

**Preliminary Comments from Members of the Clean Air Scientific  
Advisory Committee (CASAC) Air Monitoring and Methods  
Subcommittee (AMMS)  
Preliminary Comments received on 2/15/11  
In Preparation for Public Meeting, February 16, 2011  
Carolina Inn, 211 Pittsboro Street, Chapel Hill, NC, 27516 (919-933-2001)**

**Purpose:** To review and provide advice on the scientific adequacy and appropriateness of EPA draft documents on monitoring and methods for Oxides of Nitrogen (NO<sub>x</sub>) and Sulfur (SO<sub>x</sub>).

**Additional Preliminary Comments from Mr. George Allen**

I'd like to call the AMMS attention to an evaluation of the Castnet AmoN passive nh<sub>3</sub> sampler. My response to Q 6:

The Radiello® passive samplers used in the AMoN network appear to be suitable for 2 week duration samples. See the precision/accuracy and blanks plots on pages 7 and 8 of a CAMD presentation from October 27, 2010:  
<http://www.nescaum.org/documents/mac/mac-committee-meeting-3/rury-amon.pdf/>

The presentation is also attached here. These results are presumably from carefully controlled tests, and thus may not reflect the data quality from routine field measurements.

Few panel members are aware of these performance evaluation results, and Ms. Rury's presentation at this Nescaum meeting [organized by me] seems to be the only available source of this information. It might be worth showing 2-3 of the slides from this presentation that demonstrate accuracy and precision and blanks. I'd be happy to walk the group thru these, or they can just read my comments.



# **NADP'S NEW NETWORK: AMON THE PASSIVE AMMONIA MONITORING NETWORK**

Melissa Rury, EPA's Clean Air Markets Division  
David Gay, National Atmospheric Deposition Program  
Chris Lehmann, Central Analytical Laboratory

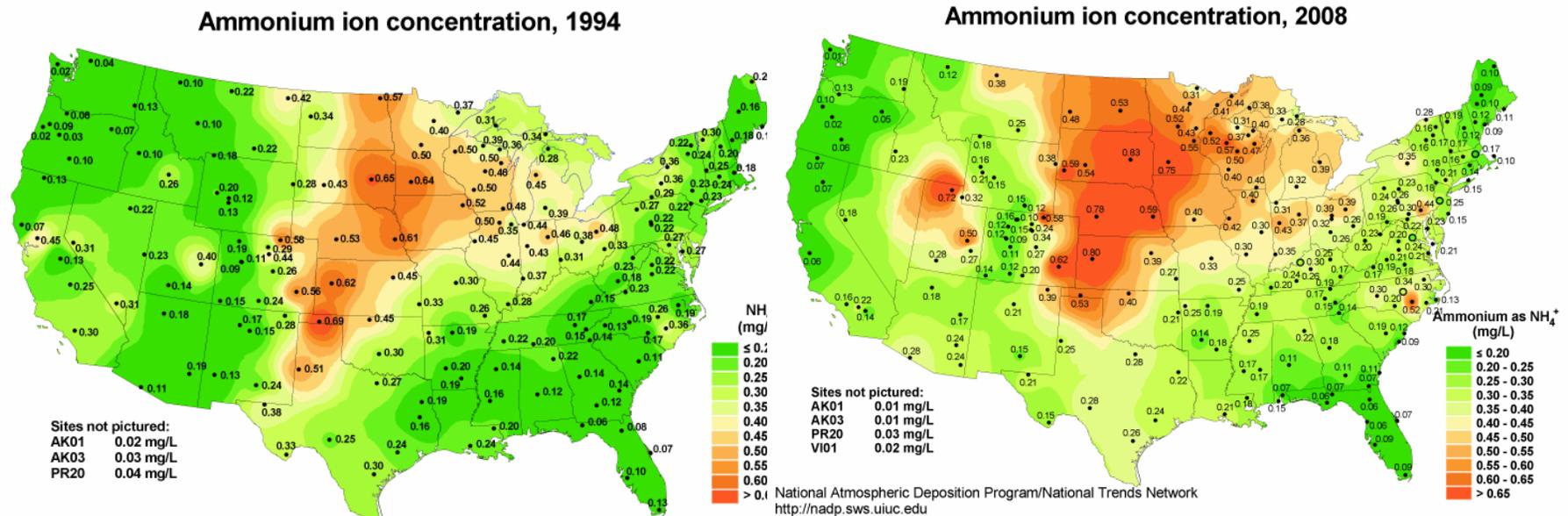


# OVERVIEW

- Importance of ammonia measurements
- Status of the network
  - Quality assurance
  - Partners involved in the operation
- Data uses
- Future needs
- Where to go for more information



# WHY AMMONIA MEASUREMENTS?



National Atmospheric Deposition Program/National Trends Network  
<http://nadp.sws.uiuc.edu>

