

ANNUAL REPORT

National Research Support Project 3, National Atmospheric Deposition Program January 1 to December 31, 2000

Title: The National Atmospheric Deposition Program-A Long-term Monitoring Program in Support of Research on Effects of Atmospheric Chemical Deposition
Supported by the Regional Research Fund, Hatch Act, as amended August 11, 1985, and voluntary contributions from many other federal, state, and private research organizations

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| | | | | | |
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| Cape Romain NWR | L. Klimek | | D. Boyle | Meteorological Service of Canada | D. MacTavish |
| Chassahowitzka NWR | B. Quarles | | D. S. Brown | | D. McKay |
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| Muleshoe NWR | G. Copley | | M. Carlson | | R. Tordon |
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National Research Support Project - 3, National Atmospheric Deposition Program Progress of Work and Principal Accomplishments - 2000

The National Atmospheric Deposition Program (NADP) provides quality assured data and information on the exposure of managed and natural ecosystems and cultural resources to acidic compounds, nutrients, base cations, and mercury in precipitation. These data support informed decisions on air quality issues related to precipitation chemistry and are used by scientists, policy-makers, educators, and the public. Data are freely available via the Internet, which enables on-line retrieval of individual data points, seasonal and annual averages, trend plots, concentration and deposition maps, reports, and other information (<http://nadp.sws.uiuc.edu>).

The NADP operates three precipitation chemistry networks: the National Trends Network (NTN), the Atmospheric Integrated Research Monitoring Network (AIRMoN), and the Mercury Deposition Network (MDN). At the end of December 2000, 228 NTN stations were collecting one-week precipitation samples in 48 states, Puerto Rico, the Virgin Islands, and Quebec Province, Canada (Appendix 1). The NTN provides the only long-term nationwide record of wet deposition in the United States. Complementing the NTN are the 9-site AIRMoN (Appendix 2) and the 52-site MDN (Appendix 3). Data from daily precipitation samples collected at AIRMoN sites support continued research of atmospheric transport and removal of air pollutants and development of computer simulations of these processes. The MDN offers the only regional measurements of mercury in North American precipitation, and MDN data are used to quantify mercury deposition to water bodies that have fish and wildlife consumption advisories due to this toxic chemical.

In October, 137 scientists attended the 2000 NADP Technical Committee meeting in Saratoga Springs, New York. A two-day scientific symposium, "NADP 2000 - Ten Years after the Clean Air Act Amendments: Adirondacks in the Balance," followed a day of business meetings of the NADP Executive Committee (Appendix 4), three subcommittees, and full Technical Committee (minutes in Appendix 5). The symposium drew the largest attendance at an NADP meeting in more than 15 years and featured four sessions on the impacts of emissions changes on precipitation chemistry, stream quality, and forest health, following enactment of the 1990 Clean Air Act Amendments. Other sessions addressed coastal eutrophication, air toxics and the environment, and atmospheric deposition monitoring and assessment. Seventy-eight papers were presented in eight platform sessions and a poster session. During the business meeting, the Technical Committee endorsed activities associated with the strategic initiative to modernize NADP field equipment. Field tests of a new rain gauge are underway at six NADP sites. Two companies are developing prototype wet deposition collectors. The Network Operations and the Data Management and Analysis Subcommittees announced efforts to develop a new site classification scheme. The Environmental Effects Subcommittee will begin work on a mercury brochure patterned after the highly successful nitrogen brochure, *Nitrogen in the Nation's Rain*.

Below are highlights of year 2000 research activities in which Technical Committee scientists used NADP data to learn about spatial distributions or temporal trends in atmospheric wet deposition (objective 1):

Objective 1. Characterize geographic patterns and temporal trends in biologically important chemical deposition.

- Recent journal articles by researchers at Penn State University and the Illinois State Water Survey compared 1995-1997 and 1983-1994 NTN data and reported that sulfate and free acidity in and downwind of the Ohio River Valley decreased by 10 to 25 percent from 1983-1994 to 1995-1997; in 1995 the Clean Air Act effected lower limits on sulfur dioxide emissions from 110 large sources, more than 60 percent in states along the Ohio River.
- University of California-Davis scientists found that wintertime fog has nitrate and ammonium concentrations ~100-200 times higher than precipitation at the Davis NTN site and has organic nitrogen concentrations ~20 percent of the inorganic nitrogen concentrations, making fog deposition an important nitrogen source for California's Central Valley ecosystems.
- Based on objectively analyzed data from 150 NTN sites operating in 1985-1989 and in 1995-1999, University of Illinois scientists reported that ammonium concentrations increased 26 percent on average from the early to the late period, and they are now exploring possible causes.
- Initial results of a major sampling effort by Oak Ridge National Laboratory and National Oceanic and Atmospheric Administration investigators in Barrow, Alaska, suggest that atmospheric mercury deposition during the four months following polar sunrise at this Arctic site significantly exceeds deposition measured at eastern U.S. MDN sites.
- Atmospheric chemists at Penn State University applied meteorological and chemical models to study the role of atmospheric oxidants, nitrogen oxides, hydrocarbons, and meteorological factors leading to a storm that delivered extremely high sulfate deposition to the central Pennsylvania AIRMoN site.

- Scientists in Puerto Rico's Luquillo Long Term Ecological Research (LTER) study found that the mass ratio of non-seasalt sulfur to nitrogen in NTN samples at the LTER site averages 2.5 to 1 compared with 2.1 to 1 in southeastern U.S. NTN samples, leading them to hypothesize that "extra sulfate" is coming from dimethyl sulfide emitted by plankton in Puerto Rican ocean waters.
- Using NTN wet deposition data and Clean Air Status and Trends Network dry deposition data, U.S. Department of Agriculture - Forest Service researchers determined that precipitation accounts for 69 percent of the nitrogen deposition and 81 percent of the sulfur deposition in Wyoming's Snowy Range.
- Testing for trends in NTN records from sites in western North Carolina and surrounding areas, scientists at the North Carolina Department of Environment and Natural Resources found statistically significant decreases in sulfate concentrations (1.6 - 2.4 percent/year over ~20 years) at all Appalachian Mountain sites, except Mount Mitchell, North Carolina.

Below is a list of selected year 2000 research activities in which NADP data supported investigations of the effects of atmospheric deposition (objective 2):

Objective 2. Support research activities related to: (a) the productivity of managed and natural ecosystems; (b) the chemistry of surface and ground waters including estuaries; (c) the health of domestic animals, wildlife, and fish; (d) human health; (e) the effects of atmospheric deposition on visibility and materials; and (f) discerning source-receptor relationships.

