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GIS Determination of Candidate Truck Stop Electrification Sites on Interstate 95 in North Carolina

Elizabeth A. Harris
North Carolina State University

What is TSE?

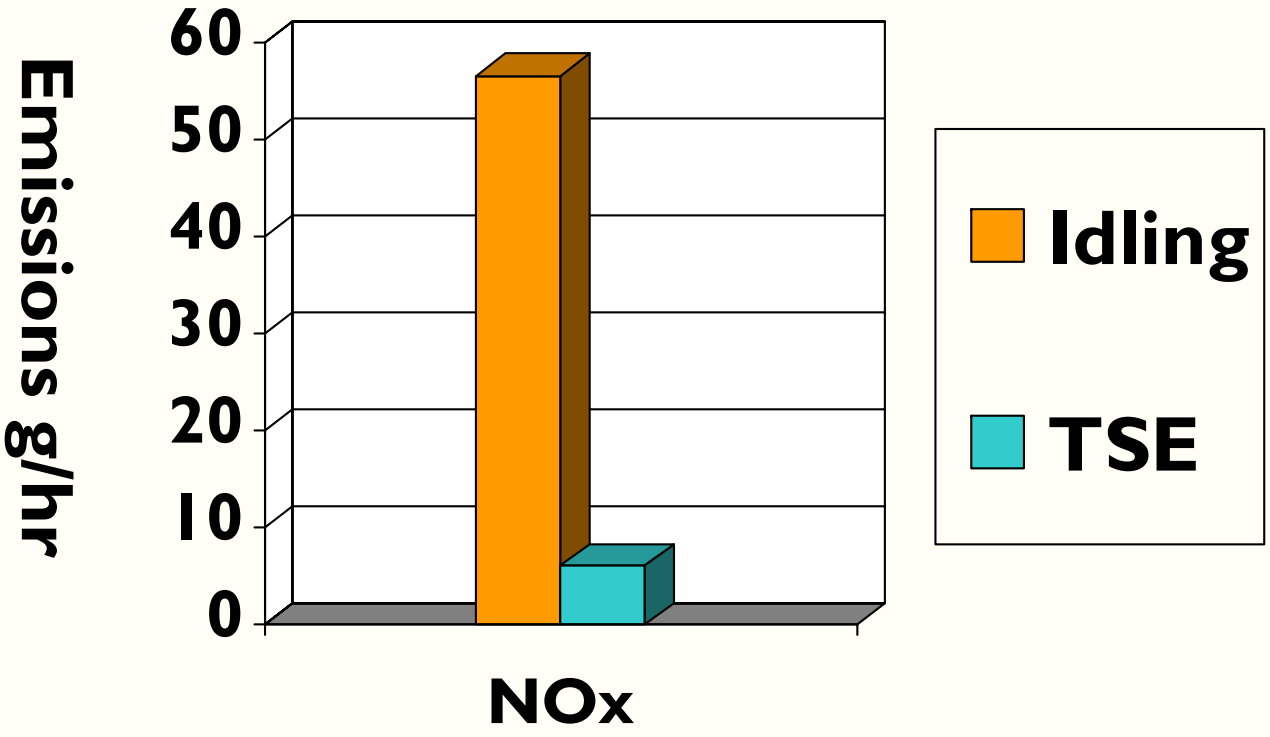
- **T**ruck **S**top **E**lectrification
- Truck idling during rest periods
  - Cabin **comfort** and amenities
  - Engine and fuel **warmth**
- Allows truckers to **plug in** vehicles
- **Combined** or **stand-alone** systems

Stand-Alone System

Why TSE?

