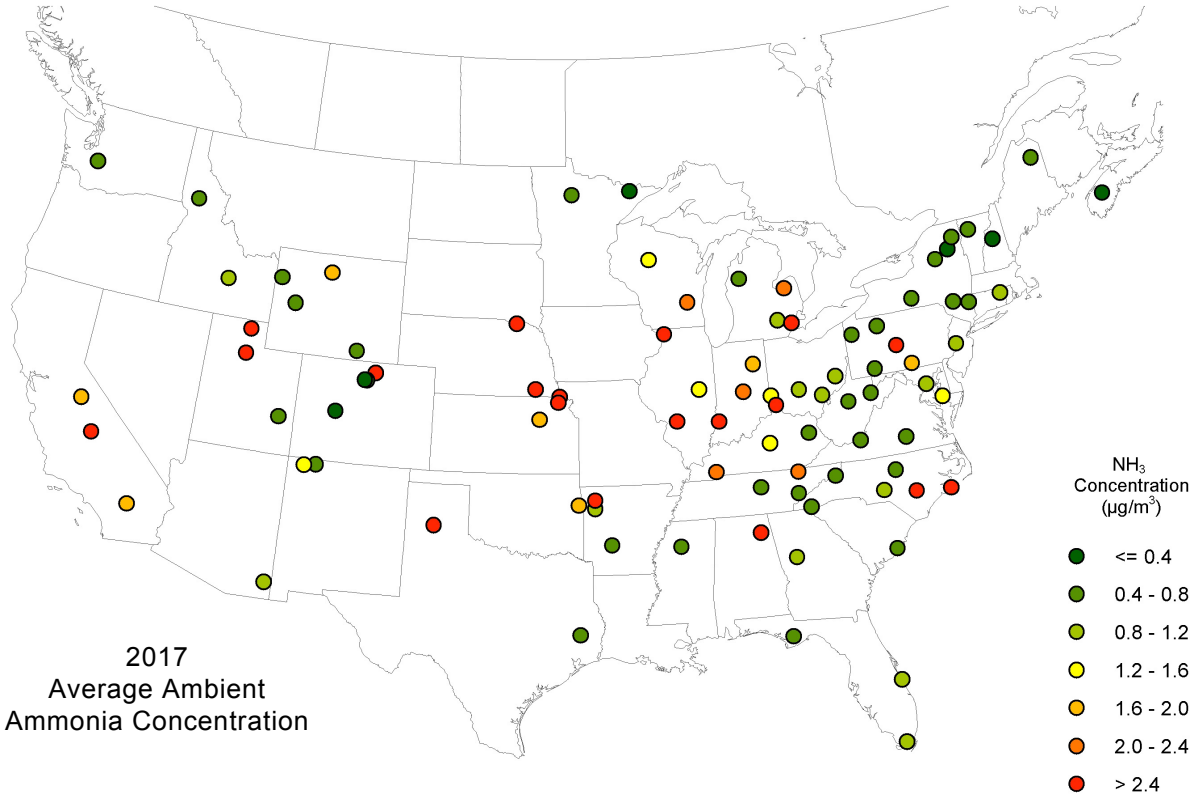
Ambient Ammonia Monitoring Network (AMoN)



The Ammonia Monitoring Network (AMoN) provides land managers, air quality modelers, ecologists, and policymakers critical data that allows them to:

- assess the long-term trends and spatial variability in ambient NH_3 concentrations and deposition;
- validate atmospheric models;
- better estimate total nitrogen inputs to ecosystems;
- assess changes in atmospheric chemistry due to SO_2 and NO_x reductions; and
- assess compliance with $PM_{2.5}$ standards.

There are currently 106 AMoN sites covering 34 states. There are 18 sites that have been operating for over 10 years.