- NADP shows NH<sub>4</sub><sup>+</sup> concentrations increasing in many areas of the US
- Ammonia is the primary basic component in PM<sub>2.5</sub> formation
- Airborne particulate ammonium species contribute to visibility degradation & human health problems
- Wet and dry deposition of ammonium ion can cause eutrophication of natural ecosystems, loss of biodiversity and soil acidification

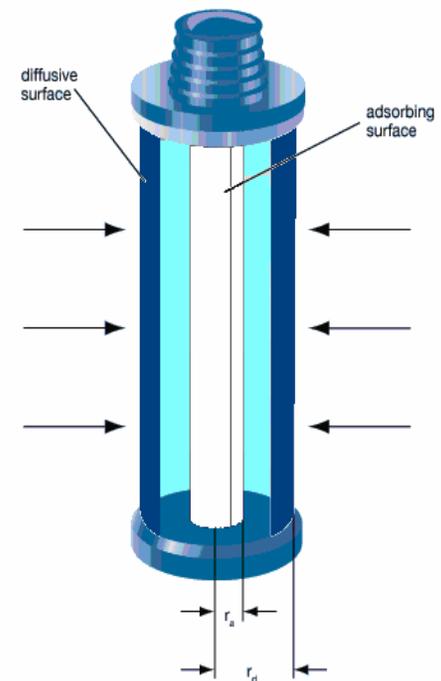
# AN AMMONIA NETWORK

- The NADP operates 5 national networks and partners include federal agencies, states, universities, tribes and organizations
- In the past, NADP has focused on wet deposition
  - NTN, MDN and AIRMoN
- Two new networks with goal of estimating dry deposition
  - AMNet and AMoN
- Currently, no baseline for  $\text{NH}_3$  concentrations
- AMoN is the only US national  $\text{NH}_3$  monitoring network
- Provide land managers, ecologists and policymakers critical data that will allow them to:
  - Assess the long-term trends in ambient  $\text{NH}_3$  concentrations and deposition of reduced nitrogen species;
  - Validate atmospheric models;
  - Better estimate total nitrogen inputs to ecosystems; and
  - Assess compliance with  $\text{PM}_{2.5}$  standards
  - Changes in atmospheric chemistry due to emission reductions

