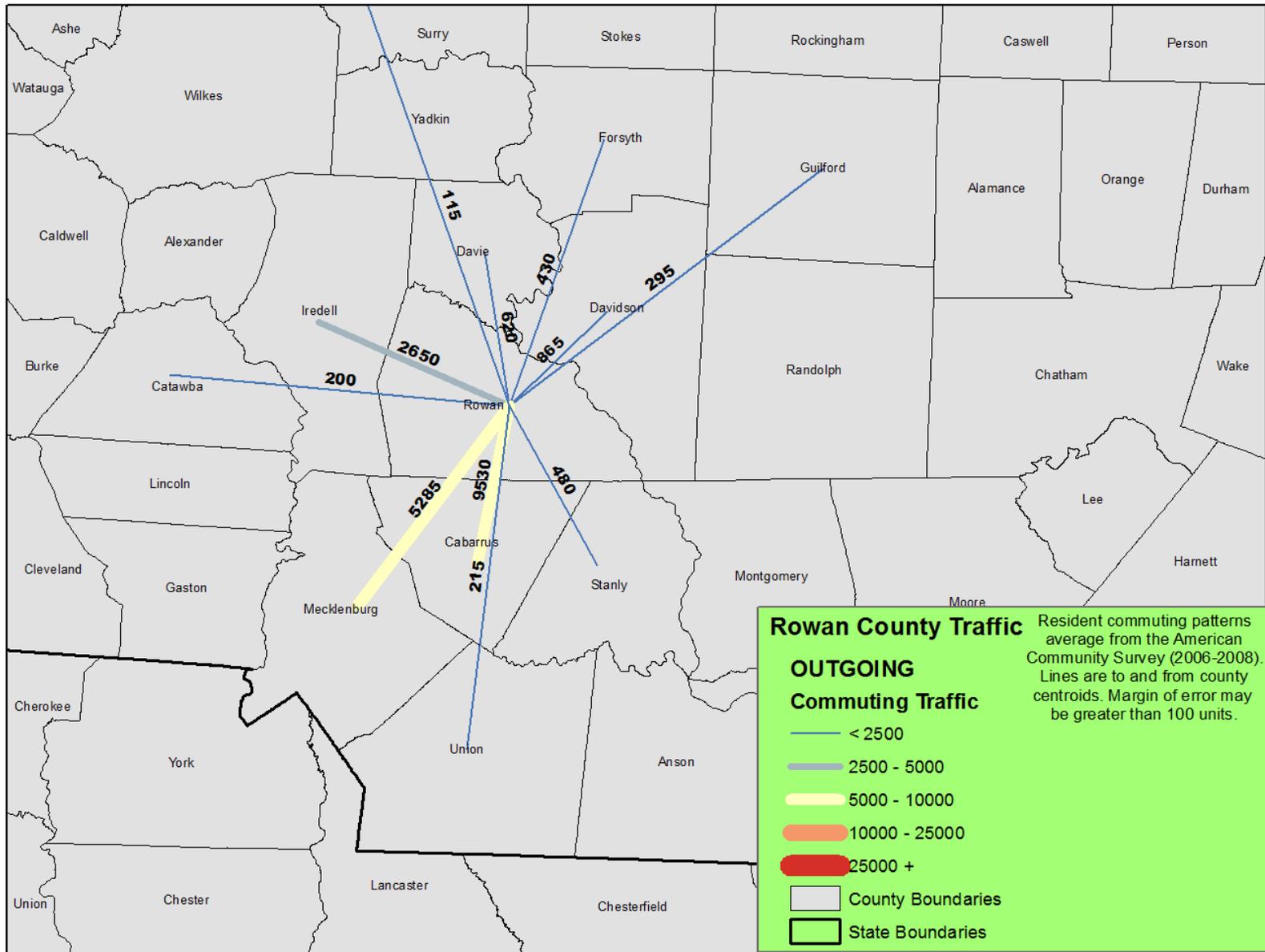
# Lincoln County ACS Outgoing



# Union County ACS Outgoing

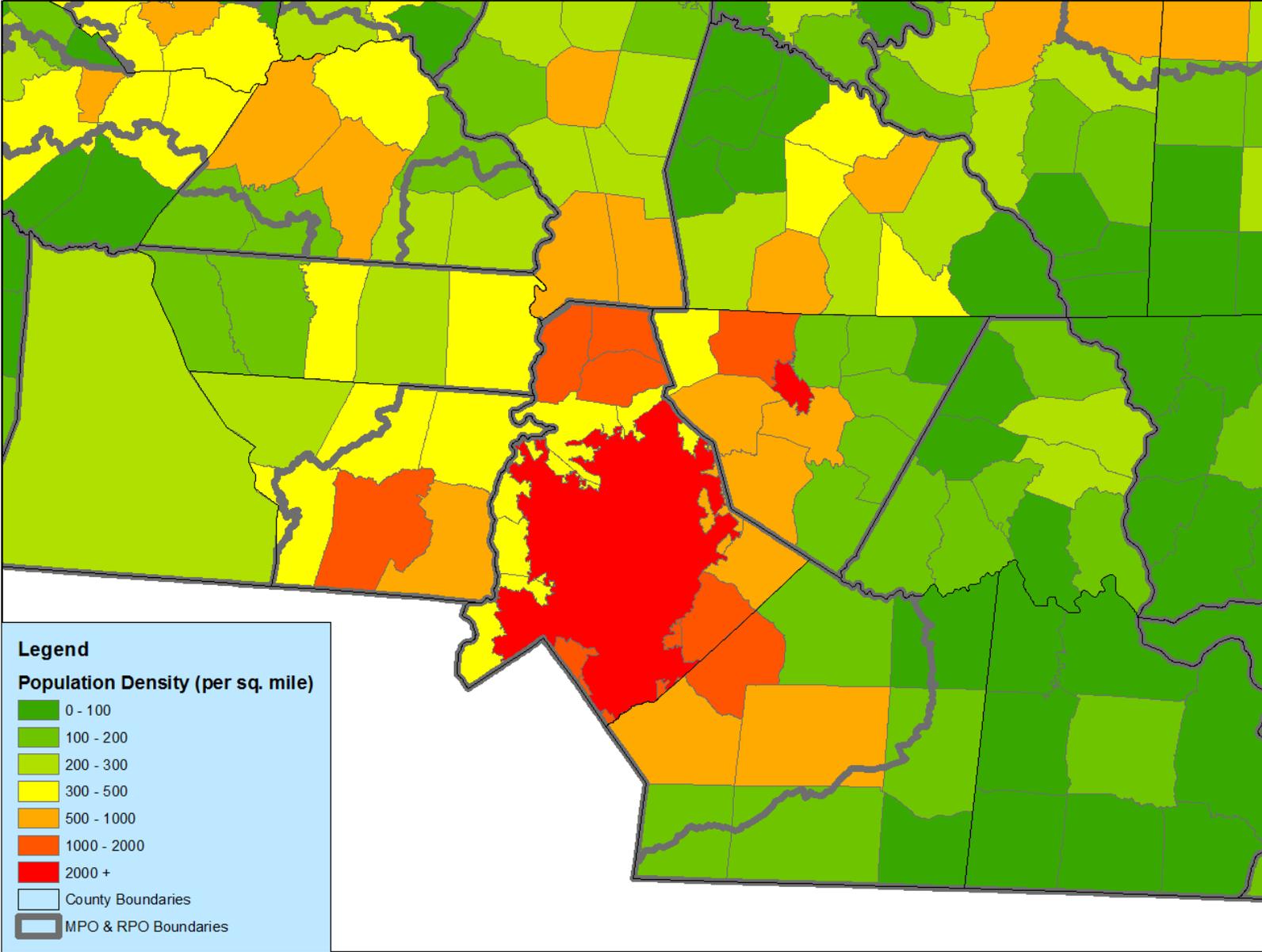


# Rowan County ACS Outgoing

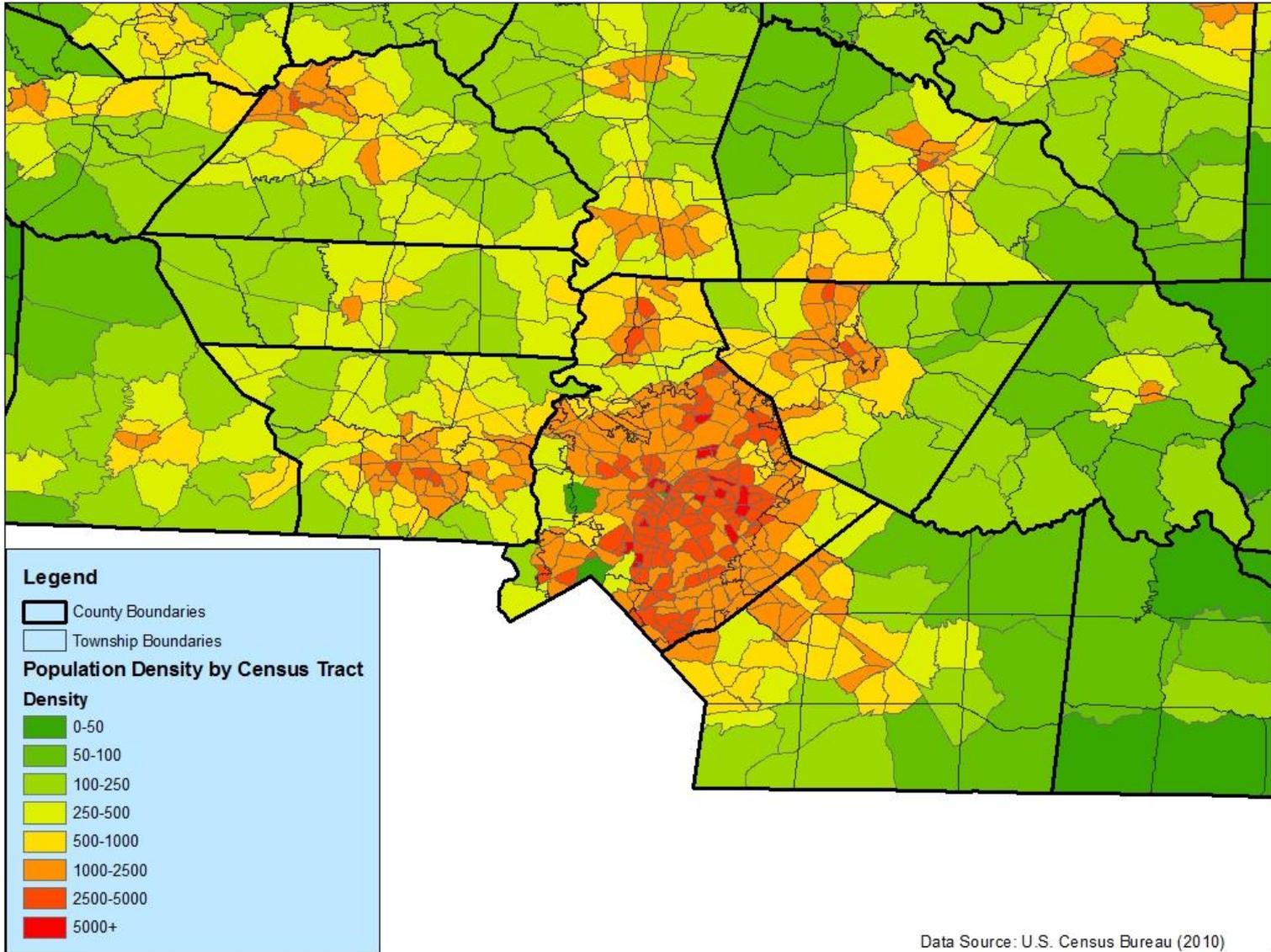




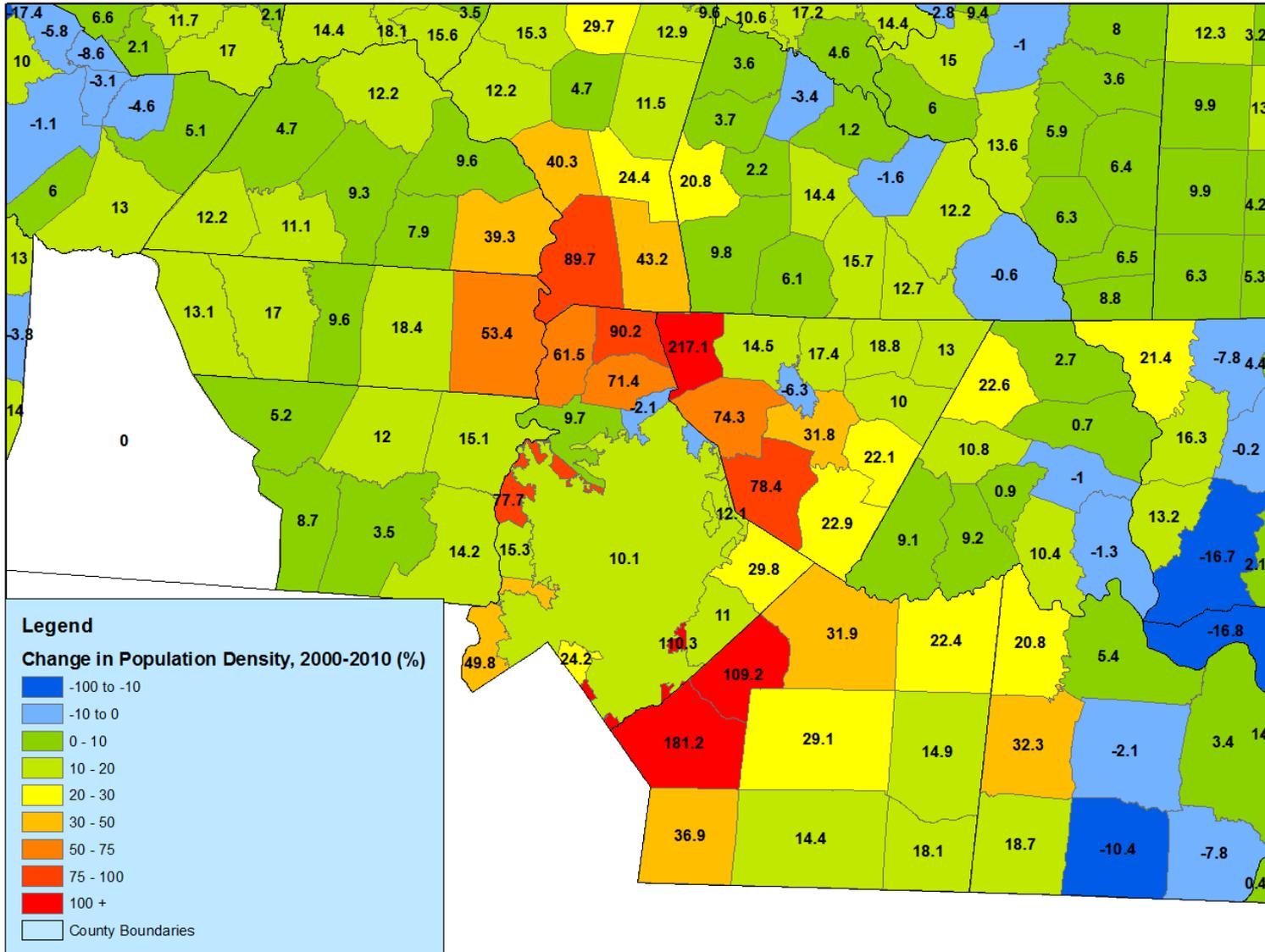