- As a contribution to an assessment of hypoxia in the Gulf of Mexico, authors of a recent journal article used NTN data to evaluate the flux and sources of nutrients entering the Mississippi-Atchafalaya River basin from the nitrate and ammonium in precipitation.
- Measuring the chemistry of throughfall, bulk deposition, and streams along an elevational gradient in a first-order forested watershed in the Catskill Mountains of New York, researchers found that atmospheric nitrogen deposition increases at higher elevations while streams export a smaller fraction of incoming nitrogen, possibly due to soil and tree species composition and temperature effects on nitrogen cycling.
- Forest canopy nitrogen uptake, calculated from measurements of wet and dry deposition and throughfall, was found to modify nitrogen cycling and have a potential impact on the carbon sequestration rate in a spruce-fir forest, according to NADP scientists collaborating in a Forest Service study in central Maine.
- By combining NTN data with snowpack chemistry measurements along east and west slopes of the Rocky Mountains, National Park Service and U.S. Geological Survey scientists determined that nitrogen and sulfur sources from both sides of the Continental Divide have an important impact on high-elevation ecosystems in Colorado.
- Using NTN data in assessing the calcium budget of a forested watershed near Atlanta, Georgia, investigators discovered that watershed inputs from atmospheric deposition and weathering are less than 20 percent of outputs from uptake by merchantable trees and leaching of soils, which indicates calcium depletion.
- Evaluating sugar maple health in the northeastern United States, Forest Service scientists found high mortality in stands stressed by multiple defoliations and low foliar calcium and magnesium concentrations.
- Assessing the transport and fate of atmospheric mercury emissions, scientists working for the Electric Power Research Institute are evaluating and guiding future development of a model simulating regional source-receptor cycling of mercury, using measurements of the annual wet deposition flux of mercury at MDN sites in 12 states.
- Kansas State University NADP cooperators are using NTN data to study the impact of nutrients in precipitation on grassland species and nutrient budgets at the Konza Prairie Long Term Ecological Research site.
- A University of Wyoming researcher used analyses of the ¹⁸O abundance in archived 1989-1991 NTN samples and in water extracted from grasses and shrubs to differentiate among water sources (summer or winter precipitation and surface or ground water) for vegetation in riparian and prairie ecosystems.

Usefulness of Findings

The NADP database, with 22 years of NTN data, 8 years of AIRMoN data, and 4 years of MDN data, is an invaluable resource supporting research of atmospheric deposition and its effects on managed and unmanaged ecosystems, i.e., NRSP-3 objectives 1 and 2.

In a new report to Congress, *Deposition of Air Pollutants to the Great Waters - 3rd Report to Congress 2000*, scientists report that NADP monitoring data show relatively constant rates of inorganic nitrogen deposition to the Great Lakes, Lake Champlain, Chesapeake Bay, and coastal waters over the last two decades. Based on these data, atmospheric deposition contributes ~10 to 40 percent of total nitrogen loads reaching bays and estuaries in east and Gulf coastal areas. Other studies indicate atmospheric deposition contributions between 10 and 85 percent of total mercury loadings to certain water bodies. In another report to Congress, *ACID RAIN, Emissions Trends and Effects in the Eastern United States*, the General Accounting Office in cooperation

with Penn State and University of Illinois scientists used NADP data to demonstrate how sulfur dioxide emissions reductions had reduced acidic deposition, while nitrogen oxide emissions and nitrate deposition had changed little. Consistent with deposition changes, sulfate levels decreased in 92 percent of representative Adirondack Mountain lakes, while nitrate increased in 48 percent of these lakes, decreased in 25 percent, and remained unchanged in the remaining 27 percent.

In 2000, the NADP Internet site (nadp.sws.uiuc.edu) received more than 40,000 unique visitors, an 18 percent increase over 1999 usage. Nearly one in four visitors returned to the site, which logged more than 100,000 user sessions. Most frequently accessed data products continued to be color contour maps of pollutant concentrations and depositions. Site users viewed nearly 146,000 maps and retrieved nearly 17,000 data files. User statistics show that researchers primarily use NADP data to study atmospheric deposition and watershed processes, as well as environmental phenomena such as the effects of deposition on aquatic and terrestrial ecosystems and on cultural resources (Appendix 6). Research usage has averaged about two times educational usage; however, electronic data requests serving educators from elementary schools, secondary schools, and colleges increased to ~40 percent of the total requests in 2000. This shift may reflect interest in new educational materials available on the Internet site and NADP involvement in the development of educational materials.

The NADP brochure, *Inside Rain*, is featured in an educational curriculum, *Inside Rain - Working with Precipitation Chemistry Data* (Appendix 7), published in March 2000 by the National Science Teachers Association. Developed for students in grades 9-12, this activities-based curriculum teaches how rain forms and how it captures and deposits pollutants. Students retrieve data and information from the NADP Internet site in half of the activities, which were designed with technical advice from NADP Technical Committee members. In July 2000, the *Scout Science and Engineering Report* featured the on-line NADP brochure, *Nitrogen in the Nation's Rain*. The National Science Foundation funds the Scout Project to evaluate Web sites and especially recognize sites with high-quality content. *Nitrogen in the Nation's Rain* is a new informational, educational brochure developed under guidance from the NADP Environmental Effects Subcommittee.

Research groups measuring the isotopic composition of water have found an important new application for archival NTN samples. Measurements demonstrate that these samples, which are held for five years in refrigerated storage at the NADP Central Analytical Laboratory, are suitable for isotopic studies. Scientists are measuring the ^{18}O and ^2H abundance in archival samples and comparing the isotopic composition of NTN samples with standard mean ocean water. These data are being used to evaluate the relative contributions of the Gulf of Mexico, North Pacific Ocean, and Atlantic Ocean as sources of the water vapor that led to precipitation. Spatial and seasonal changes in the ^{18}O abundance also are used to assess the importance of continental recycling of ocean water and to investigate the effects of air and water temperatures on isotopic composition. An accessible database is being developed for the isotope research community using ^{18}O and ^2H measurements from 80 NTN sites over 14 years. These sites comprise the U.S. contribution to the International Atomic Energy Agency's Global Network for Isotopes in Precipitation.

Work Planned for 2001

The NADP will continue to provide uninterrupted high-quality measurements of inorganic acids, nutrients, base cations, and mercury in precipitation. A multi-year effort to make Geographic Information System coverages available on the NADP Internet site will continue. Coverages under preparation include maps of topography, land use, roads, population, and point and area emissions in the vicinity of each NADP site. A system that enables users to view these coverages selectively is planned.

Publications

Appendix 8 lists more than 200 publications, including 53 journal articles, in the year 2000 list of publications by NADP scientists. In May, seven articles appeared in a special section, entitled the "National Atmospheric Deposition Program," of the journal *Atmospheric Environment* (Appendix 9). Van Bowersox, NADP Coordinator, published an article "NADP, A long-term monitoring program in support of research on the effects of atmospheric chemical deposition," in an issue of *Water Resources IMPACT* devoted to long-term water data. Three reports and a brochure were published: Technical Committee meeting proceedings (Appendix 10), 1998 Central Analytical Laboratory QA report (Appendix 11), 1999 map summary (Appendix 12) and *Nitrogen in the Nation's Rain* (Appendix 13). Finally, the 2001 *CALendar* (Appendix 14), featuring 19 sites was published and distributed to site supervisors, operators, and Technical Committee meeting attendees.

APPROVED:

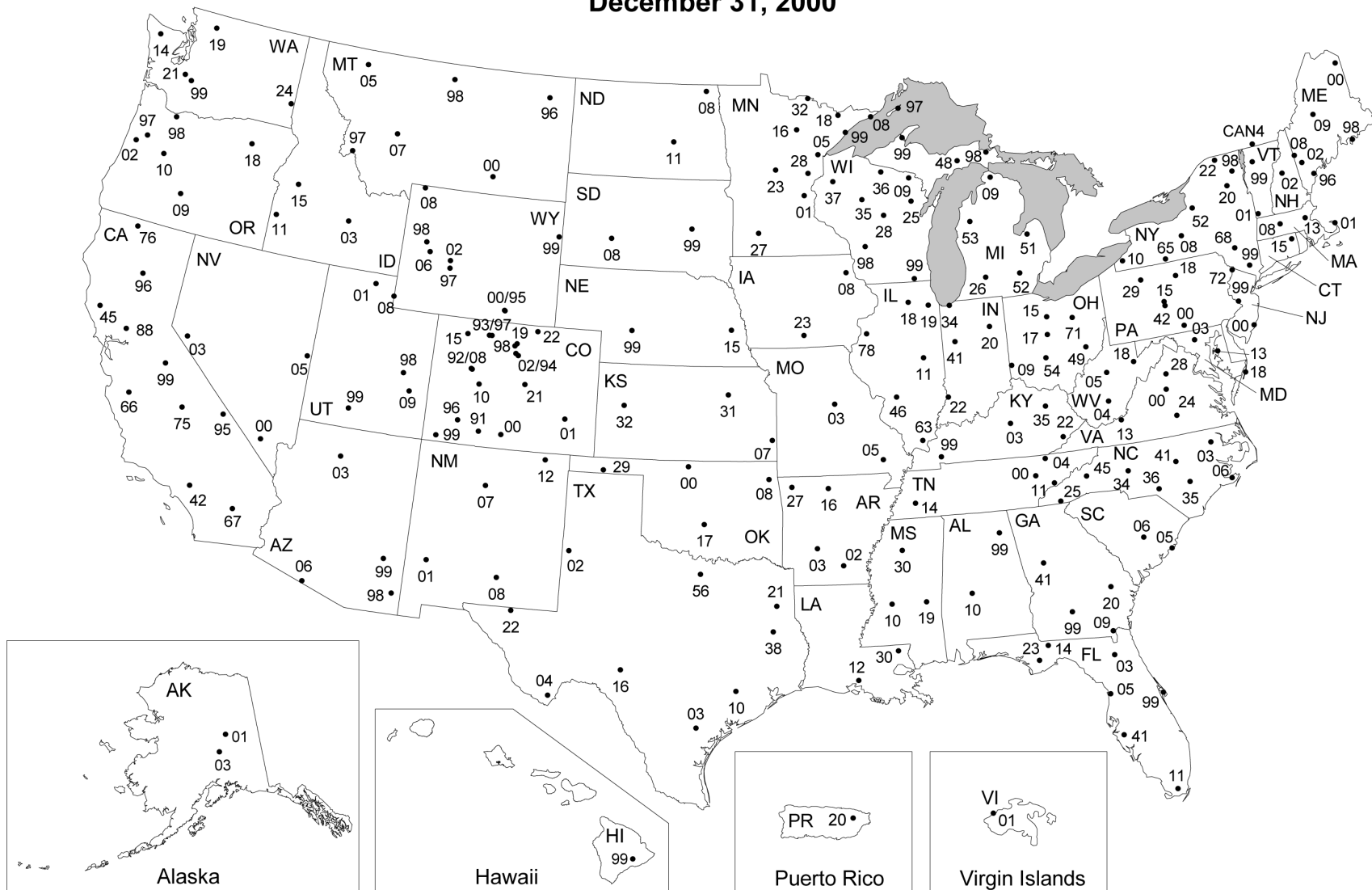
James A. Lynch
Past Chair
NRSP-3 Technical Committee

Date

Wayne Banwart
Administrative Advisor
NRSP-3

Date

National Atmospheric Deposition Program National Trends Network December 31, 2000



**National Atmospheric Deposition Program/National Trends Network Sites
December 31, 2000**

| State | | | | Start |
|--------------------|-------------------------------------|----------------|--|-------|
| Site Code | Site Name | County | Sponsoring Agency | Date |
| Alabama | | | | |
| AL10 | Black Belt Ag Substation | Dallas | US Geological Survey | 08/83 |
| AL99 | Sand Mountain Ag Experiment Station | DeKalb | Tennessee Valley Authority | 10/84 |
| Alaska | | | | |
| AK01 | Caribou - Poker Creek | Fairbanks | USDA Forest Service | 12/92 |
| AK03 | Denali NP - Mount McKinley | Denali | National Park Service - Air Resources Div | 06/80 |
| Arizona | | | | |
| AZ03 | Grand Canyon NP - Hopi Point | Coconino | National Park Service - Air Resources Div | 08/81 |
| AZ06 | Organ Pipe Cactus NM | Pima | National Park Service - Air Resources Div | 04/80 |
| AZ98 | Chiricahua | Cochise | US Environmental Protection Agency-CAMD | 02/99 |
| AZ99 | Oliver Knoll | Graham | US Geological Survey | 08/81 |
| Arkansas | | | | |
| AR02 | Warren 2WSW | Bradley | US Geological Survey | 05/82 |
| AR03 | Caddo Valley | Clark | US Geological Survey | 12/83 |
| AR16 | Buffalo NR - Buffalo Point | Marion | National Park Service - Air Resources Div | 07/82 |
| AR27 | Fayetteville | Washington | US Geological Survey | 04/80 |
| California | | | | |
| CA42 | Tanbark Flat | Los Angeles | USDA Forest Service | 01/82 |
| CA45 | Hopland | Mendocino | US Geological Survey | 10/79 |
| CA66 | Pinnacles NM - Bear Valley | San Benito | National Park Service - Air Resources Div | 11/99 |
| CA67 | Joshua Tree NP - Black Rock | San Bernardino | National Park Service - Air Resources Div | 09/00 |
| CA75 | Sequoia NP - Giant Forest | Tular | National Park Service - Air Resources Div | 07/80 |
| CA76 | Montague | Siskiyou | US Geological Survey | 06/85 |
| CA88 | Davis | Yolo | US Geological Survey | 09/78 |
| CA95 | Death Valley NP - Cow Creek | Inyo | National Park Service - Air Resources Div | 02/00 |
| CA96 | Lassen Volcanic NP - Manzanita Lake | Shasta | National Park Service - Air Resources Div | 06/00 |
| *CA99 | Yosemite NP - Hodgdon Meadow | Tuolumne | National Park Service - Air Resources Div | 12/81 |
| Colorado | | | | |
| CO00 | Alamosa - Weather Service Office | Alamosa | US Geological Survey | 04/80 |
| CO01 | Las Animas Fish Hatchery | Bent | US Geological Survey | 10/83 |
| CO02 | Niwot Saddle | Boulder | NSF/INSTAAR-University of Colorado | 06/84 |
| CO08 | Four Mile Park | Garfield | US Environmental Protection Agency-CAMD | 12/87 |
| CO10 | Gothic | Gunnison | US Environmental Protection Agency-CAMD | 02/99 |
| CO15 | Sand Spring | Moffat | Bureau of Land Management | 03/79 |
| CO19 | Rocky Mountain NP - Beaver Meadows | Larimer | National Park Service - Air Resources Div | 05/80 |
| CO21 | Manitou | Teller | USDA Forest Service | 10/78 |
| CO22 | Pawnee | Weld | NSF-LTER/Colorado State University | 05/79 |
| CO91 | Wolf Creek Pass | Mineral | USDA Forest Service | 05/92 |
| CO92 | Sunlight Peak | Garfield | US Environmental Protection Agency-CAMD | 01/88 |
| CO93 | Buffalo Pass - Dry Lake | Routt | USDA Forest Service | 10/86 |
| CO94 | Sugarloaf | Boulder | US Environmental Protection Agency-CAMD | 11/86 |
| CO96 | Molas Pass | San Juan | USDA Forest Service | 07/86 |
| CO97 | Buffalo Pass - Summit Lake | Routt | USDA Forest Service | 02/84 |
| CO98 | Rocky Mountain NP - Loch Vale | Larimer | USGS/Colorado State University | 08/83 |
| CO99 | Mesa Verde NP - Chapin Mesa | Montezuma | US Geological Survey | 04/81 |
| Connecticut | | | | |
| CT15 | Abington | Windham | US Environmental Protection Agency-CAMD | 01/99 |
| Florida | | | | |
| FL03 | Bradford Forest | Bradford | St. John's River Water Management District | 10/78 |
| FL05 | Chassahowitzka NWR | Citrus | US Fish & Wildlife Serv - Air Quality Branch | 08/96 |
| FL11 | Everglades NP - Research Center | Dade | National Park Service - Air Resources Div | 06/80 |
| FL14 | Quincy | Gadsden | US Geological Survey | 03/84 |
| FL23 | Sumatra | Liberty | US Environmental Protection Agency-CAMD | 01/99 |
| FL41 | Verna Well Field | Sarasota | US Geological Survey | 08/83 |
| FL99 | Kennedy Space Center | Brevard | NASA/Dynamac Corporation | 08/83 |