- Increase in long-haul trucking
- Fuel costs
- Noise
- Regulations
- And…

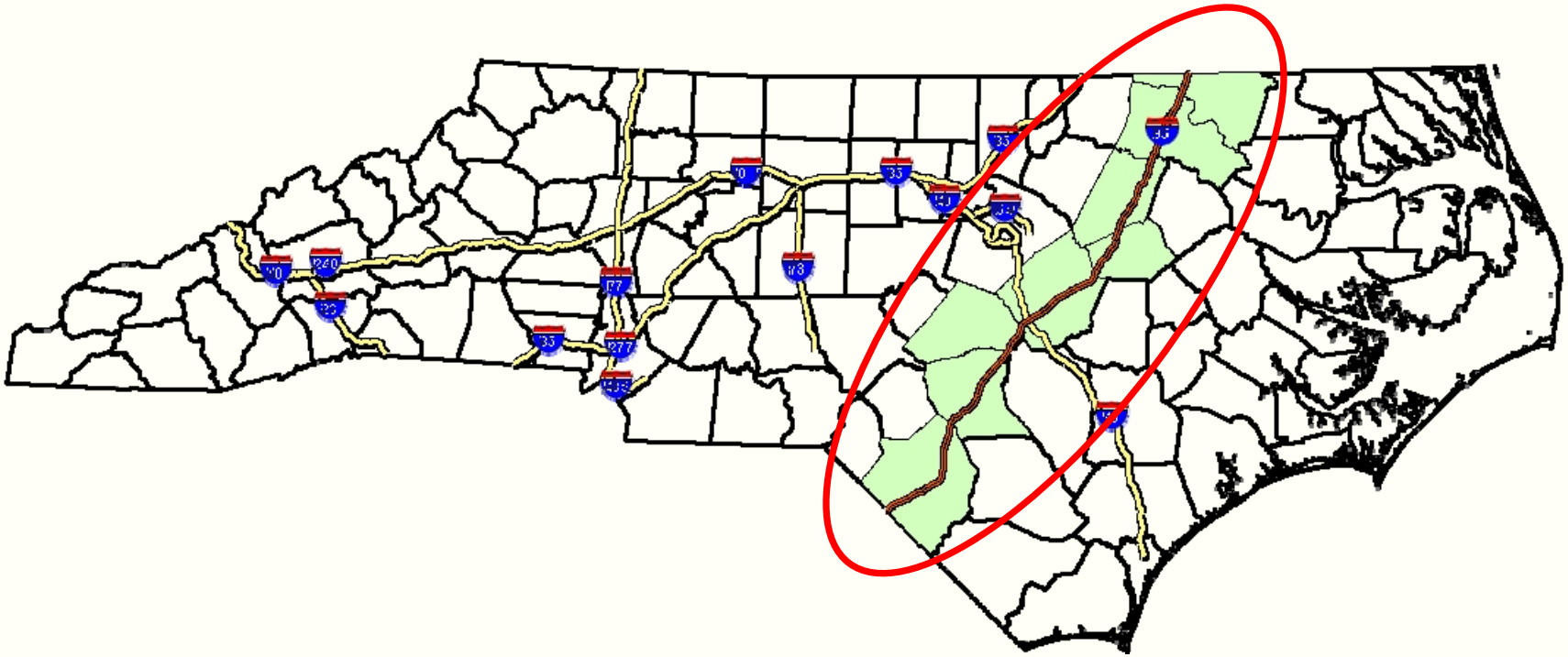
Emissions Reduction



Study Scope

- TSE **best** along major interstates
- North Carolina
  - I-40 and I-85 TSE **already**
  - **Focus** on I-95
  - **No** TSE on I-95 south of Baltimore
- Construction year: **2010**

Study Scope



Previous Site Selection Efforts

NESCAUM

- Selected **10** sites
- **9** criteria
  - Ozone attainment
  - Statewide data
  - No traffic data
  - Cancer risk