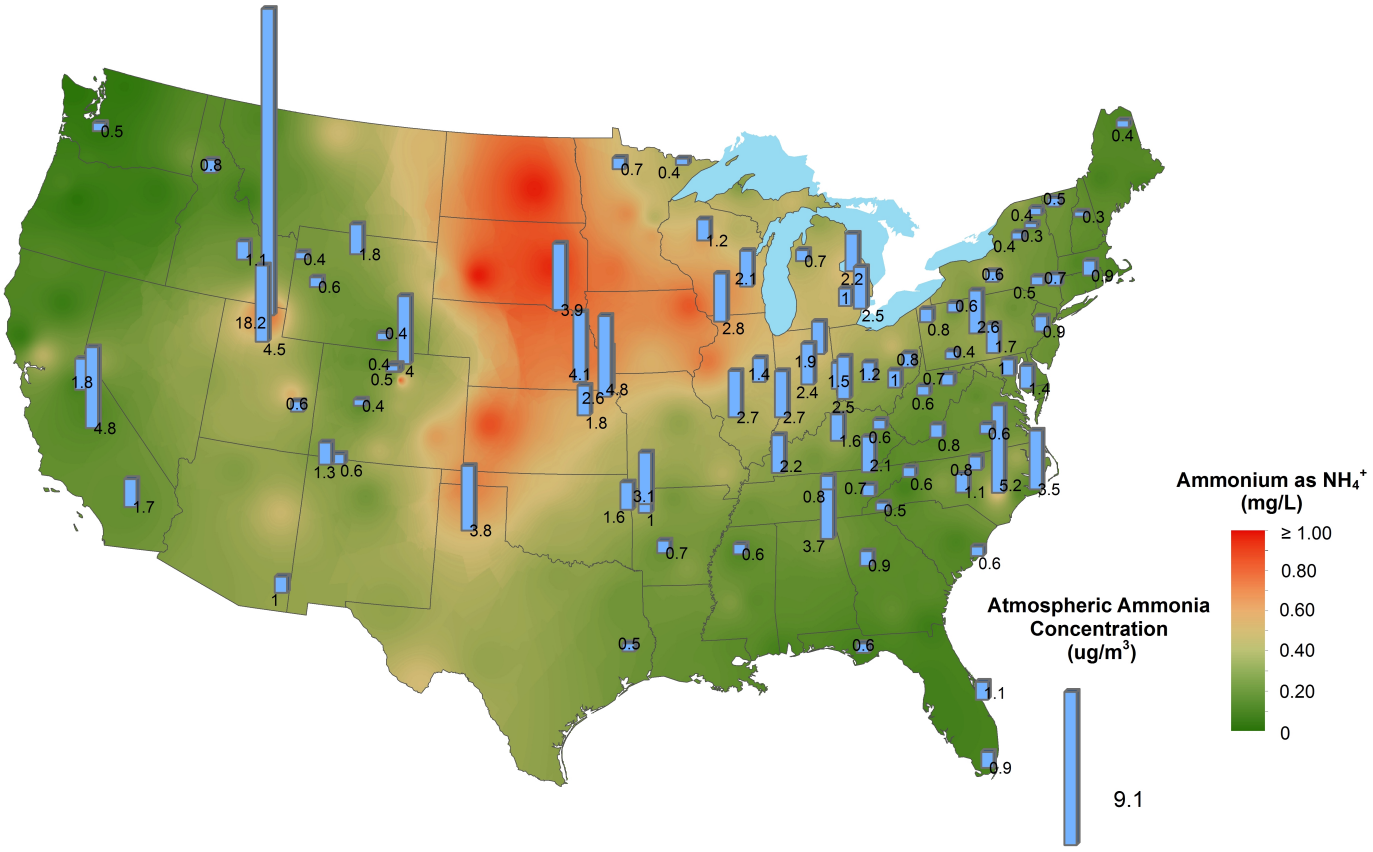
AMoN field site at Sequoia National Park (CA83)

National Atmospheric Deposition Program

The Importance of Ammonia in the Atmosphere

Ammonia (NH_3) is released into the air from agricultural sources, as well as from industrial processes, vehicular emissions and volatilization from soils, vegetation and oceans. It is the principal basic gas in the atmosphere. While NH_3 has many beneficial uses, it can detrimentally affect the quality of the environment through the acidification and eutrophication of natural ecosystems and the associated loss of biodiversity formation of secondary particles in the atmosphere.