| State | Site Code | Site Name | County | Sponsoring Agency | Start Date |
|----------------------|-----------|---------------------------------|-------------|--|------------|
| Georgia | | | | | |
| | GA09 | Okefenokee NWR | Charlton | US Fish & Wildlife Serv - Air Quality Branch | 06/97 |
| | GA20 | Bellville | Bellville | US Environmental Protection Agency-CAMD | 04/83 |
| | GA41 | Georgia Station | Pike | SAES-University of Georgia | 10/78 |
| | GA99 | Chula | Tift | US Geological Survey | 02/94 |
| Hawaii | | | | | |
| | HI99 | Hawaii Volcanoes NP - Thurston | Hawaii | National Park Service - Air Resources Div | 11/00 |
| Idaho | | | | | |
| | ID03 | Craters of the Moon NM | Butte | National Park Service - Air Resources Div | 08/80 |
| | ID11 | Reynolds Creek | Owyhee | US Geological Survey | 11/83 |
| | ID15 | Smiths Ferry | Valley | US Geological Survey | 10/84 |
| Illinois | | | | | |
| | IL11 | Bondville | Champaign | SAES-University of Illinois | 02/79 |
| | IL18 | Shabbona | DeKalb | SAES-University of Illinois | 05/81 |
| | IL19 | Argonne | DuPage | DOE-Argonne National Laboratory | 03/80 |
| | IL46 | Alhambra | Madison | US Environmental Protection Agency-CAMD | 01/99 |
| | IL63 | Dixon Springs Ag Center | Pope | SAES-University of Illinois | 01/79 |
| | IL78 | Monmouth | Warren | US Geological Survey | 01/85 |
| Indiana | | | | | |
| | IN20 | Huntington Reservoir | Huntington | US Geological Survey | 08/83 |
| | IN22 | Southwest Purdue Ag Center | Knox | US Geological Survey | 09/84 |
| | IN34 | Indiana Dunes NL | Porter | National Park Service - Air Resources Div | 07/80 |
| | IN41 | Purdue University Ag Farm | Tippecanoe | SAES-Purdue University | 07/82 |
| Iowa | | | | | |
| | IA08 | Big Springs Fish Hatchery | Clayton | US Geological Survey | 08/84 |
| | IA23 | McNay Memorial Research Center | Lucas | US Geological Survey | 09/84 |
| Kansas | | | | | |
| | KS07 | Farlington Fish Hatchery | Crawford | US Geological Survey | 03/84 |
| | KS31 | Konza Prairie | Riley | SAES-Kansas State University | 08/82 |
| | KS32 | Lake Scott State Park | Scott | US Geological Survey | 03/84 |
| Kentucky | | | | | |
| | KY03 | Mackville | Washington | US Geological Survey | 11/83 |
| | KY22 | Lilley Cornett Woods | Letcher | NOAA-Air Resources Lab | 09/83 |
| | KY35 | Clark State Fish Hatchery | Rowan | US Geological Survey | 08/83 |
| | KY99 | Mulberry Flats | Trigg | TVA/Murray State University | 12/94 |
| Louisiana | | | | | |
| | LA12 | Iberia Research Station | Iberia | US Geological Survey | 11/82 |
| | LA30 | Southeast Research Station | Washington | US Geological Survey | 01/83 |
| Maine | | | | | |
| | ME00 | Caribou | Aroostook | NOAA-Air Resources Lab | 04/80 |
| | ME02 | Bridgton | Cumberland | EPA/Maine Dept of Environmental Protection | 09/80 |
| | ME08 | Gilead | Oxford | US Geological Survey | 09/99 |
| | ME09 | Greenville Station | Piscataquis | SAES-University of Maine | 11/79 |
| | ME96 | Casco Bay - Wolfe's Neck Farm | Cumberland | EPA/University of Southern Maine | 01/98 |
| | ME98 | Acadia NP - McFarland Hill | Hancock | National Park Service - Air Resources Div | 11/81 |
| Maryland | | | | | |
| | MD03 | White Rock Substation | Carroll | Constellation Energy Group | 10/84 |
| | MD13 | Wye | Queen Anne | SAES-University of Maryland | 03/83 |
| | MD18 | Assateague Island NS - Woodcock | Worcester | Maryland Department of Natural Resources | 09/00 |
| Massachusetts | | | | | |
| | MA01 | North Atlantic Coastal Lab | Barnstable | National Park Service - Air Resources Div | 12/81 |
| | MA08 | Quabbin Reservoir | Franklin | NESCAUM | 03/82 |
| | MA13 | East | Middlesex | NESCAUM | 02/82 |

