

# National Air Emissions Monitoring Study Data Analysis Update



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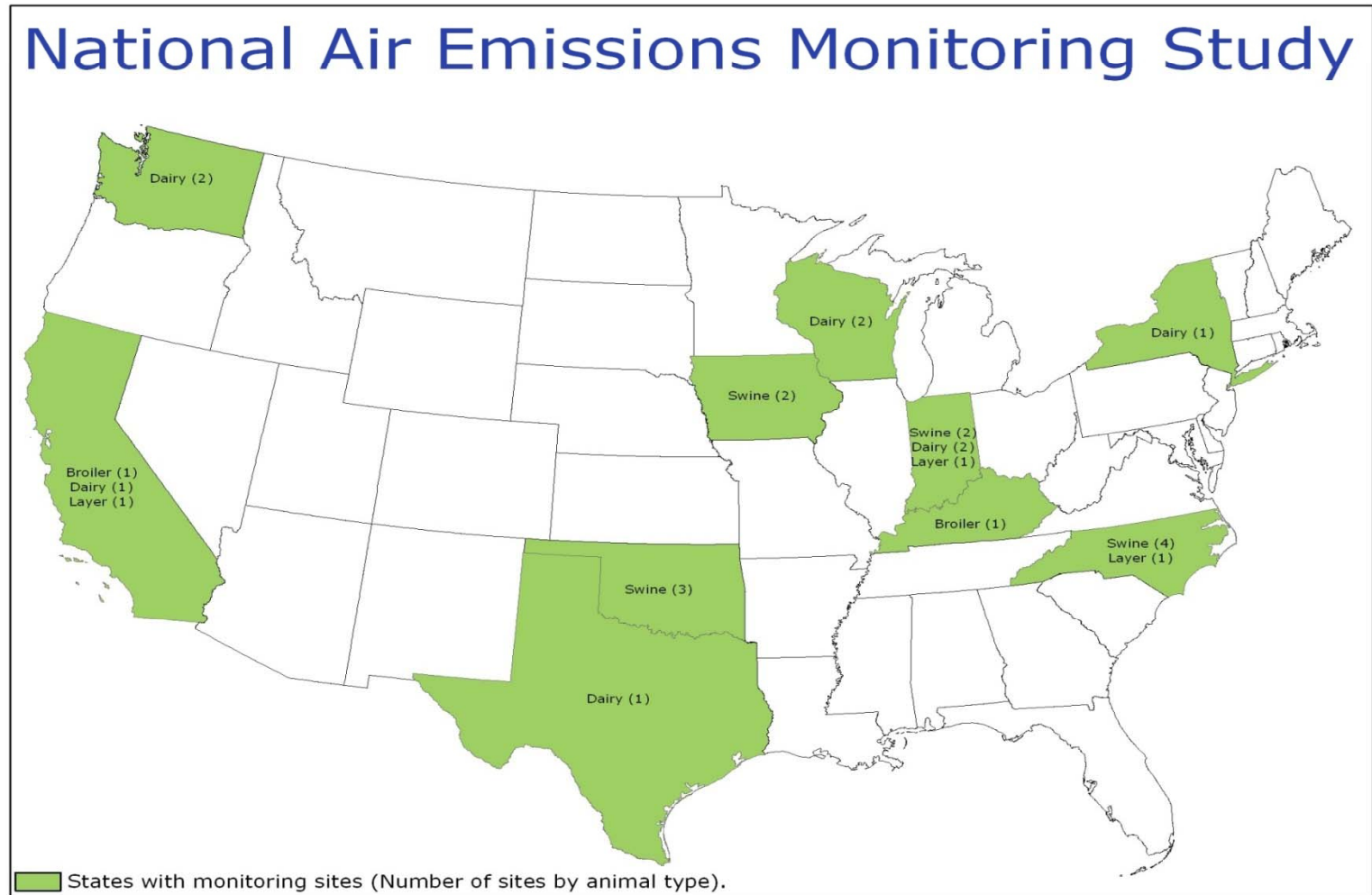
# Monitoring Study - Overview