The dominant source of NH_3 emissions in the U.S. is agriculture (~85%), largely from animal waste and commercial fertilizer application. Data from the National Atmospheric Deposition Program/National Trends Network (NADP/NTN), a 40+ year wet deposition network with over 260 sites across the U.S., has shown “hot spots” of ammonium ion (NH_4) concentrations in the U.S. (see figure below). Yet, despite its importance in atmospheric chemistry and its impact on ecosystems, there has been no routine national monitoring of ambient NH_3 until NADP established a routine, long-term, cost efficient passive NH_3 monitoring network in October 2007.

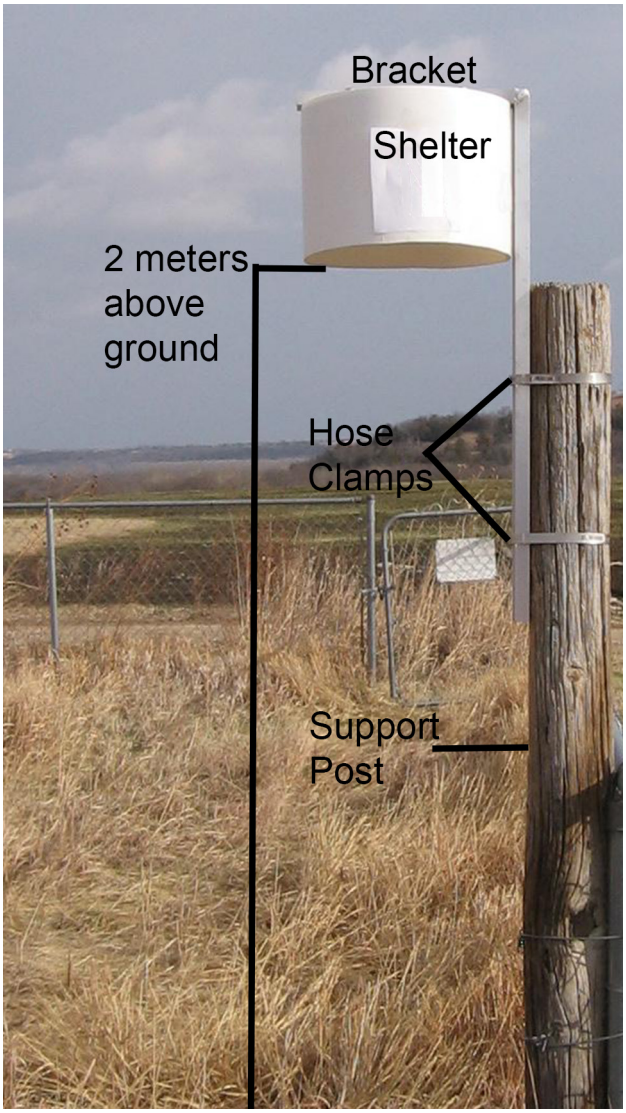


The background map represents the 2017 precipitation weighted mean ammonium ion concentration over the continental United States as measured by the NADP/National Trends Network (NADP/NTN). The blue bars represent the 2017 annual average atmospheric ammonia concentration as measured by AMoN.

AMoN Sampling Methods

The AMoN uses Radiello® passive samplers (https://www.sigmaaldrich.com/analytical-chromatography/air-monitoring/radiello.html), which do not require electricity or a data logger. AMoN sites can be installed almost anywhere, provided the area meets the siting criteria. An example of the site setup is shown below.