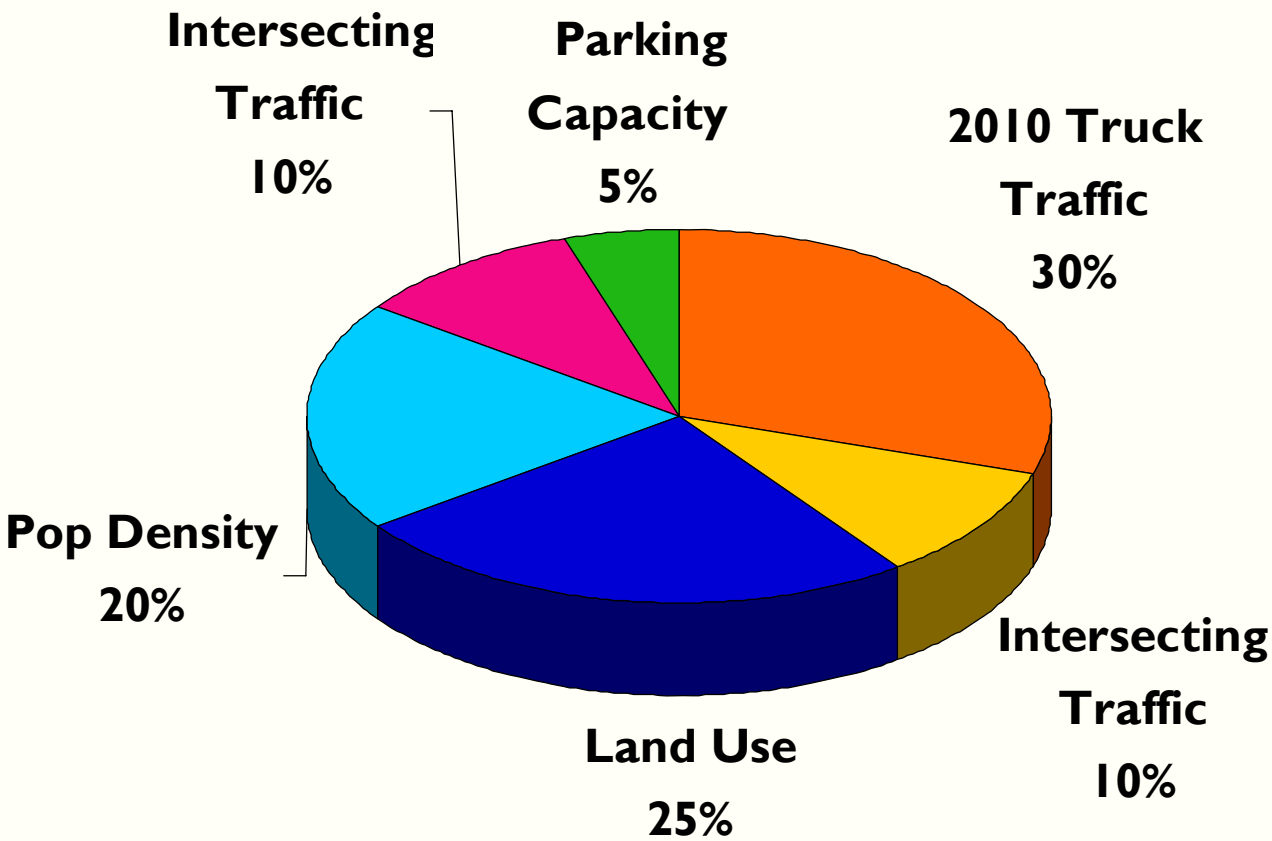
EPA

- Selected **6** sites
- **No** criteria given

Site Selection Criteria

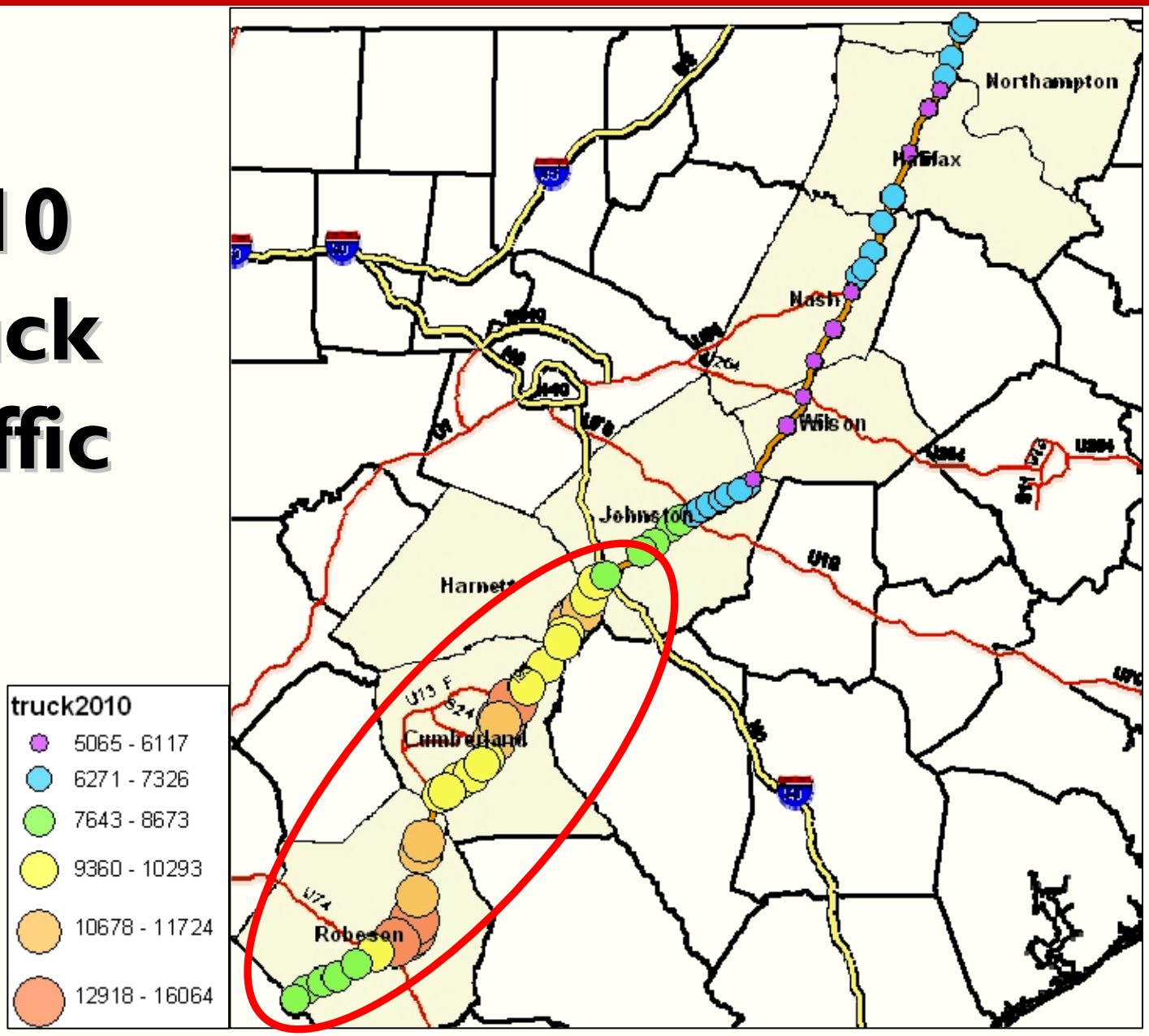
- **Perspective**
  - Select location where TSE is **most** beneficial
  - Develop a site selection method using GIS
- **Assumptions**
  - IdleAire-style installation
  - Commercial truck stops **only**
  - Parking capacity **> 50** spaces
  - **One mile** or less from interstate