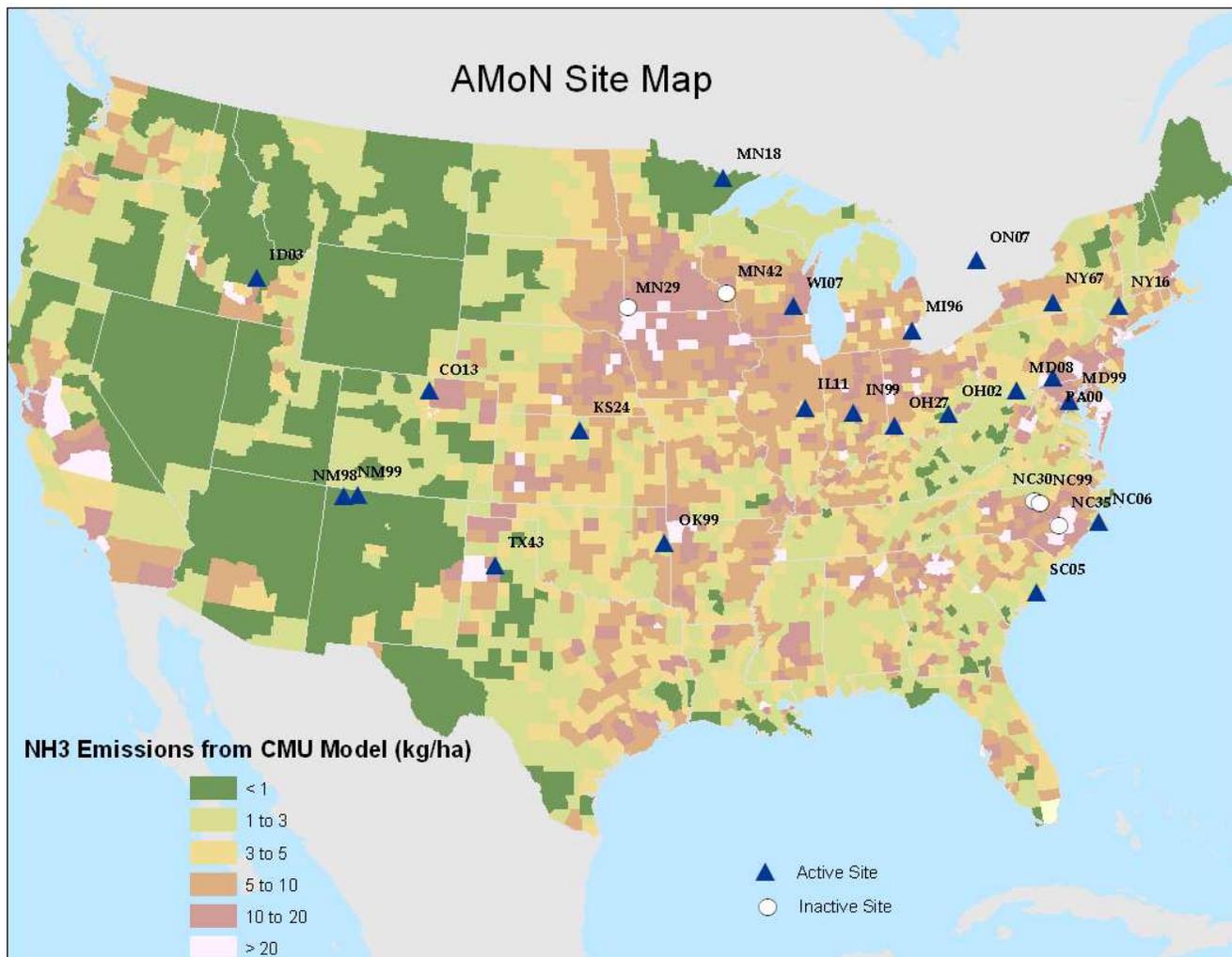


# OVERVIEW OF THE NETWORK

- Objective: measure NH in a spatially dense, long-term, cost effective network
- Radiello<sup>®</sup> passive samplers are deployed every two weeks
  - Easy to use
  - Inexpensive
  - Virtually unbreakable
  - *2-week sample*
  - *Accuracy is questioned*
- Initiative began in 2007
  - Over 200 site-weeks of data collected from more than 20 sites
- Accepted as an official NADP network last week



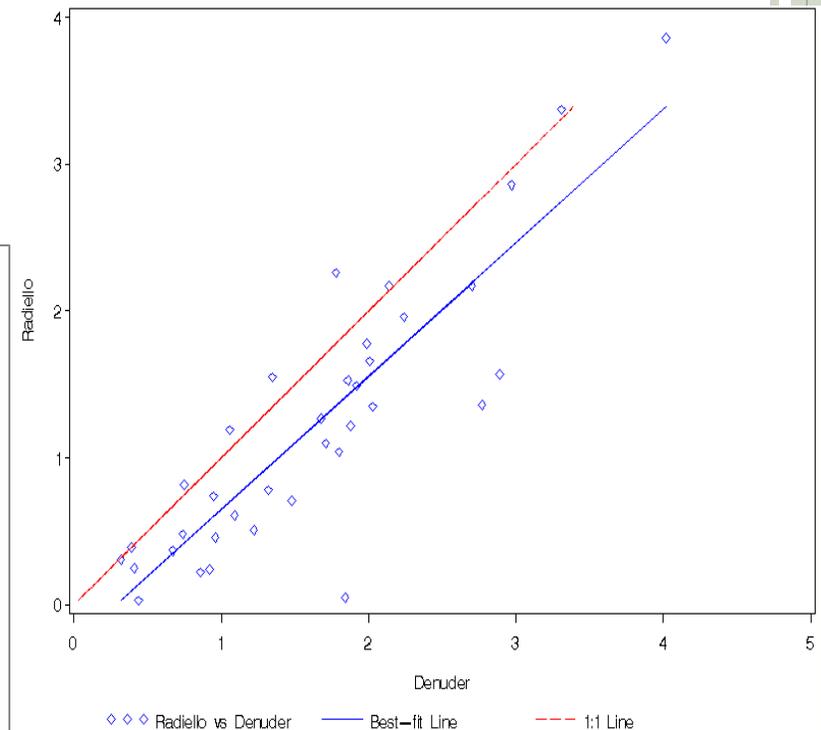
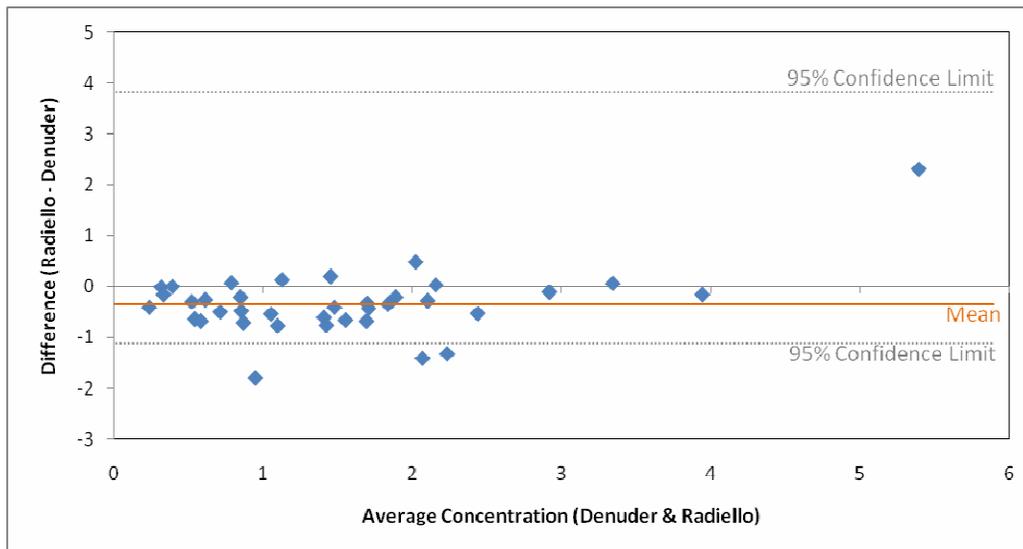
# SITE LOCATIONS & MODELED EMISSIONS