Samplers are deployed for 2-week periods. The time commitment of the site operator is approximately 30 minutes at the site every other Tuesday. The NADP's Central Analytical Laboratory assembles and ships passive samplers to sites and, when returned, analyzes, quality assures, and provides the analytical data to the NADP. The AMoN data, including site specific information, are available for download at http://nadp.slh.wisc.edu/AMoN.

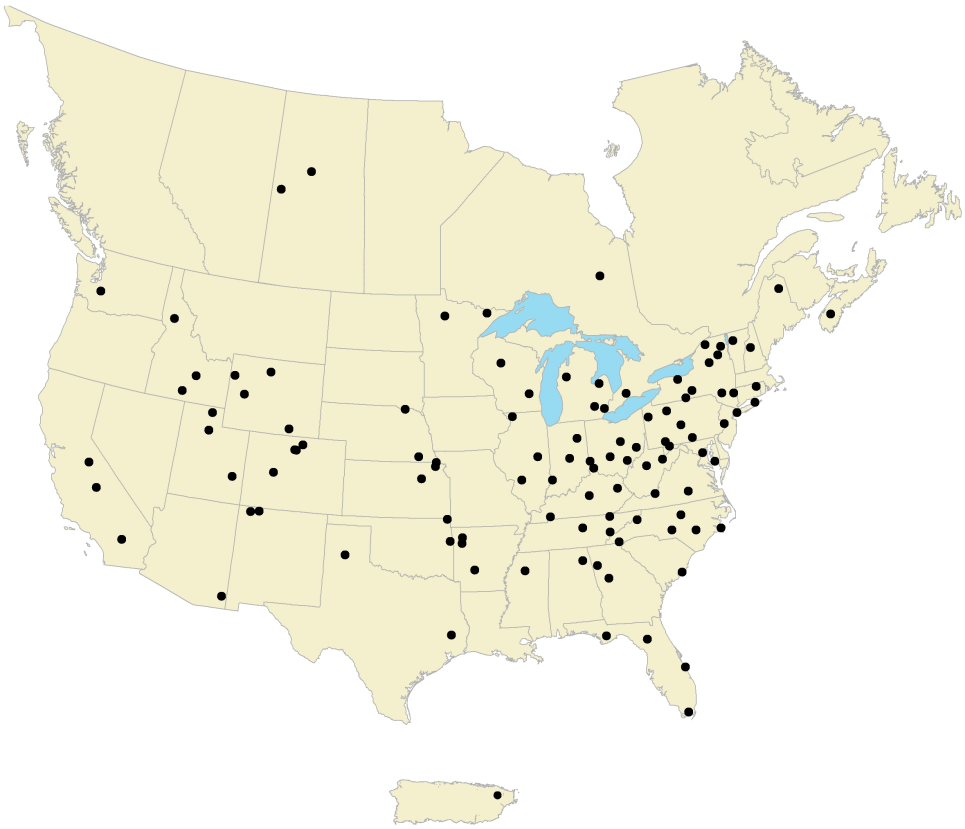


Above: Example of AMoN Sample Shelter at Beltsville, MD (MD99). Left: Ammonia Sampler, screwed into roof of housing.

The Future of the AMoN

Future plans for AMoN include:

- expanding the network to cover all sensitive ecoregions of North America;
- utilizing the measured NH_3 concentrations for validation of air quality and deposition models;
- providing deposition fluxes at AMoN sites; and
- providing educational outreach materials highlighting the hands-on experience in atmospheric science that students can receive by participating in AMoN.



Puerto Rico

Sites Active in 2017

AMoN Site Costs

The annual cost of participating in the network is $2,476 per site/year. This annual cost includes site supplies, shipping to and from the site, sample analysis, quality assurance activities, monthly reports and data reporting on the internet. A site installation kit is required ($250), and this cost will be added to the initial invoice.

For more information, visit the AMoN website at
http://nadp.slh.wisc.edu/AMoN.

National Atmospheric Deposition Program

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