# Population Density by Township



# Population Density by Census Tract



# Population Density Change by Township



# Meteorology

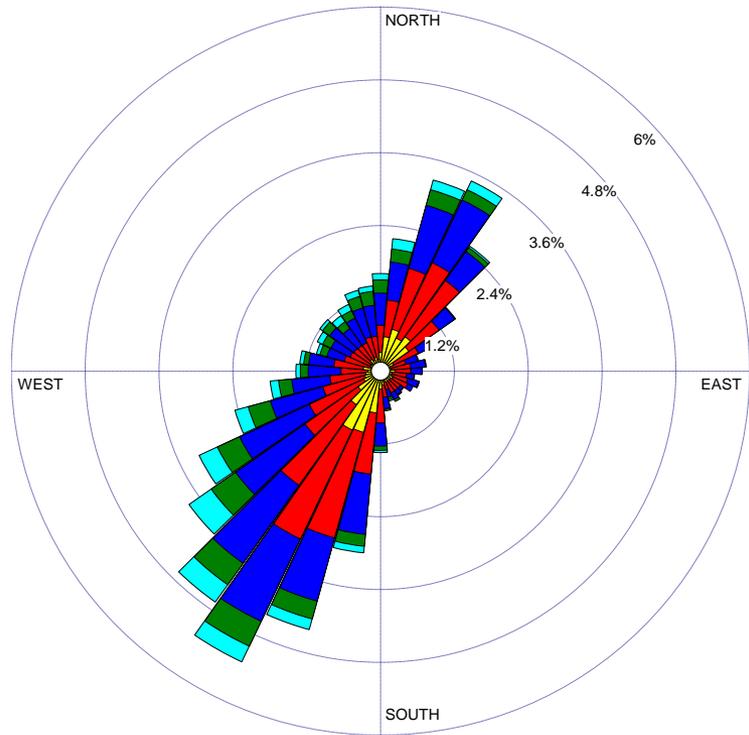
- **Use wind roses and trajectories to determine source regions of air for the violating monitors**
- **If winds tend to blow to/from an area on high ozone days, then