# QUALITY ASSURANCE

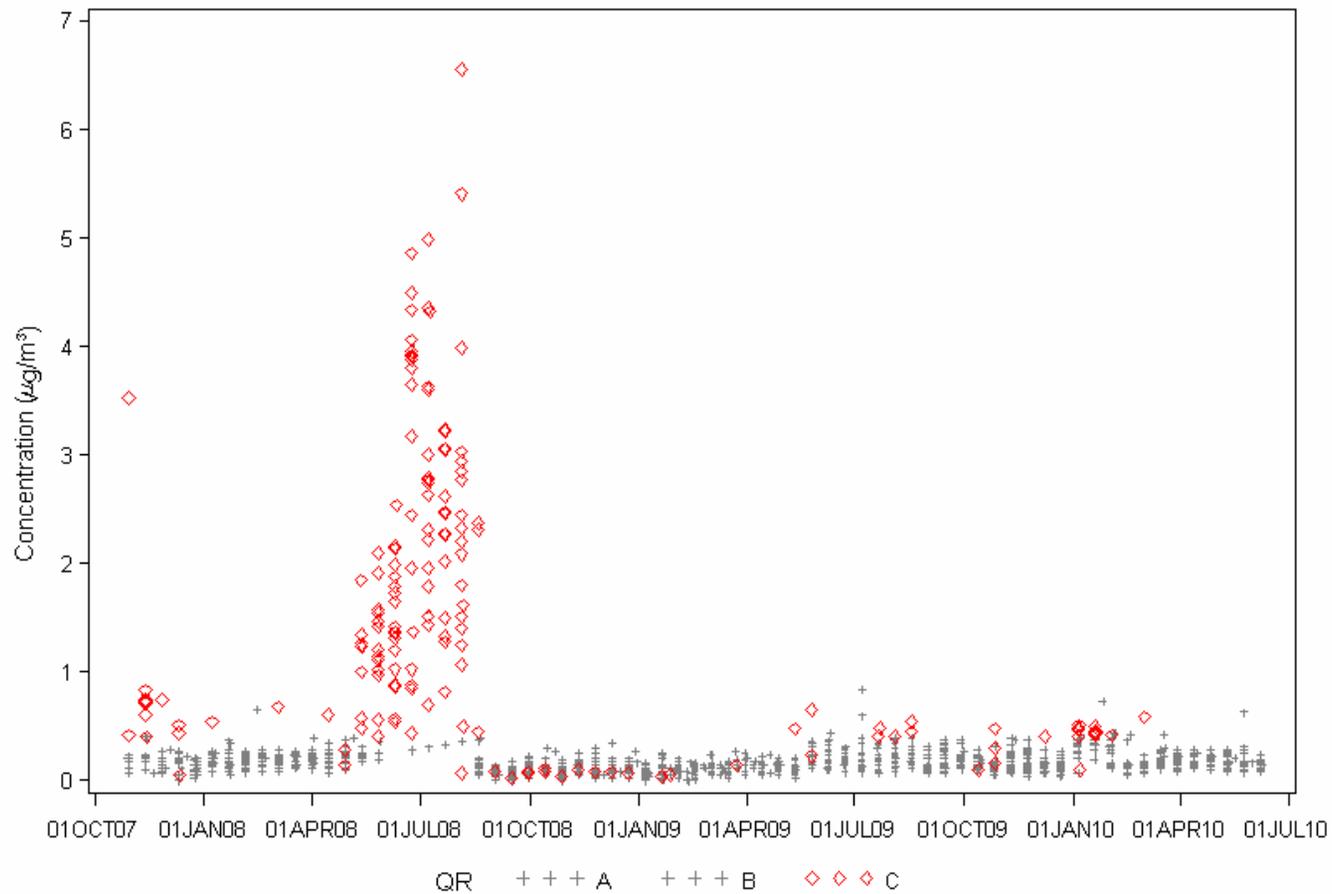
- Precision of triplicate Radiello<sup>®</sup> samplers < 10% (sites with more than 10 samples)
- Accuracy (URG denuders versus Radiello<sup>®</sup> samplers at IL11 and OK99)