Criteria and Weights



Top score = 100 points

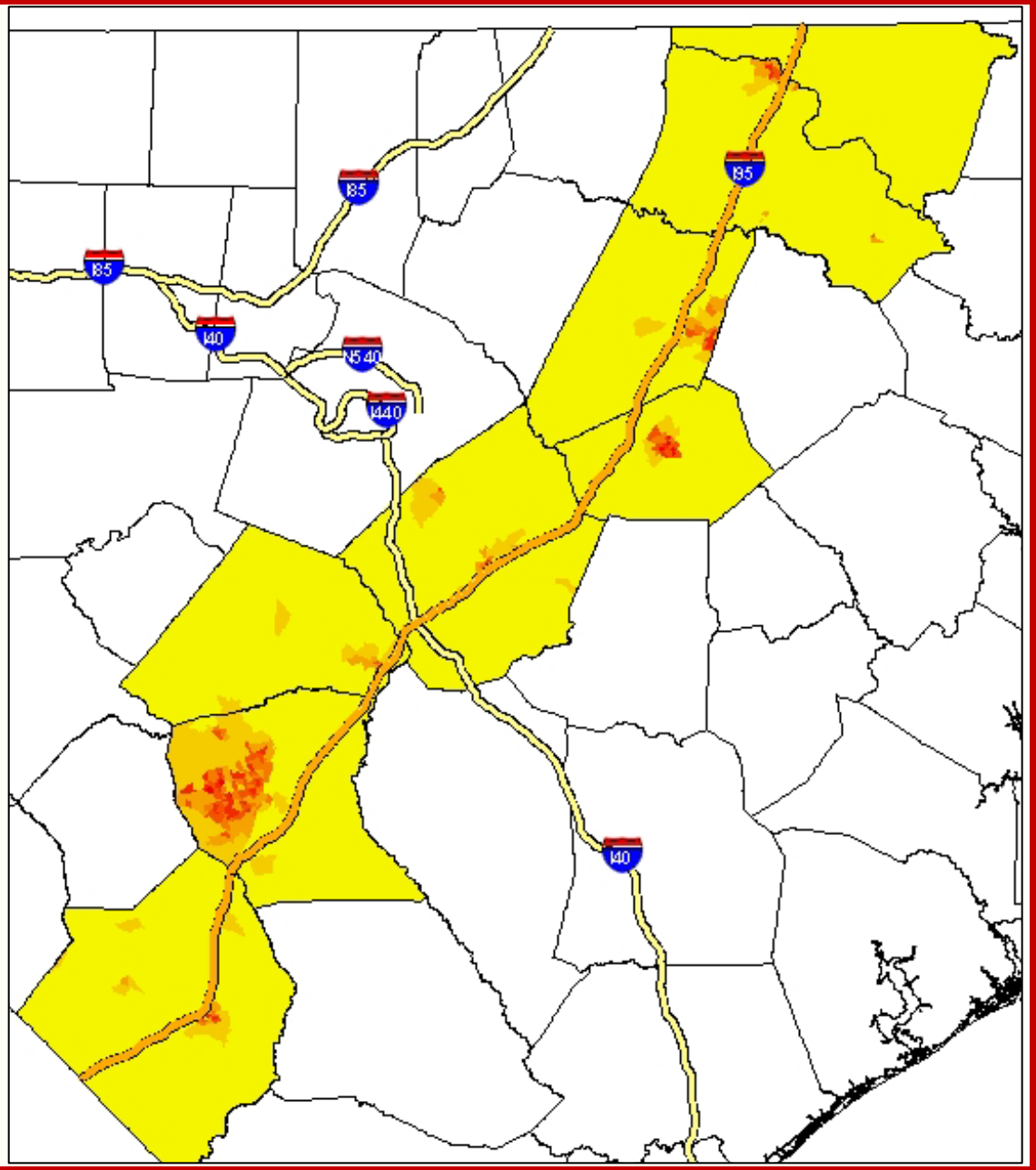
2010 Truck Traffic



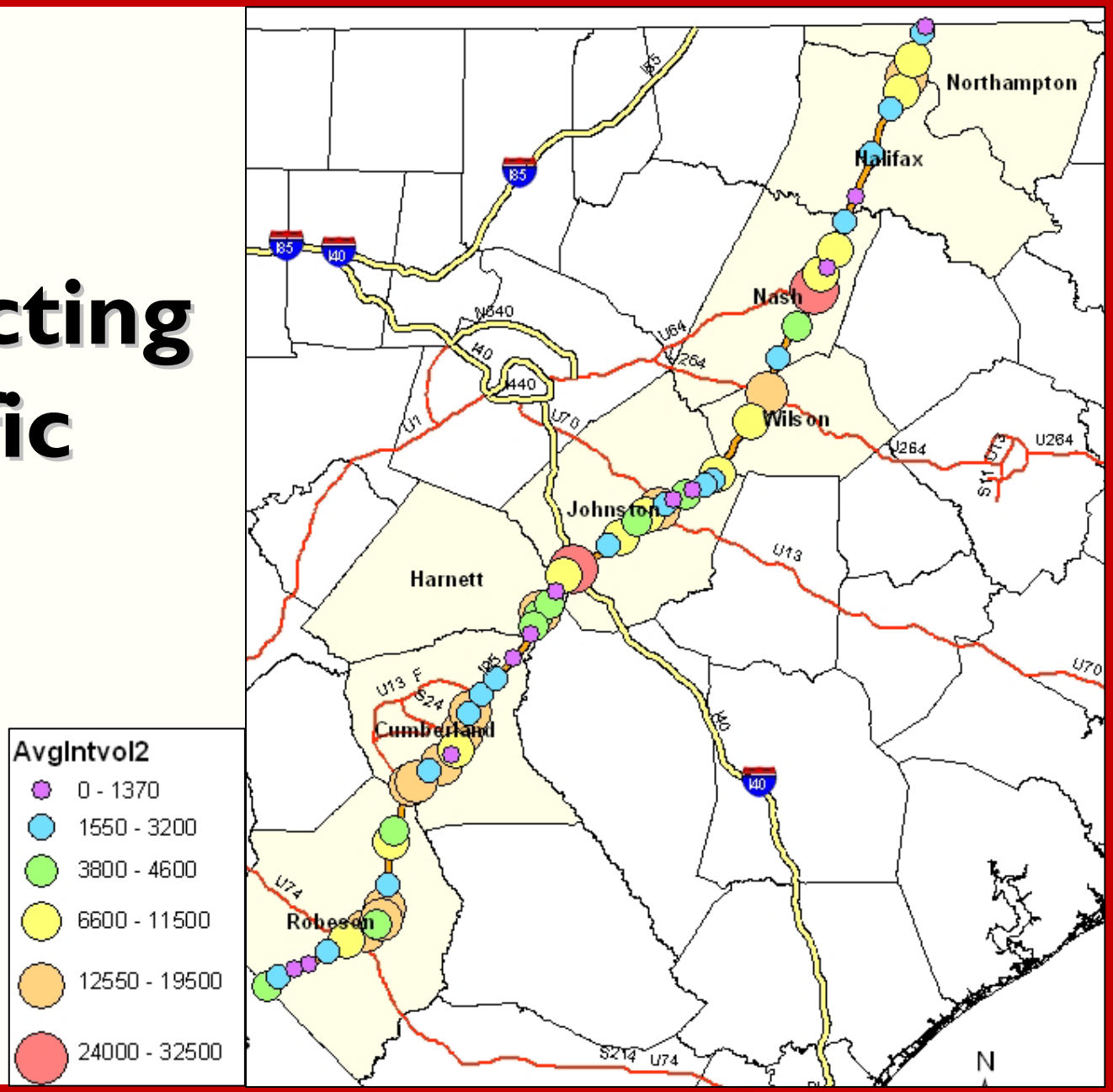
Land Use

- Residential/Urban - **Higher** Rank
  - Improve conditions for the most people
- Commercial and Agriculture - **Lower** Rank