we may decide to include that area in the nonattainment boundary**

# Wind Roses

- Include wind direction for days with high ozone ( $\geq 70$  ppb)
- Shows where the wind was coming from

WIND ROSE PLOT:  
**Arrowood Wind Data 2009-2011**  
 Days Where 8hr avg Ozone  $\geq 70$  ppb

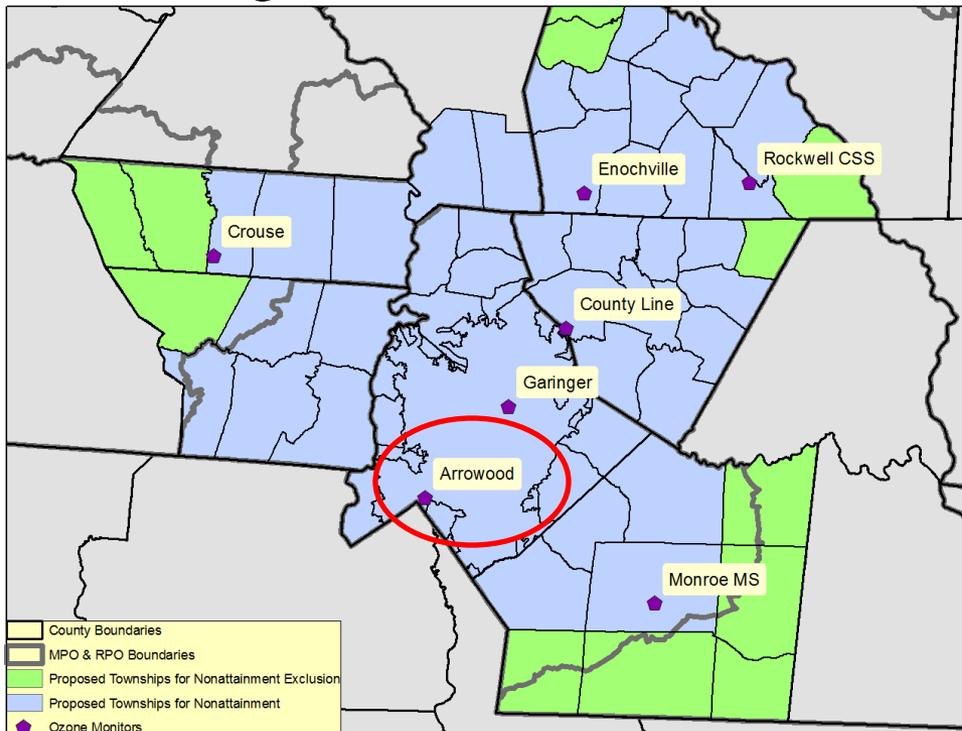
DISPLAY:  
**Wind Speed**  
 Direction (blowing from)



WIND SPEED  
 (Knots)

- $\geq 22$
- 17 - 21
- 11 - 17
- 7 - 11
- 4 - 7
- 1 - 4

Calms: 36.82%



COMMENTS:

DATA PERIOD:

Start Date: 3/31/2009 - 00:00

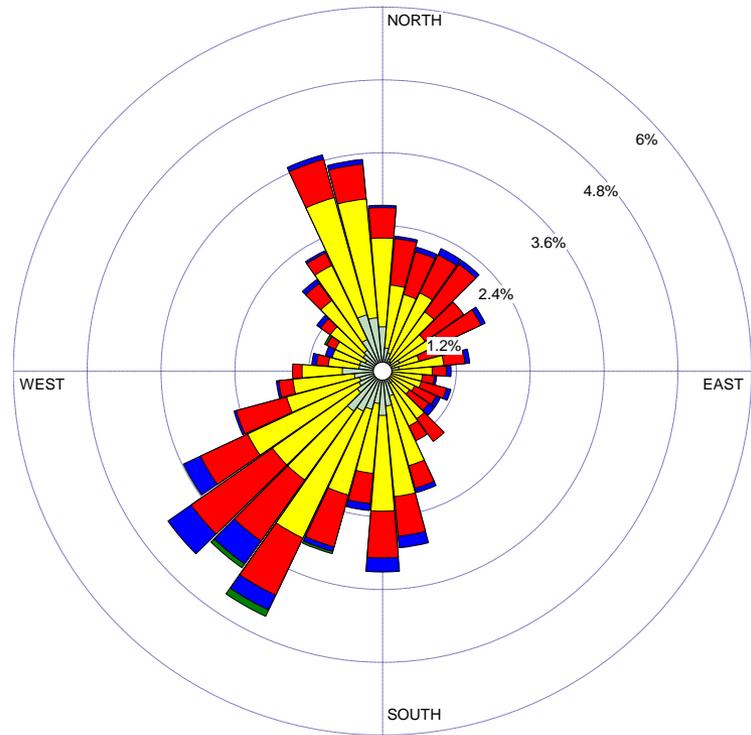
COMPANY NAME:

# Wind Roses

- Include wind direction for days with high ozone ( $\geq 70$  ppb)
- Shows where the wind was coming from

WIND ROSE PLOT:  
**Garinger Wind Data 2009-2011**  
 Days Where 8hr avg Ozone  $\geq 70$  ppb

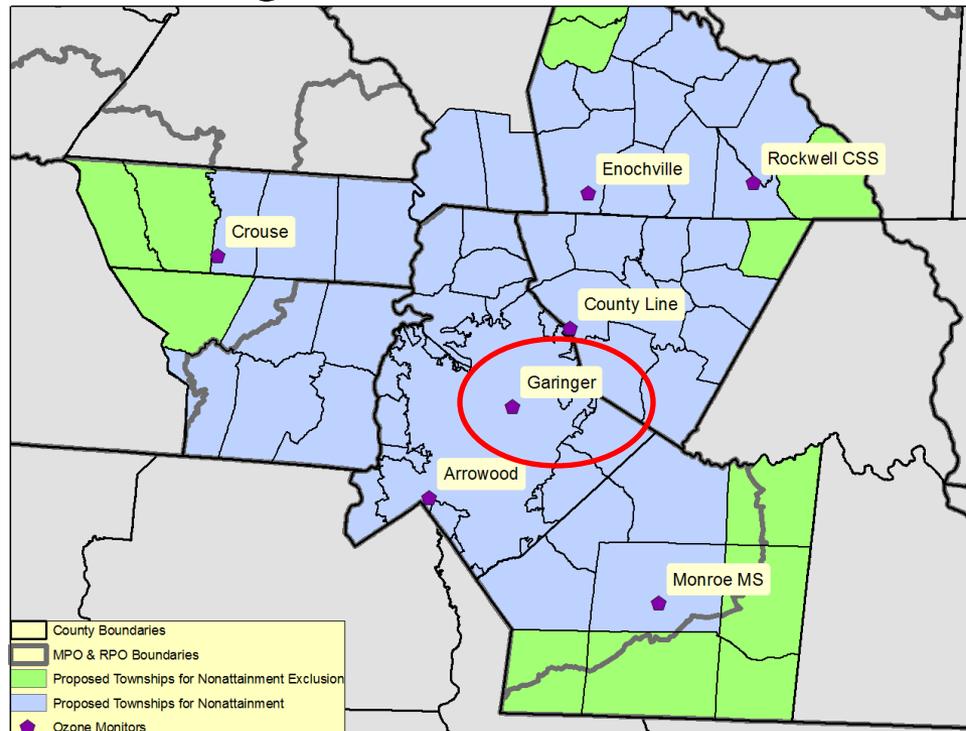
DISPLAY:  
**Wind Speed**  
 Direction (blowing from)



WIND SPEED  
(Knots)

- $\geq 22$
- 17 - 21
- 11 - 17
- 7 - 11
- 4 - 7
- 1 - 4

Calms: 16.19%



COMMENTS:

DATA PERIOD:

Start Date: 1/2/2009 - 00:00

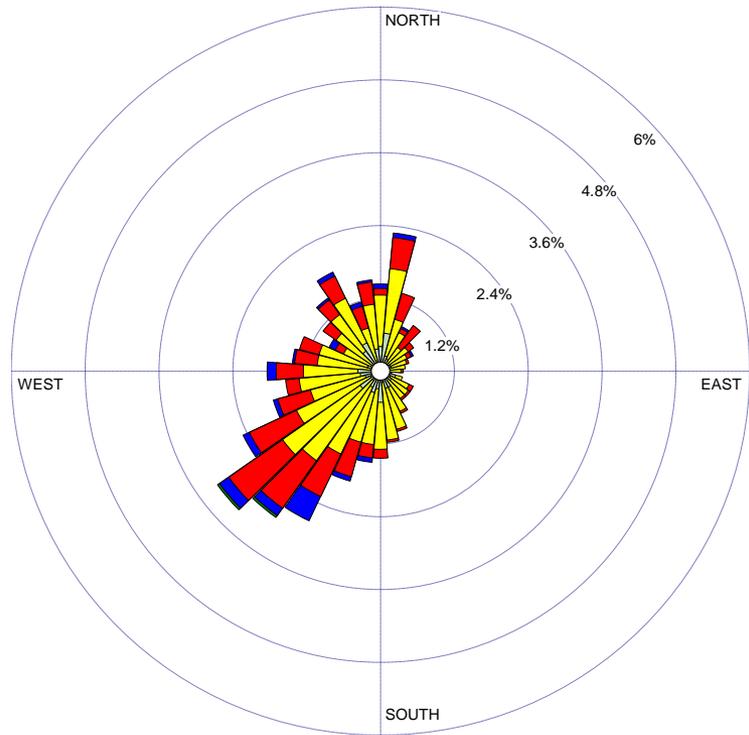
COMPANY NAME:

# Wind Roses

- Include wind direction for days with high ozone ( $\geq 70$  ppb)
- Shows where the wind was coming from