N	Slope	Intercept	R <sup>2</sup>
36	1.04	-0.47	0.76



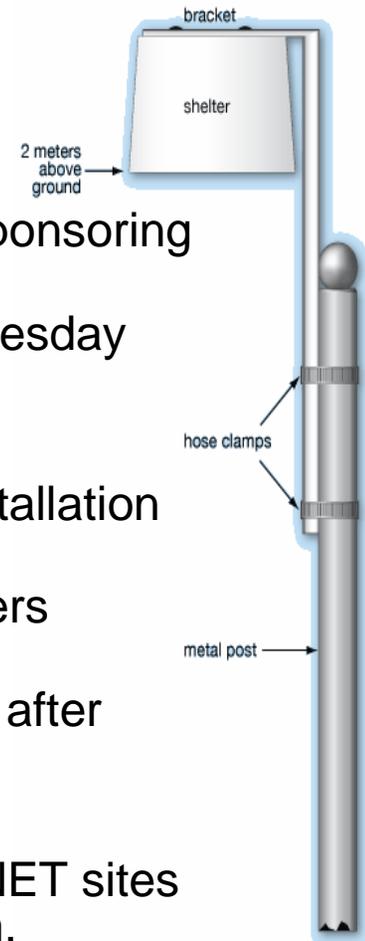
# TRAVEL BLANK CONCENTRATIONS

**Radiello Travel Blank Concentrations**  
Includes All AMoN Sites



# WHAT IS INVOLVED?

- Sponsoring Agency:
  - An agreement is put in place between NADP and the sponsoring agency of the site (~\$2,700/year + \$250 installation)
  - Site operator removes the used sampler every other Tuesday and replaces with the new sampler
- The Program Office/Laboratory
  - The Central Analytical Laboratory (CAL) will ship an installation kit with the housing unit and field SOPs
  - The CAL ships, receives, coats and analyzes all samplers following the SOPs posted on the NADP website
  - Quality assured data are posted to the website 60 days after sample receipt
- External QA
  - Sites which are already NTN, MDN, AIRMoN or CASTNET sites will be visited as part of the NADP external QA program, however, there is no additional cost or need for a site visit if the site is only an AMoN site – site photographs will be used to determine if changes have occurred



# DOCUMENTATION AVAILABLE

## NADP Siting Criteria – Ammonia Monitoring Network

### ≥ 30m from sampler:

- unpaved roads (> 10 vehicles/day, ≤ 50 km/hr)
- walkways (> 100 power vehicle/day)
- maintenance areas (> 5 vehicles/day)
- parking lots (> 5 vehicles/day)

### ≥ 20m from sampler:

- cultivated fields for fiber use
- herbicide use
- pastures

### ≥ 10m from sampler:

- access roads (≤ 10 km/hr, ≤ 10 vehicles/day)
- maintenance areas ≤ 5 vehicles/day
- parking lots ≤ 5 vehicles/day

### ≥ 5m from sampler:

- ditches > 1m tall and > 5m in width or depth

### < 5m from sampler:

- avoid local low elevations
- ground cover typical of area
- ground slope ≤ 15%
- vegetation height ≤ 0.5m

### ≥ 100m from sampler:

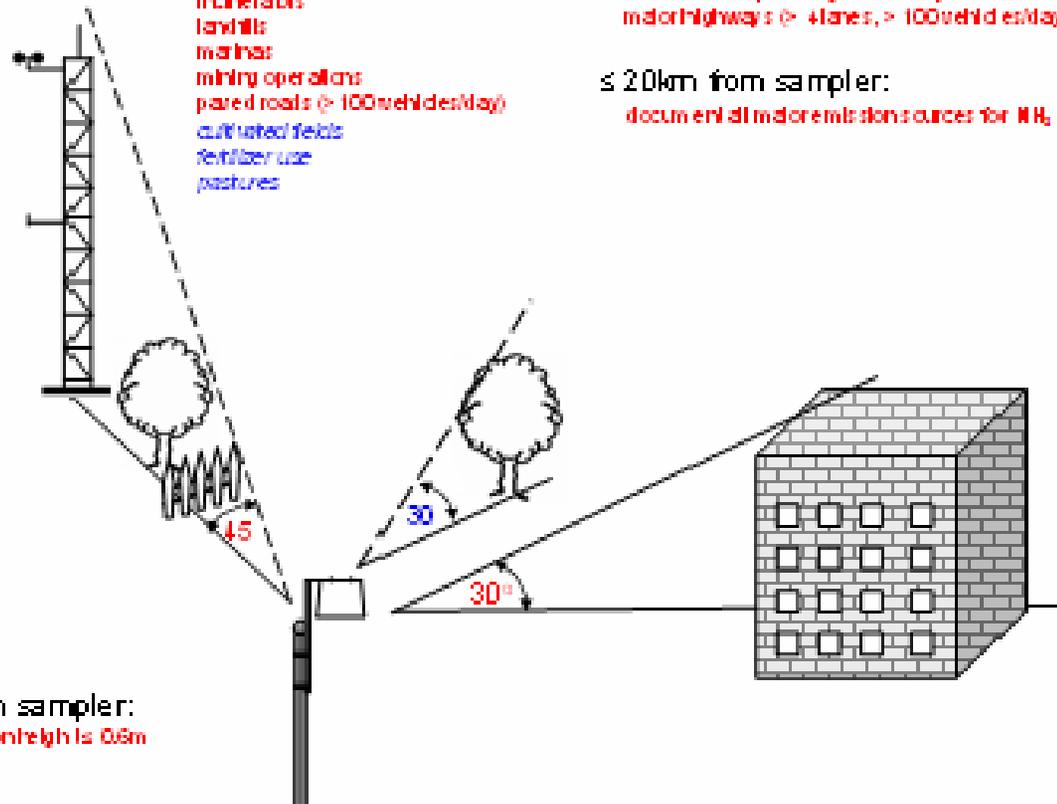
- airports
- chemical manufacturing
- electric utilities
- small feedlot operations
- harbors
- incinerators
- landfills
- marinas
- mining operations
- paved roads (> 100 vehicles/day)
- cultivated fields
- fertilizer use
- pastures