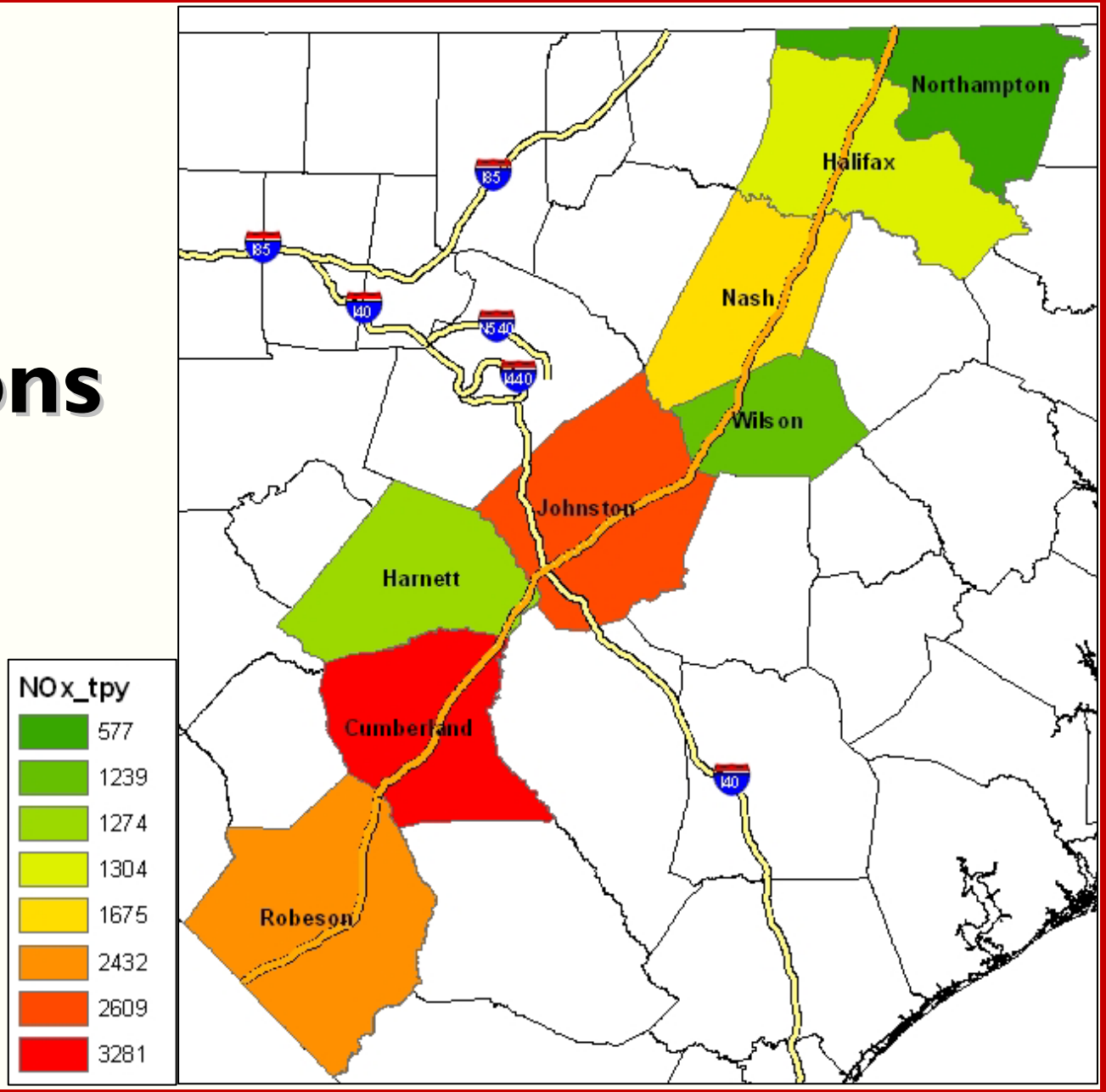
Population Density



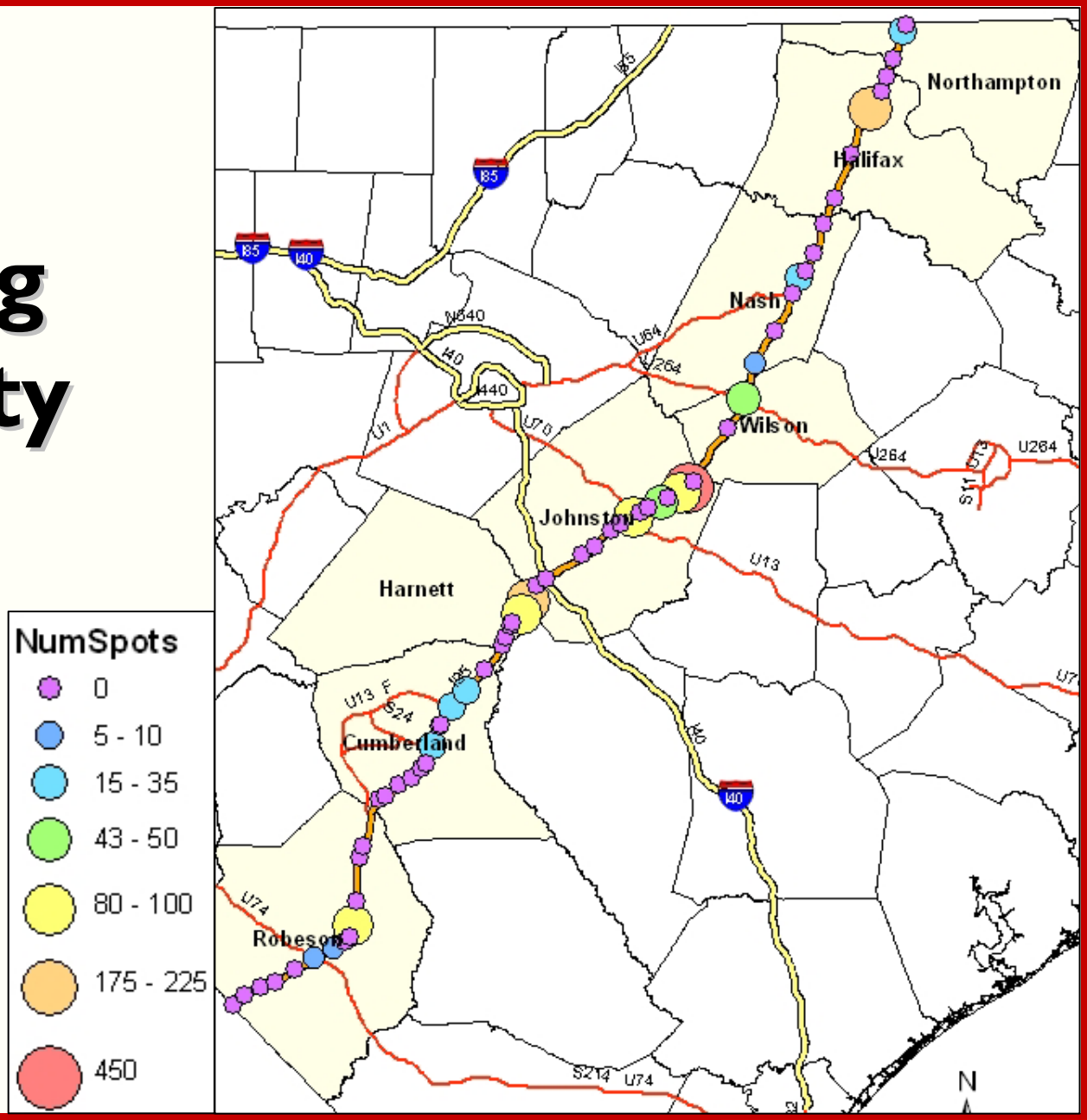
Intersecting Traffic



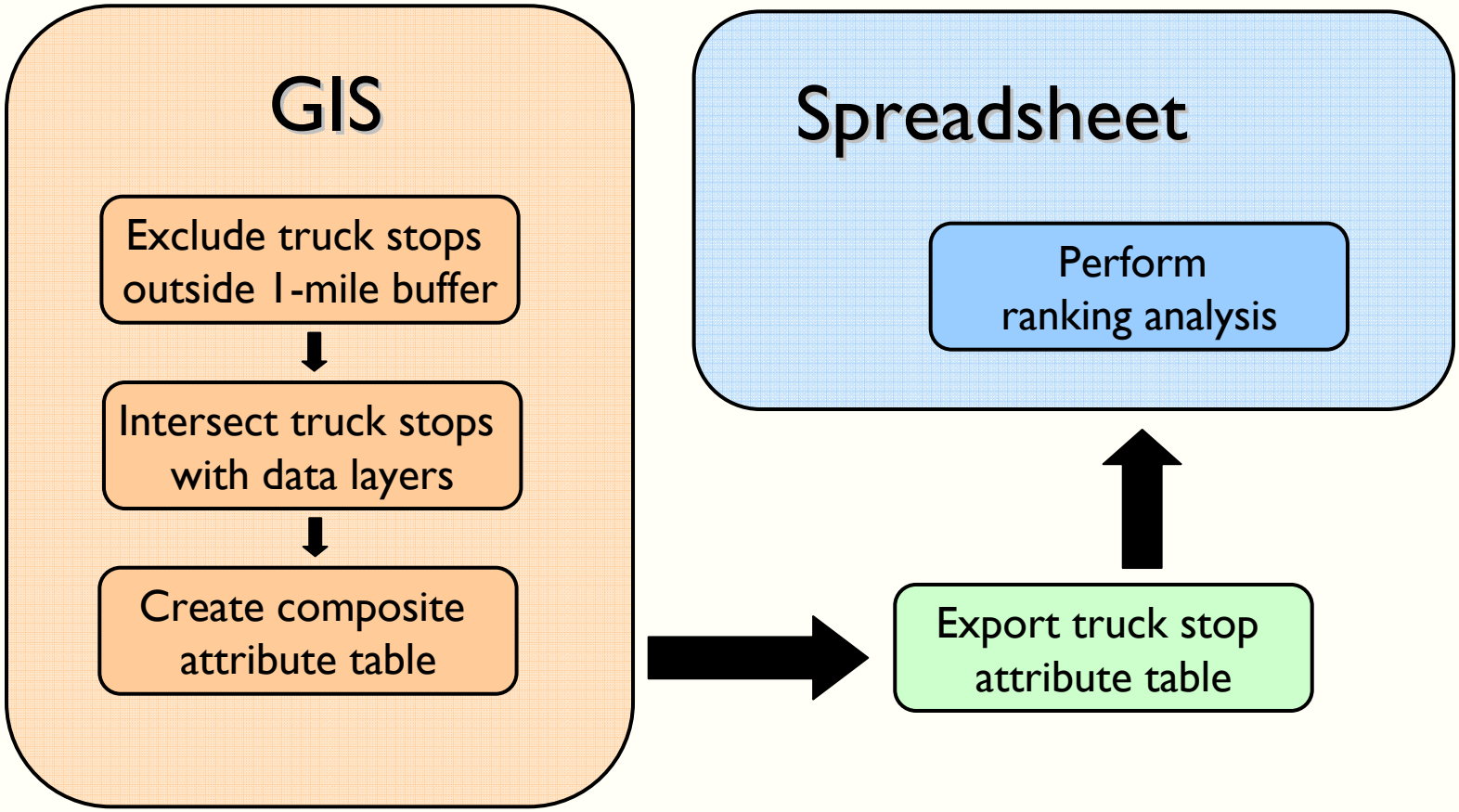
NOx Emissions



Parking Capacity



Selection Method

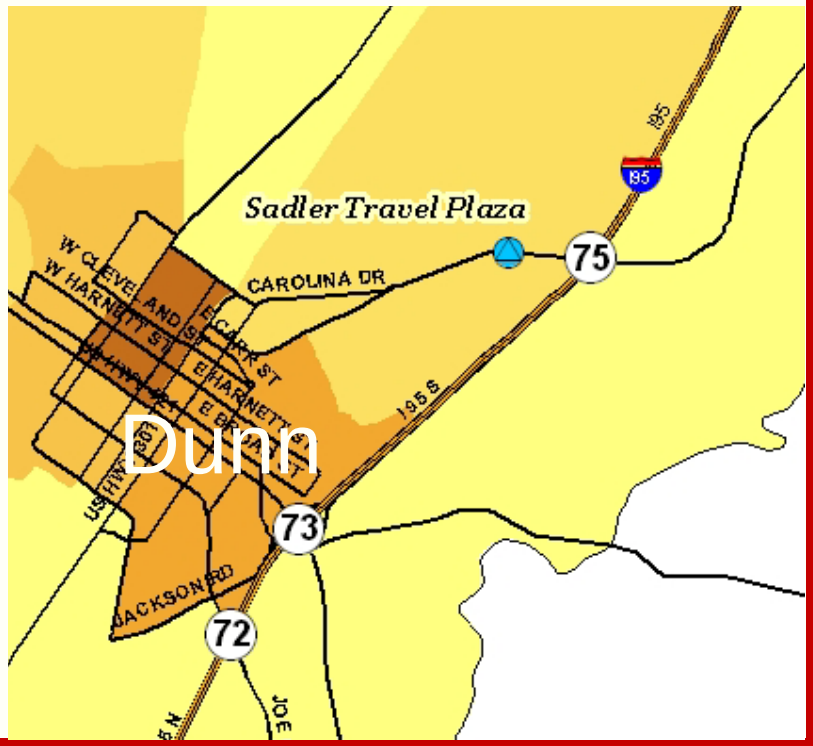


Results

Score	Truck Stop Name	City	Exit	Capacity
70	**Sadler Travel Plaza**	Dunn	75	90
68	**Minute Man Food Mart #24**	Lumberton	22	100
62	**M & N Truck Stop**	Selma	97	80
50	**Robin Hood BP Travel Plaza**	Dunn	77	150
49	**L & L Truck Stop**	Selma	101	50
49	Speedway/Pilot #55	Dunn	77	75
44	**TravelCenters of America**	Kenly	106	275
42	Wilco Travel Plaza 218	Kenly	106	150
39	**Big Boy's Truck Stop - Citgo**	Kenly	105	100
39	**Lakewood Travel Center**	Halifax	168	175

Challenges

- Creating missing GIS data layers
  - Time-consuming
- Detailed data often **unavailable**
  - Emissions
  - Truck traffic monitoring
  - Trucker behavior



Conclusions

- Method chose a good location
- Similar results to previous studies
- This method can be modified
  - Set **own** criteria
  - **Different** weight allocation

Recommendations

- Can perform sensitivity study
- More truck stop-specific data
- Additional truck traffic stations
- Air quality monitoring near I-95

Questions?

Elizabeth Harris

eagrafpe@ncsu.edu

Numbers

- Typical intercity tractor-trailer idles an estimated **1,830 hr/yr** when parked overnight at truck stops
- Idling long-haul trucks consume about **838 million gallons** diesel fuel/yr
- Long-haul trucks idle an average of **6 hr/day** and up to **10 hr/day** in winter