WIND ROSE PLOT: County Line Wind Data 2009-2011  
Days Where 8hr avg Ozone  $\geq 70$  ppb

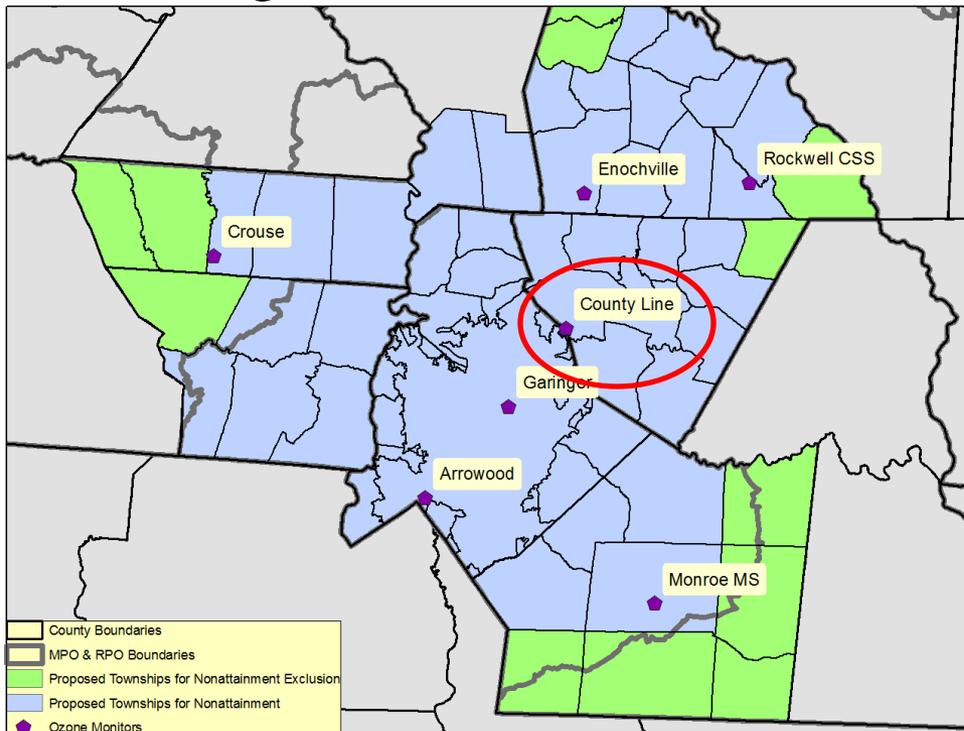
DISPLAY: Wind Speed  
Direction (blowing from)



WIND SPEED (Knots)

- $\geq 22$
- 17 - 21
- 11 - 17
- 7 - 11
- 4 - 7
- 1 - 4

Calms: 27.35%



COMMENTS:

DATA PERIOD:

Start Date: 1/2/2009 - 00:00

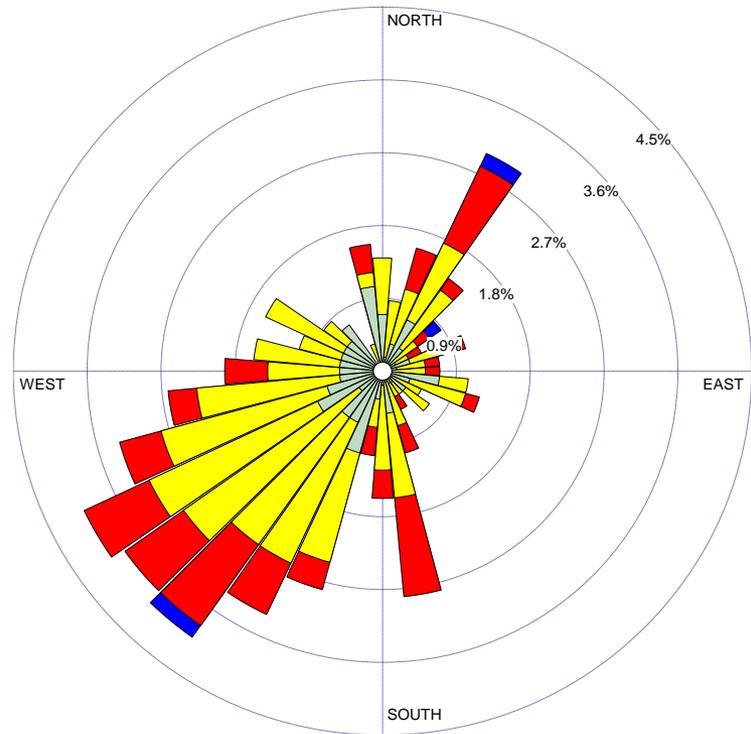
COMPANY NAME:

# Wind Roses

- Include wind direction for days with high ozone ( $\geq 70$  ppb)
- Shows where the wind was coming from

WIND ROSE PLOT:  
**Enochville Wind Data 2009-2011**  
 Days Where 8hr avg Ozone  $\geq 70$  ppb