### ≥ 500m from sampler:

- animal operations (> 250 beef cattle, > 100 dairy cattle, > 350 pigs, or > 10,000 chickens)
- industrial complex/large stationary sources
- major highways (> 4 lanes, > 100 vehicles/day)

### ≤ 20km from sampler:

- document all major emissions sources for NH<sub>3</sub>



< 2m from sampler:  
vegetation height ≤ 0.5m

Rule  
Guideline

# AMON COLLABORATION

- EPA
  - Clean Air Markets Division
  - ORD – model development, chamber study
- National Park Service
- States (Pennsylvania, Maryland)
- LADCO – model development
- Tribes (Cherokee Nation)
- US Forest Service
- BLM

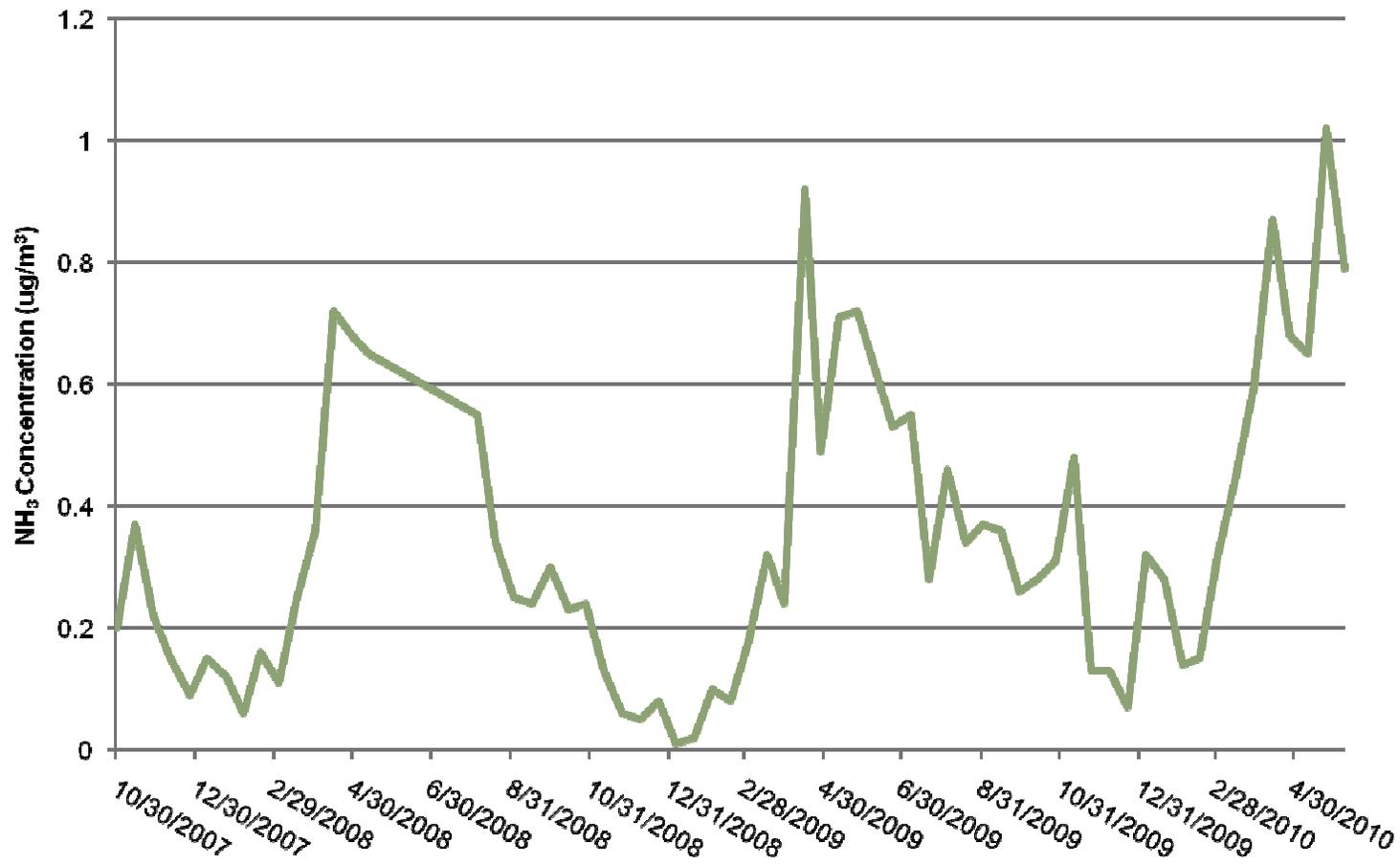


# PRELIMINARY DATA ANALYSES

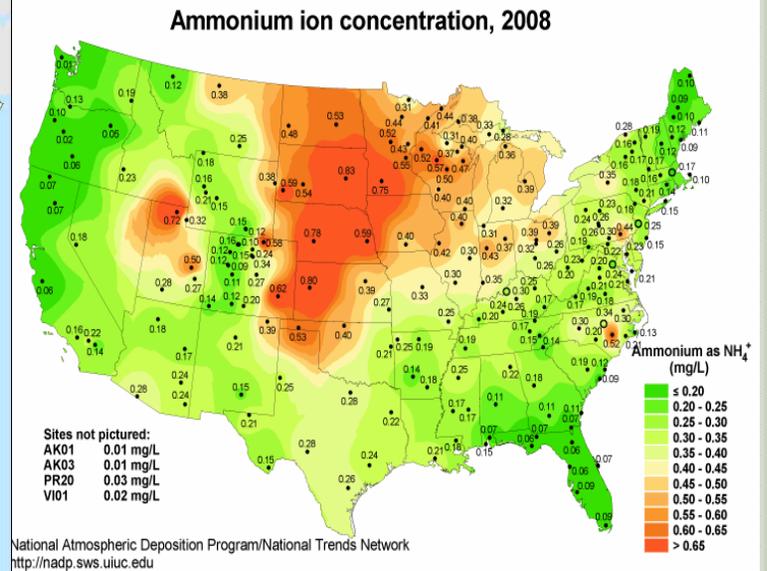
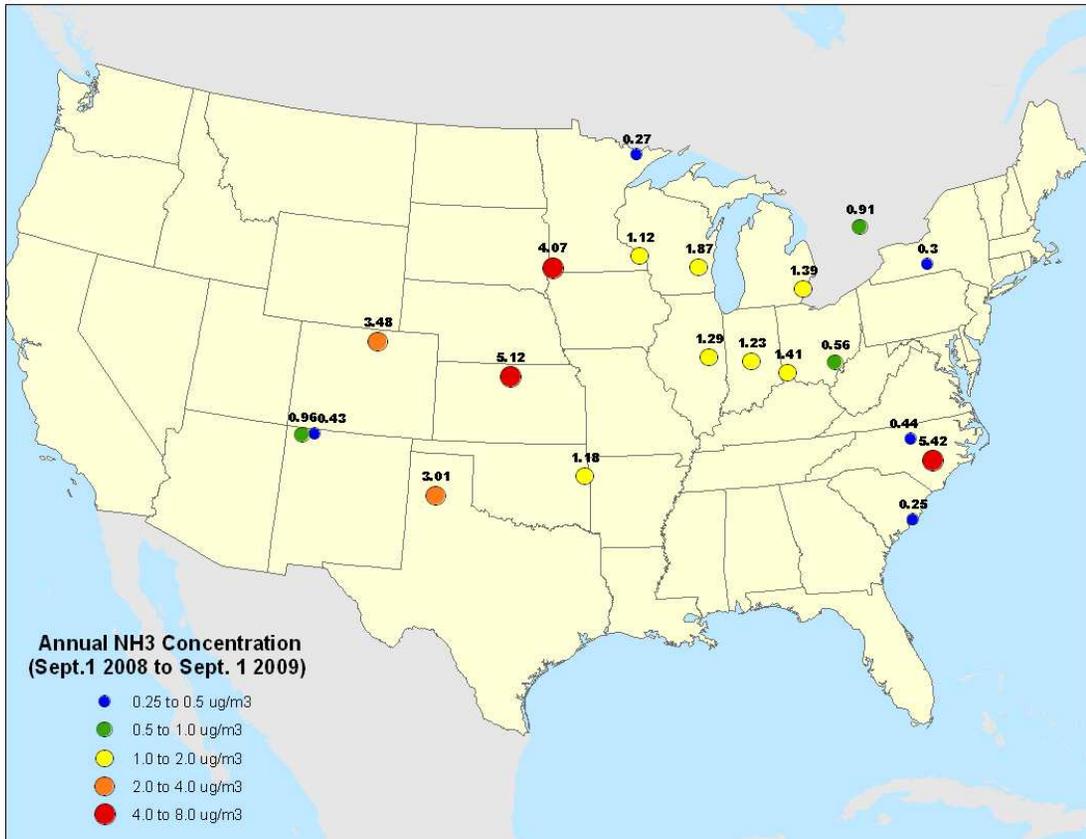