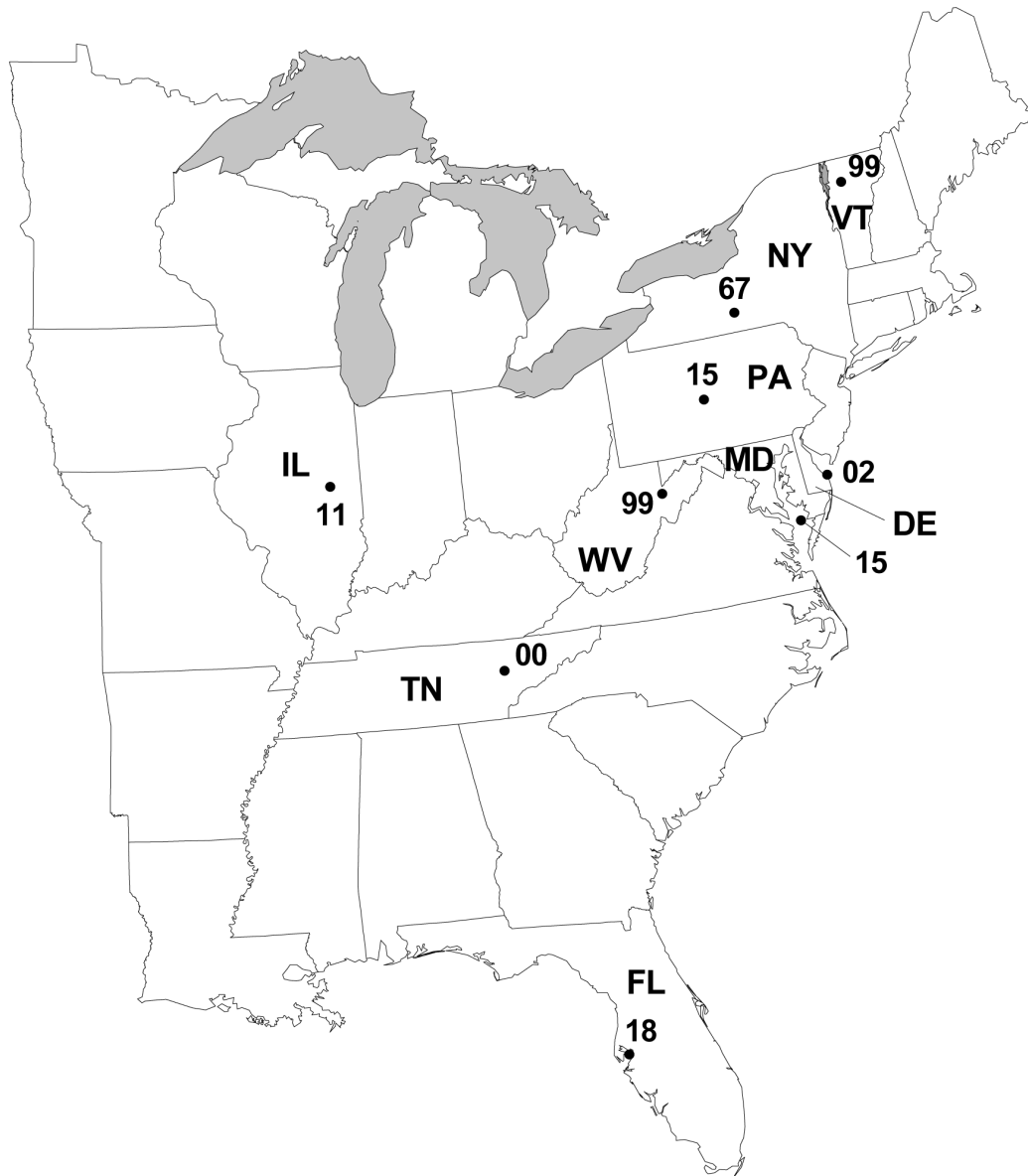
| State | Site Code | Site Name | County | Sponsoring Agency | Start Date |
|----------------------|-----------|--|-------------|--|------------|
| Michigan | | | | | |
| | MI09 | Douglas Lake- Univ Michigan Biological Station | Cheboygan | USDA/Michigan State University | 07/79 |
| | MI26 | Kellogg Biological Station | Kalamazoo | USDA/Michigan State University | 06/79 |
| | MI48 | Seney NWR - Headquarters | Schoolcraft | US Fish & Wildlife Serv - Air Quality Branch | 11/00 |
| | MI51 | Unionville | Tuscola | US Environmental Protection Agency-CAMD | 01/99 |
| | MI52 | Ann Arbor | Washtenaw | US Environmental Protection Agency-CAMD | 01/99 |
| | MI53 | Wellston | Wexford | USDA Forest Service | 10/78 |
| | MI97 | Isle Royale NP - Wallace Lake | Keneenaw | National Park Service - Air Resources Div | 05/85 |
| | MI98 | Raco | Chippewa | US Environmental Protection Agency-CAMD | 05/84 |
| | MI99 | Chassell | Houghton | National Park Service - Air Resources Div | 02/83 |
| Minnesota | | | | | |
| | MN01 | Cedar Creek | Anoka | Minnesota Pollution Control Agency | 12/96 |
| | MN05 | Fond du Lac | Carlton | EPA/Fond du Lac Reservation | 11/96 |
| | MN08 | Hovland | Cook | Minnesota Pollution Control Agency | 12/96 |
| | MN16 | Marcell Experimental Forest | Itasca | USDA Forest Service | 07/78 |
| | MN18 | Fernberg | Lake | US Environmental Protection Agency-CAMD | 11/80 |
| | MN23 | Camp Ripley | Morrison | US Geological Survey | 10/83 |
| | MN27 | Lamberton | Redwood | Minnesota Pollution Control Agency | 01/79 |
| | MN28 | Grindstone Lake | Pine | Minnesota Pollution Control Agency | 12/96 |
| | MN32 | Voyageurs NP - Sullivan Bay | St. Louis | National Park Service - Air Resources Div | 05/00 |
| | MN99 | Wolf Ridge | Lake | Minnesota Pollution Control Agency | 12/96 |
| Mississippi | | | | | |
| | MS10 | Clinton | Hinds | US Geological Survey | 07/84 |
| | MS19 | Newton | Newton | NOAA-Air Resources Lab | 11/86 |
| | MS30 | Coffeeville | Yalobusha | Tennessee Valley Authority | 07/84 |
| Missouri | | | | | |
| | MO03 | Ashland Wildlife Area | Boone | US Geological Survey | 10/81 |
| | MO05 | University Forest | Butler | US Geological Survey | 10/81 |
| Montana | | | | | |
| | MT00 | Little Big Horn Battlefield | Big Horn | US Geological Survey | 07/84 |
| | MT05 | Glacier NP - Fire Weather Station | Flathead | National Park Service - Air Resources Div | 06/80 |
| | MT07 | Clancy | Jefferson | US Geological Survey | 01/84 |
| | MT96 | Poplar River | Roosevelt | EPA/Ft. Peck Tribes | 12/99 |
| | MT97 | Lost Trail Pass | Ravalli | USDA Forest Service | 09/90 |
| | MT98 | Havre | Hill | US Geological Survey | 07/85 |
| Nebraska | | | | | |
| | NE15 | Mead | Saunders | SAES-University of Nebraska | 07/78 |
| | NE99 | North Platte Ag Station | Lincoln | US Geological Survey | 09/85 |
| Nevada | | | | | |
| | NV00 | Red Rock Canyon | Clark | Bureau of Land Management | 01/85 |
| | NV03 | Smith Valley | Smith | US Geological Survey | 08/85 |
| | NV05 | Great Basin NP - Lehman Caves | White Pine | National Park Service - Air Resources Div | 01/85 |
| New Hampshire | | | | | |
| | *NH02 | Hubbard Brook | Grafton | USDA Forest Service | 07/78 |
| New Jersey | | | | | |
| | NJ00 | Edwin B. Forsythe NWR | Atlantic | US Fish & Wildlife Serv - Air Quality Branch | 10/98 |
| | NJ99 | Washington Crossing | Mercer | US Environmental Protection Agency-CAMD | 08/81 |
| New Mexico | | | | | |
| | NM01 | Gila Cliff Dwellings NM | Catron | EPA/New Mexico Environment Dept. | 07/85 |
| | NM07 | Bandelier NM | Los Alamos | DOE-Los Alamos National Lab | 06/82 |
| | NM08 | Mayhill | Otero | US Geological Survey | 01/84 |
| | NM12 | Capulin Volcano NM | Union | EPA/New Mexico Environment Dept. | 11/84 |
| New York | | | | | |
| | NY08 | Aurora Research Farm | Cayuga | USDA/Cornell University | 04/79 |
| | NY10 | Chautauqua | Chautauqua | US Geological Survey | 06/80 |
| | NY20 | Huntington Wildlife | Essex | EPA/State Univ of New York-Syracuse | 10/78 |
| | NY22 | St. Regis Mohawk - Fort Covington | Franklin | US Environmental Protection Agency-CAMD | 08/99 |
| | NY52 | Bennett Bridge | Oswego | EPA/State Univ of New York-Oswego | 06/80 |
| | NY65 | Jasper | Steuben | US Geological Survey | 02/80 |
| | NY68 | Biscuit Brook | Ulster | US Geological Survey | 10/83 |
| | NY98 | Whiteface Mountain | Essex | US Geological Survey | 07/84 |
| | NY99 | West Point | Orange | US Geological Survey | 09/83 |