- Study is part of a consent agreement between EPA and animal feeding operation industry.
- Two year industry funded monitoring study (\$14.8 M).
- Purpose: gather data for developing emission estimating methodologies
- Measured emissions at layers, broilers, dairies, and swine facilities.
  - Particulate matter
  - Hydrogen sulfide
  - Volatile organic compounds
  - Ammonia

## Monitoring Study Overview (con't)

- Monitoring:
  - began summer of 2007; ended early 2010.
  - 25 monitoring sites located in 10 states.
- Reports & Data:
  - Agency began receiving final reports & data in early July 2010.
  - Reports & data will be made available to the public.
- Additional information can be found at:  
[www.epa.gov/agriculture/airmonitoringstudy.html](http://www.epa.gov/agriculture/airmonitoringstudy.html).

## Monitoring Study – Site Selection



# Monitoring Sites

- 25 monitoring sites
  - 15 barns & 10 area (lagoons & corral)
- Sites by species
  - 2 Broiler sites – All barn sites
  - 3 Egg layer sites - All barn sites
    - 2 High rise houses
    - 1 Belt battery house
  - 11 Swine sites – 5 Barns & 6 Area
    - 3 Breeder barns & 3 Breeder lagoons
    - 2 Finisher barns & 3 Finisher lagoons
  - 9 Dairy sites
    - 5 Barns
    - 4 Area (3 lagoons & 1 corral)

# Barn Data

- Daily values for:
  - Animal inventory, animal mass, and production information (eggs/milk).
  - Average concentrations and emissions of  $\text{NH}_3$ ,  $\text{H}_2\text{S}$ , PM (TSP,  $\text{PM}_{10}$ ,  $\text{PM}_{2.5}$ ), and VOC.
  - VOC grab samples.
  - Confinement temperature, relative humidity, static pressure, and ventilation flow rate.
  - Ambient temperature, relative humidity, pressure, wind speed, wind direction, and solar radiation.
- Periodic (e.g., monthly) values for mass balance data (nitrogen, ammonia, and solids content of litter, manure, etc.).



# Area Data

- Daily average values for:
  - $\text{NH}_3$  and  $\text{H}_2\text{S}$  emissions (based upon remote sensing techniques).
  - Ambient temperature, relative humidity, pressure, wind speed, wind direction, and solar radiation.
- Composition data for manure and lagoon liquid.

# Developing Emission Estimating Methodologies

- Methodologies for estimating daily and annual emissions of  $\text{NH}_3$ ,  $\text{H}_2\text{S}$ , TSP,  $\text{PM}_{10}$ ,  $\text{PM}_{2.5}$ , and VOC.
- Anticipate that the methodologies will take the form of multi-parameter emissions factors (similar in form to those used to estimate PM emissions from unpaved roads).
- Where possible, EPA will develop tiered methodologies that will provide gross and more detailed emission estimates (depending on the availability of input data at the farm level).



# Emission Estimating Methodology Development Process

- Construct plots of daily emissions and parameter values to identify trends and data outliers.
- Review field site-specific notes to identify farm activities that might affect emissions (used in conjunction with daily plots).
- Conduct multivariate analyses of daily average values to identify correlated parameters and develop regression equation(s).

## Emission Estimating Methodology Development Process (con't)

- Develop emission methodologies based upon:
  - The results of the multivariate analyses;
  - Review of parameter plots and field notes; and
  - Knowledge of the production processes.
- Construct a nitrogen mass balance around confinement sources for evaluating the appropriateness of the  $\text{NH}_3$  emissions methodology.

## Next Steps

- Provide public access to data.
- Solicit additional data/studies.
- Publish Emission Estimating Methodologies (EEM) – 18 months after receiving final reports.
- Plan to publish EEM on a rolling basis:
  - Broilers, egg layers, swine & dairy
- Public review process will be consistent with the Agency's approach for developing emission factors.