# SEASONAL TRENDS

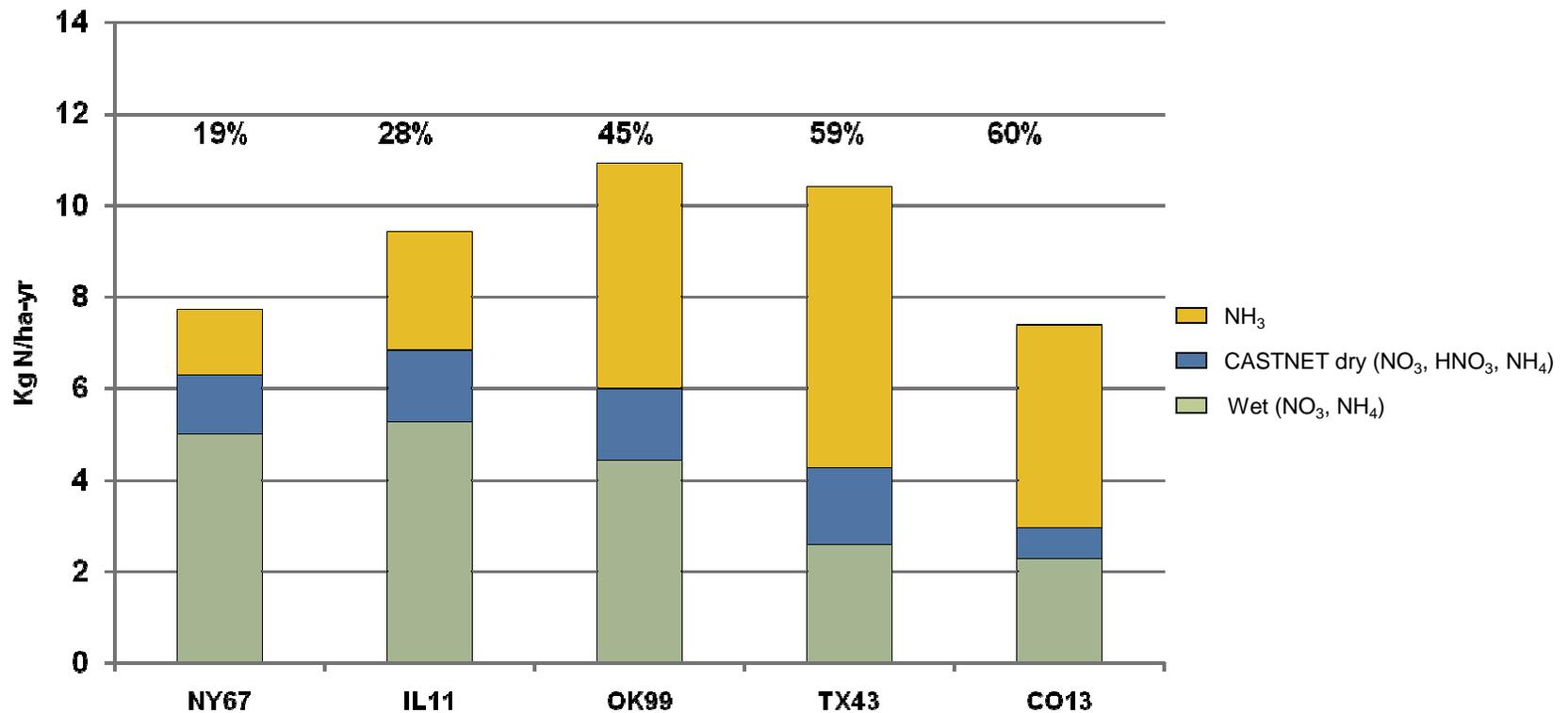
NY67



# SPATIAL VARIABILITY



# CASTNET, NTN AND AMON – ESTIMATING THE TOTAL N BUDGET



Missing 20-60% of the total nitrogen deposition flux based on CMAQ deposition velocities and measured concentrations



# NEXT STEPS

- Provide concentrations to improve models
  - Bi-directional flux model will lower CMAQ deposition velocity
- Assess trends due to new policies (TR, secondary NO<sub>x</sub>/SO<sub>x</sub> standards)
- Outreach
  - Expand the network – new site sponsors, operators and funding sources
  - Provide educational materials or website to involve schools
- Finalize siting criteria document, SOPs, passive ammonia inter-comparison paper



# CONCLUSIONS

- The infrastructure for the network is available and ready to go
- At a time when state and federal monitoring budgets are shrinking, AMoN is an inexpensive way to continue to provide data that is needed by modelers, scientists and policymakers
- Passive samplers are low maintenance and the site installation kit makes it convenient and simple to install
- AMoN provides a more complete N budget at minimal cost to the agency



# Questions?

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<http://nadp.isws.illinois.edu/nh3net/>