| State | Site Code | Site Name | County | Sponsoring Agency | Start Date |
|-----------------------|-----------|---|-------------|--|------------|
| North Carolina | | | | | |
| | NC03 | Lewiston | Bertie | North Carolina State University | 10/78 |
| | NC06 | Beaufort | Carteret | US Environmental Protection Agency-CAMD | 01/99 |
| | NC25 | Coweeta | Macon | USDA Forest Service | 07/78 |
| | NC34 | Piedmont Research Station | Rowan | North Carolina State University | 10/78 |
| | NC35 | Clinton Crops Research Station | Sampson | North Carolina State University | 10/78 |
| | NC36 | Jordan Creek | Scotland | US Geological Survey | 10/83 |
| | NC41 | Finley Farms | Wake | North Carolina State University | 10/78 |
| | NC45 | Mount Mitchell | Yancey | North Carolina State University | 11/85 |
| North Dakota | | | | | |
| | ND08 | Icelandic State Park | Pembina | US Geological Survey | 10/83 |
| | ND11 | Woodworth | Stutsman | US Geological Survey | 11/83 |
| Ohio | | | | | |
| | OH09 | Oxford | Butler | US Geological Survey | 08/84 |
| | OH15 | Lykens | Crawford | US Environmental Protection Agency-CAMD | 01/99 |
| | OH17 | Delaware | Delaware | USDA Forest Service | 10/78 |
| | OH49 | Caldwell | Noble | US Geological Survey | 09/78 |
| | OH54 | Deer Creek State Park | Pickaway | US Environmental Protection Agency-CAMD | 01/99 |
| | OH71 | Wooster | Wayne | US Geological Survey | 09/78 |
| Oklahoma | | | | | |
| | OK00 | Salt Plains NWR | Alfalfa | US Geological Survey | 12/83 |
| | OK08 | Lake Eucha | Delaware | Oklahoma Conservation Commission | 02/00 |
| | OK17 | Great Plains Apiaries | McClain | NOAA-Air Resources Lab | 03/83 |
| | OK29 | Goodwell Research Station | Texas | US Geological Survey | 01/85 |
| Oregon | | | | | |
| | OR02 | Alsea Guard Ranger Station | Benton | US Environmental Protection Agency-CAMD | 12/79 |
| | OR09 | Silver Lake Ranger Station | Lake | US Geological Survey | 08/83 |
| | OR10 | H J Andrews Experimental Forest | Lane | USDA Forest Service | 05/80 |
| | OR18 | Starkey Experimental Forest | Union | US Geological Survey | 03/84 |
| | OR97 | Hyslop Farm | Benton | US Environmental Protection Agency-CAMD | 04/83 |
| | OR98 | Bull Run | Clackamas | USGS/Portland Water Bureau, OR | 07/82 |
| Pennsylvania | | | | | |
| | PA00 | Arendtsville | Adams | US Environmental Protection Agency-CAMD | 01/99 |
| | PA15 | Penn State | Centre | NOAA-Air Resources Lab | 06/83 |
| | PA18 | Young Woman's Creek | Clinton | US Geological Survey | 04/99 |
| | PA29 | Kane Experimental Forest | Elk | USDA Forest Service | 07/78 |
| | PA42 | Leading Ridge | Huntingdon | SAES-Pennsylvania State University | 04/79 |
| | PA72 | Milford | Pike | USDA Forest Service | 12/83 |
| Puerto Rico | | | | | |
| | PR20 | El Verde | Rio Grande | USDA Forest Service | 02/85 |
| South Carolina | | | | | |
| | SC05 | Cape Romain - NWR | Charleston | US Fish & Wildlife Serv - Air Quality Branch | 11/00 |
| | SC06 | Santee NWR | Clarendon | US Geological Survey | 07/84 |
| South Dakota | | | | | |
| | SD08 | Cottonwood | Jackson | NOAA-Air Resources Lab | 10/83 |
| | SD99 | Huron Well Field | Huron | US Geological Survey | 11/83 |
| Tennessee | | | | | |
| | TN00 | Walker Branch Watershed | Anderson | DOE/Oak Ridge Natl Lab/Lockheed-Martin | 03/80 |
| | TN04 | Speedwell | Claiborne | US Environmental Protection Agency-CAMD | 01/99 |
| | TN11 | Great Smoky Mountain NP - Elkmont | Sevier | National Park Service - Air Resources Div | 08/80 |
| | TN14 | Hatchie NWR | Haywood | Tennessee Valley Authority | 10/84 |
| Texas | | | | | |
| | TX02 | Muleshoe NWR | Bailey | US Geological Survey | 06/85 |
| | TX03 | Beeville | Bee | NOAA-Air Resources Lab | 02/84 |
| | TX04 | Big Bend NP - K-Bar | Brewster | National Park Service - Air Resources Div | 04/80 |
| | TX10 | Attwater Prairie Chicken NWR | Colorado | US Geological Survey | 07/84 |
| | TX16 | Sonora | Edwards | US Geological Survey | 06/84 |
| | TX21 | Longview | Gregg | Texas Natural Resource Conservation Comm | 06/82 |
| | TX22 | Guadalupe Mountains NP-Frijole Ranger Station | Culberson | US Geological Survey | 06/84 |
| | TX38 | Forest Seed Center | Nacogdoches | Texas Natural Resource Conservation Comm | 08/81 |
| | TX56 | LBJ National Grasslands | Wise | US Geological Survey | 09/83 |

| State | Site Code | Site Name | County | Sponsoring Agency | Start Date |
|-----------------------|-----------|--|---------------|---|------------|
| Utah | | | | | |
| | UT01 | Logan | Cache | US Geological Survey | 12/83 |
| | UT08 | Murphy Ridge | Rich | BP Amoco | 03/86 |
| | UT09 | Canyonlands NP - Island in the Sky | San Juan | National Park Service - Air Resources Div | 11/97 |
| | UT98 | Green River | Emery | US Geological Survey | 04/85 |
| | UT99 | Bryce Canyon NP - Repeater Hill | Garfield | National Park Service - Air Resources Div | 01/85 |
| Vermont | | | | | |
| | VT01 | Bennington | Bennington | US Geological Survey | 04/81 |
| | VT99 | Underhill | Chittenden | US Geological Survey | 06/84 |
| Virgin Islands | | | | | |
| | VI01 | Virgin Islands NP - Lind Point | St. John | National Park Service - Air Resources Div | 04/98 |
| Virginia | | | | | |
| | VA00 | Charlottesville | Albemarle | US Geological Survey | 10/84 |
| | VA13 | Horton's Station | Giles | Tennessee Valley Authority | 07/78 |
| | VA24 | Prince Edward | Prince Edward | US Environmental Protection Agency-CAMD | 01/99 |
| | VA28 | Shenandoah NP - Big Meadows | Madison | National Park Service - Air Resources Div | 05/81 |
| Washington | | | | | |
| | WA14 | Olympic NP - Hoh Ranger Station | Jefferson | National Park Service - Air Resources Div | 05/80 |
| | WA19 | North Cascades NP-Marblemount Ranger Station | Skagit | US Geological Survey | 02/84 |
| | WA21 | La Grande | Pierce | US Environmental Protection Agency-CAMD | 04/84 |
| | WA24 | Palouse Conservation Farm | Whitman | US Geological Survey | 08/85 |
| | WA99 | Mount Rainier NP - Tahoma Woods | Pierce | National Park Service - Air Resources Div | 10/99 |
| West Virginia | | | | | |
| | WV04 | Babcock State Park | Fayette | US Geological Survey | 09/83 |
| | WV05 | Cedar Creek State Park | Gilmer | US Environmental Protection Agency-CAMD | 01/99 |
| | WV18 | Parsons | Tucker | USDA Forest Service | 07/78 |
| Wisconsin | | | | | |
| | WI09 | Popple River | Florence | Wisconsin Department of Natural Resources | 12/86 |
| | WI25 | Suring | Oconto | Wisconsin Department of Natural Resources | 01/85 |
| | WI28 | Lake Dubay | Portage | Wisconsin Department of Natural Resources | 06/82 |
| | WI35 | Perkinstown | Taylor | US Environmental Protection Agency-CAMD | 01/99 |
| | WI36 | Trout Lake | Vilas | Wisconsin Department of Natural Resources | 01/80 |
| | WI37 | Spooner | Washburn | Wisconsin Department of Natural Resources | 06/80 |
| | WI98 | Wildcat Mountain | Vernon | Wisconsin Department of Natural Resources | 08/89 |
| | WI99 | Lake Geneva | Walworth | Wisconsin Department of Natural Resources | 06/84 |
| Wyoming | | | | | |
| | WY00 | Snowy Range - West Glacier Lake | Albany | USDA Forest Service | 04/86 |
| | WY02 | Sinks Canyon | Fremont | Bureau of Land Management | 08/84 |
| | WY06 | Pinedale | Sublette | Bureau of Land Management | 01/82 |
| | WY08 | Yellowstone NP - Tower | Park | National Park Service - Air Resources Div | 06/80 |
| | WY95 | Brooklyn Lake | Albany | USDA Forest Service | 09/92 |
| | WY97 | South Pass City | Fremont | SF Phosphates Ltd. - Bridger Teton NF | 04/85 |
| | WY98 | Gypsum Creek | Sublette | Exxon Mobil Corporation | 12/84 |
| | WY99 | Newcastle | Weston | Bureau of Land Management | 08/81 |
| Canada | | | | | |
| | CAN4 | Sutton | Brome | US Geological Survey | 09/86 |