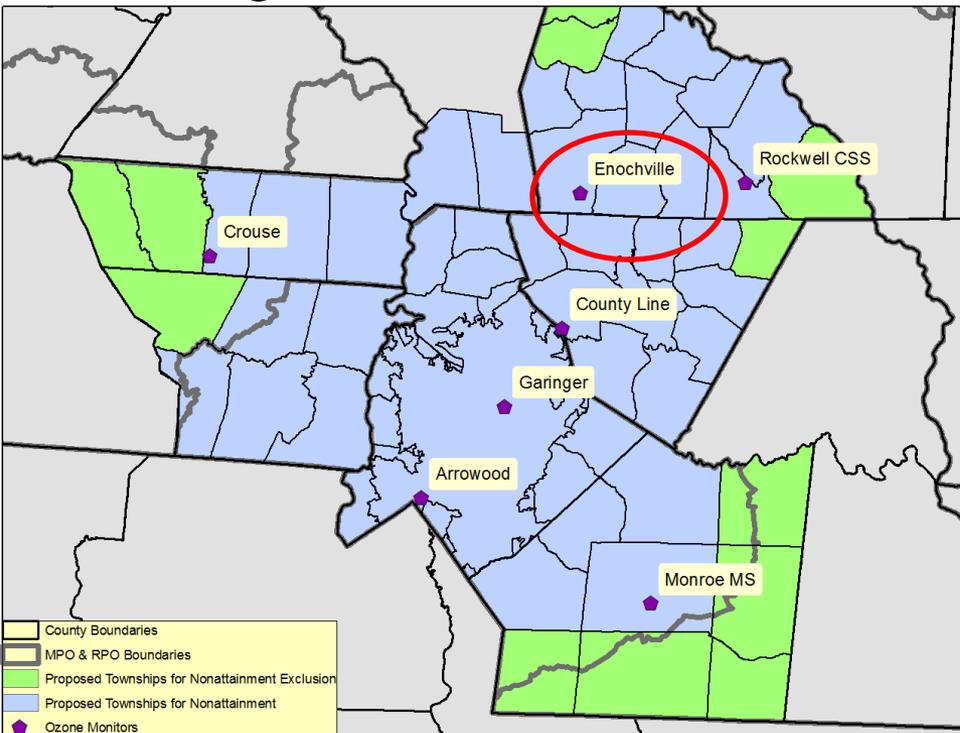
DISPLAY:  
**Wind Speed**  
 Direction (blowing from)



WIND SPEED (Knots)

- $\geq 22$
- 17 - 21
- 11 - 17
- 7 - 11
- 1 - 4

Calms: 43.55%



COMMENTS:

DATA PERIOD:

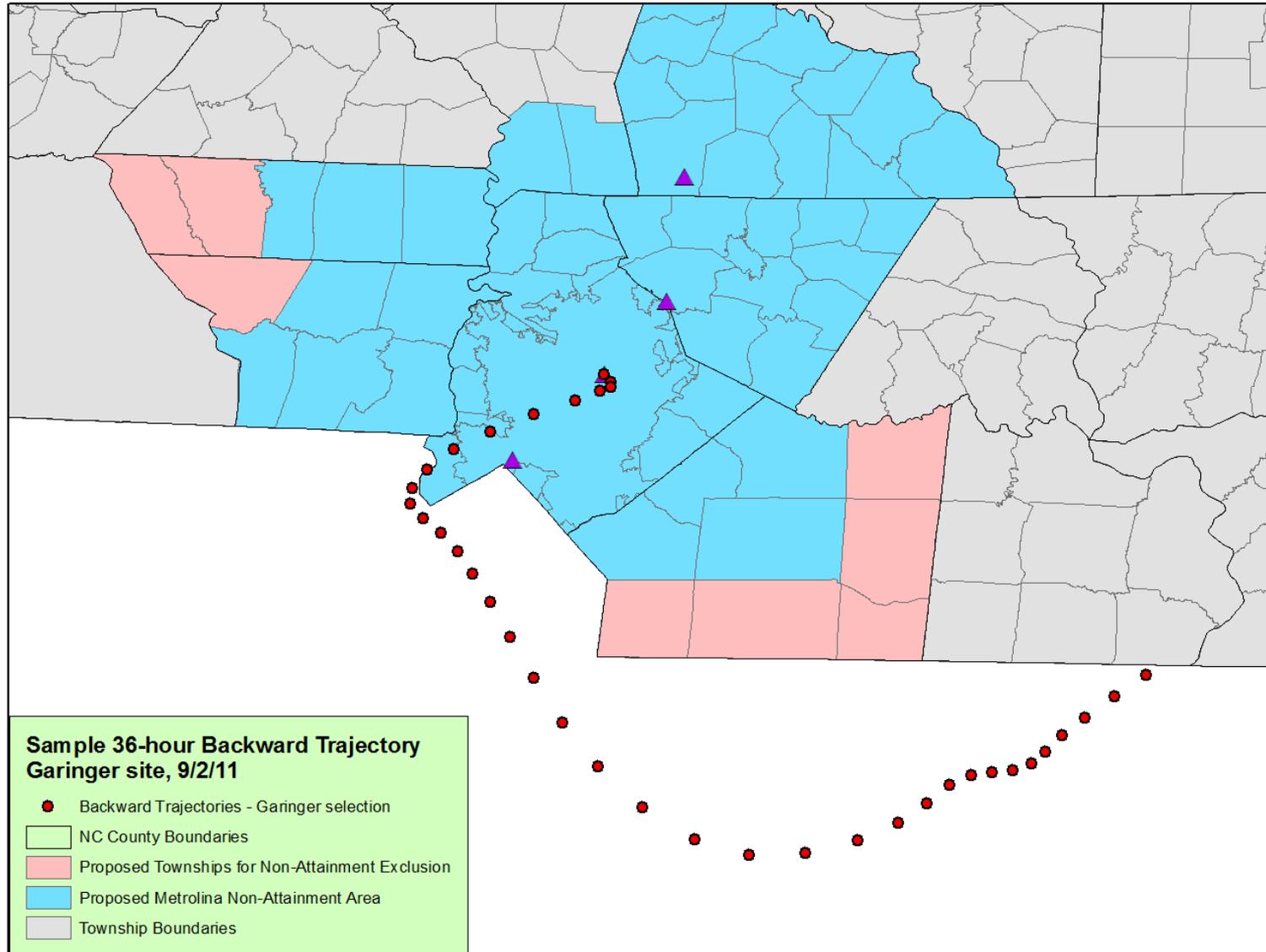
Start Date: 4/18/2009 - 07:00

COMPANY NAME:

# Backward Trajectories

- **36-hour backward trajectories on days where the 8-hour ozone average was at least 76 PPB 2009-2011**
- **For each violating monitor site.**
- **The trajectory points are color-coded based on the daily 8-hour average ozone value.**
- **Tells us where the air came from**

# Sample Backward Trajectories – Garinger (9/2/11)



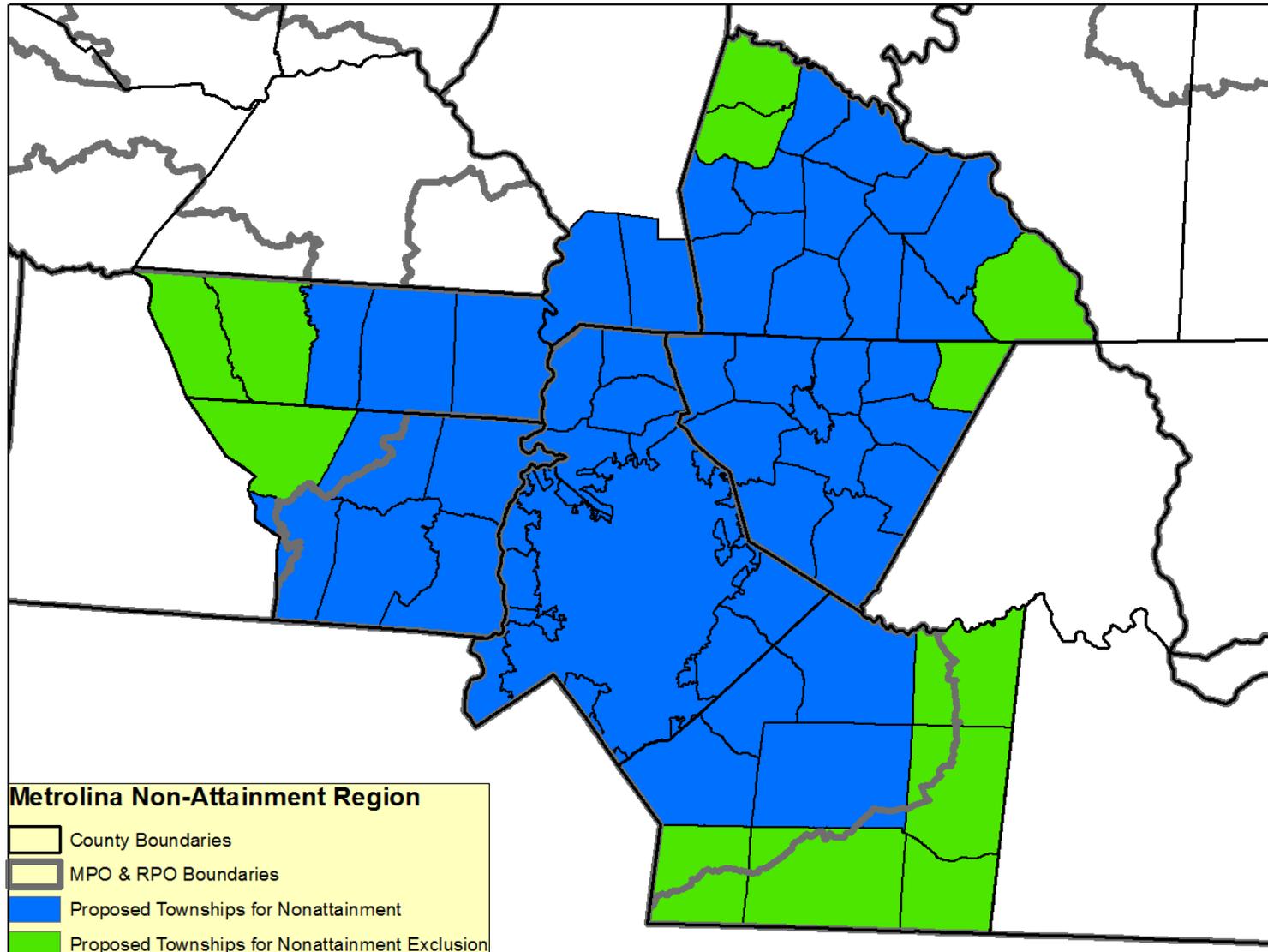
# Summary of Meteorology

- **Limited impacts from the proposed Lincoln, Gaston, and Union Townships**
- **Average winds suggest a few days with impacts from the Rowan/Cabarrus proposed townships**
  - **Magnitude of impacts still limited due to low population, traffic, lack of point sources**

# Preliminary Conclusions

- **Strong case for partial county in Lincoln, Gaston, and Union.**
- **Less certain about Rowan and Cabarrus**
  1. **Closer to larger point sources**
  2. **Average winds generally blow to/from these areas.**

# Townships Considered for NAA Exclusion





## **What's Next?**

- **February 10, 2012 – Deadline for comments from public & elected officials**
- **February 29, 2012, North Carolina will submit its recommendation for boundaries**
- **Email comments to:  
daq.publiccomments@ncdenr.gov;  
Subject “Comments on ozone boundary recommendations”**



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