*Intercomparison sites

National Atmospheric Deposition Program Atmospheric Integrated Research Monitoring Network December 31, 2000



**NADP/Atmospheric Integrated Research Monitoring Network Sites
December 31, 2000**

| State Site Code | Site Name | County | Sponsoring Agency | Start Date |
|------------------------------|-------------------------|---------------|---|-----------------------|
| Delaware DE02 | Lewes | Sussex | NOAA-Air Resources Laboratory | 09/92 |
| Florida FL18 | Tampa Bay | Hillsborough | FL-Department of Environmental Protection | 08/96 |
| Illinois IL11 | Bondville | Champaign | NOAA-Air Resources Laboratory | 10/92 |
| Maryland MD15 | Smith Island | Somerset | NOAA-Air Resources Laboratory | 11/95 |
| New York NY67 | Cornell University | Thompkins | NOAA-Air Resources Laboratory | 09/92 |
| Pennsylvania PA15 | Penn State | Centre | NOAA-Air Resources Laboratory | 10/92 |
| Tennessee TN00 | Oak Ridge National Lab | Anderson | NOAA-Air Resources Laboratory | 09/92 |
| Vermont VT99 | Underhill | Chittenden | NOAA-Air Resources Laboratory | 01/93 |
| West Virginia WV99 | Canaan Valley Institute | Tucker | NOAA-Air Resources Laboratory | 06/00 |

National Atmospheric Deposition Program Mercury Deposition Network

December 31, 2000



**National Atmospheric Deposition Program/Mercury Deposition Network Sites
December 31, 2000**

| State/Province Site Code | Site Name | County | Sponsoring Agency | Start Date |
|-----------------------------|----------------------------------|-------------|--|---------------|
| Alabama | | | | |
| AL03 | Centreville | Bibb | Southern Company/Atmospheric Research and Analysis, Inc. | 06/00 |
| California | | | | |
| CA72 | San Jose | Santa Clara | US EPA/San Francisco Estuary Institute | 01/00 |
| CA97 | Covelo | Mendocino | Electric Power Research Institute | 12/97 |
| Colorado | | | | |
| CO97 | Buffalo Pass - Summit Lake | Routt | USDA Forest Service-Rocky Mountain Research Station | 9/98 |
| Florida | | | | |
| FL04 | Andytown | Broward | South Florida Water Management Institute | 01/98 |
| FL05 | Chassahowitzka NWR | Citrus | US Fish and Wildlife Service - Air Quality Branch | 07/97 |
| FL11 | Everglades NP - Research Center | Dade | South Florida Water Management Institute | 12/95* |
| FL34 | ENRP | Palm Beach | South Florida Water Management Institute | 07/97 |
| Georgia | | | | |
| GA09 | Okefenokee NWR | Charlton | US Fish and Wildlife Service - Air Quality Branch | 07/97 |
| GA40 | Yorkville | Paulding | Southern Company/Atmospheric Research and Analysis, Inc. | 06/00 |
| Illinois | | | | |
| IL11 | Bondville | Champaign | Illinois State Water Survey | 12/95* |
| Indiana | | | | |
| IN20 | Huntington Reservoir | Huntington | Indiana Department of Environmental Management/USGS | 10/00 |
| IN28 | Bloomington | Monroe | Indiana Department of Environmental Management/USGS | 12/00 |
| IN34 | Indiana Dunes National Lakeshore | Porter | Indiana Department of Environmental Management/USGS | 10/00 |
| Louisiana | | | | |
| LA05 | Lake Charles | Calcasieu | Louisiana Department of Environmental Quality | 10/98 |
| LA10 | Chase | Franklin | Louisiana Department of Environmental Quality | 10/98 |
| LA28 | Hammond | Tangipahoa | Louisiana Department of Environmental Quality | 10/98 |
| Maine | | | | |
| ME02 | Bridgton | Cumberland | Maine Dept. of Environmental Protection | 06/97 |
| ME09 | Greenville Station | Piscataquis | Maine Dept. of Environmental Protection | 09/96 |
| ME96 | Casco Bay - Wolfe's Neck Farm | Cumberland | US EPA/University of Southern Maine | 01/98 |
| ME98 | Acadia NP - McFarland Hill | Hancock | NPS-Acadia NP & ME Dept of Environmental Protection | 01/96* |
| Minnesota | | | | |
| MN16 | Marcell Experimental Forest | Itasca | USDA Forest Service-North Central Research Station | 12/95* |
| MN18 | Fernberg | Lake | USDA- FS, Superior NF & MN Pollution Control Agency | 01/96* |
| MN23 | Camp Ripley | Morrison | Minnesota Pollution Control Agency | 07/96 |
| MN27 | Lamberton | Redwood | Minnesota Pollution Control Agency | 07/96 |
| Mississippi | | | | |
| MS22 | Oak Grove | Perry | Southern Company/Atmospheric Research and Analysis, Inc. | 06/00 |
| New Mexico | | | | |
| NM10 | Caballo | Sierra | Bureau of Reclamation/New Mexico State University | 05/97 |
| North Carolina | | | | |
| NC08 | Waccamaw State Park | Columbus | North Carolina Dept of Environment & Natural Resources | 12/95* |
| NC42 | Pettigrew State Park | Washington | North Carolina Dept of Environment & Natural Resources | 12/95* |
| New York | | | | |
| NY20 | Huntington Wildlife | Essex | US EPA/State University of New York - Syracuse | 12/99 |

| State/Province Site Code | Site Name | County | Sponsoring Agency | Start Date |
|-----------------------------|--------------------------------|------------|---|---------------|
| Pennsylvania | | | | |
| PA00 | Arendtsville | Adams | PA Dept of Environmental Protection/Penn State University | 11/00 |
| PA13 | Allegheny Portage Railroad NHS | Cambria | PA Dept of Environmental Protection/Penn State University | 01/97 |
| PA30 | Erie | Erie | PA Dept of Environmental Protection/Penn State University | 06/00 |
| PA37 | Holbrooke | Greene | US Dept of Energy/National Energy Technology Laboratory | 05/99 |
| PA60 | Valley Forge | Montgomery | PA Dept of Environmental Protection/Penn State University | 11/99 |
| PA72 | Milford | Pike | PA Dept of Environmental Protection/Penn State University | 09/00 |
| PA90 | Hills Creek State Park | Tioga | PA Dept of Environmental Protection/Penn State University | 01/97 |
| South Carolina | | | | |
| SC19 | Congaree Swamp State Park | Richland | South Carolina Dept of Health & Environmental Quality | 12/95* |
| Texas | | | | |
| TX21 | Longview | Gregg | Texas Natural Resource Conservation Commission | 12/95* |
| Washington | | | | |
| WA18 | Seattle - NOAA | King | Frontier Geosciences, Inc | 03/96 |
| Wisconsin | | | | |
| WI08 | Brule River | Douglas | Wisconsin Department of Natural Resources | 12/95* |
| WI09 | Popple River | Florence | Wisconsin Department of Natural Resources | 12/95 |
| WI36 | Trout Lake | Vilas | Wisconsin Department of Natural Resources | 12/95* |
| WI99 | Lake Geneva | Walworth | Wisconsin Department of Natural Resources | 01/97 |
| CANADA | | | | |
| Alberta | | | | |
| AB08 | Esther | | Environment Canada - Prairie and Northern Region | 03/00 |
| British Columbia | | | | |
| BC06 | Reifel Island | | Environment Canada - Pacific and Yukon Region | 03/00 |
| New Brunswick | | | | |
| NB02 | St. Andrews | | Environment Canada - Meteorological Service of Canada | 07/96 |
| Newfoundland | | | | |
| NF09 | Newfoundland | | Environment Canada - Meteorological Service of Canada | 05/00 |
| Nova Scotia | | | | |
| NS01 | Kejimikujik NP | | Environment Canada - Meteorological Service of Canada | 07/96 |
| Ontario | | | | |
| ON07 | Egbert | | Environment Canada - Air Quality Research Branch | 03/00 |
| Quebec | | | | |
| PQ04 | Saint Anicet | | Environment Canada - Atmospheric Environment Branch | 04/98 |
| PQ05 | Mingan | | Environment Canada - Atmospheric Environment Branch | 04/98 |

*These dates mark the official start of NADP/MDN operations. Data for a transition network operating in 1995 are available from the NADP web site at <http://nadp.sws.uiuc.edu>.

**NATIONAL ATMOSPHERIC DEPOSITION PROGRAM (NRSP-3)
EXECUTIVE COMMITTEE - 2000/2001**

EXECUTIVE COMMITTEE

| | |
|----------------------------------|--|
| Richard S. Artz Chair | NOAA-Air Resources Lab R/ARL, SSMC3, Room 3151 1315 East West Highway Silver Spring, MD 20910 |
| Kathy A. Tonnessen Vice Chair | NPS/RM-CESU School of Forestry University of Montana Missoula, MT 59812 |
| Richard H. Grant Secretary | Purdue University Department of Agronomy Life Sciences Building West Lafayette, IN 47907 |
| James A. Lynch Past Chair | Penn State University 311 Forest Research Lab University Park, PA 16802 |

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| | |
|---|--|
| Mark Nilles Budget Advisory Committee Co-Chair | U.S. Geological Survey Box 25046, MS 401 Denver, CO 80225 |
| John Shimshock Network Operations Subcommittee Chair | Advanced Technology Systems, Inc. 639 Alpha Drive Pittsburgh, PA 15238 |
| Gary Lear Data Management & Analysis Subcommittee Chair | U.S. Environmental Protection Agency Clean Air Markets Division Mail Code 6204N 1200 Pennsylvania Avenue NW Washington, DC 20460 |
| Ellen Porter Environmental Effects Subcommittee Co-Chair | U.S. Fish & Wildlife Service NPS - AIR P. O. Box 25287 Denver, CO 80225-0287 |
| John Sherwell Environmental Effects Subcommittee Co-Chair | MD Dept. of Natural Resources Tawes Building B-3 Annapolis, MD 21401 |

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**The National Atmospheric Deposition Program (NRSP-3)
Technical Committee Meeting**

October 17 - 20, 2000, Saratoga Springs, New York

Minutes

Tuesday, October 17, 2000

Business Meeting

Welcome and Introductions ---

The 2000 NADP Technical Committee Meeting was called to order by the Program Chair, Jim Lynch. Jim welcomed everyone to the meeting and gave a brief overview of the schedule. Jim invited everyone to introduce themselves. A participant list appears at the end of these minutes.

Executive Committee Report —

James Lynch, Technical Committee Chair, Penn State University

- Acknowledged Dave Bigelow's leadership and contributions to the organization and operation of NADP and referred everyone to the *In Memoriam* in the program proceedings booklet for the meeting.
- Reported that NRSP-3 is entering its fourth year of the current 5-year cycle and that new guidelines for multistate research activities require a program review in the next to last year; for NRSP-3, the review must be completed in 2001.
- Updated the plans for NADP equipment modernization.
- Discussed NADP growth and future research avenues, such as daily sampling for mercury, trace metal analysis, organic pollutants, and urban sampling.
- Expressed a desire to heighten the status of the annual NADP meeting to be the place where the latest atmospheric chemistry and deposition research results are presented. To move in that direction, the meeting format was changed to attract the scientific community by completely separating the business meeting activities from the scientific symposium. Feedback on this change is appreciated.

Awards ---

NADP Chair, Jim Lynch, presented site operator service awards for 5, 10, 15 and 20 years:

5 Year Awards (certificate)

| <u>Site</u> | <u>Name</u> | <u>Start Date</u> | <u>Sponsoring Agency</u> |
|-------------------------|----------------|-------------------|----------------------------|
| AZ99-Oliver Knoll | Philip Madsen | 08/25/81 | USGS |
| CO21-Manitou | Steve Tapia | 10/17/78 | USDA-Forest Service |
| NV03-Smith Valley | Laurie Bonner | 08/07/85 | USGS |
| SD99-Huron Well Field | Frank Amundson | 11/29/83 | USGS |
| TX04-Big Bend NP(K-Bar) | John Forsythe | 04/10/80 | NPS-Air Resources Division |

10 Year Awards (plaque)

| | | | |
|-------------------------------|-----------------|----------|-------------------------------|
| CA88-Davis | Mike Mata | 09/04/78 | USGS |
| MT05-Glacier NP(Fire Weather) | Lindy Key | 06/03/80 | NPS-Air Resources Division |
| NC03-Lewiston | Margaret Pierce | 10/31/78 | NC State University |
| NM01-Gila Cliff Dwellings NM | Daniel Galindo | 07/29/85 | EPA/NM Environment Department |
| SD08-Cottonwood | Ron Haigh | 10/11/83 | NOAA-Air Resources Lab |

15 Year Awards (plaque)

| | | | |
|------------------------------|------------------|----------|------------------------------|
| AL99-Sand Mtn Ag Exp Station | James Hugh Burns | 10/02/84 | TVA |
| IA23-McNay Memorial Res Ctr | Jim Secor | 09/11/84 | USGS |
| ID15-Smiths Ferry | Mary Owen | 10/09/84 | USGS |
| MD03-White Rock Substation | Robert Dalton | 10/03/84 | Constellation Energy Group |
| WI25-Suring | James Trochta | 01/23/85 | WI Dept of Natural Resources |

20 Year Awards (trophy)

| | | | |
|----------------------------|----------------|----------|------------------------------------|
| FL03-Bradford Forest | Larry Korhnaek | 10/10/78 | St John's River Water Mgt District |
| IN34-Indiana Dunes NL | Lou Brenan | 07/15/80 | NPS-Air Resources Division |
| ME02-Bridgton | Peter Lowell | 09/30/80 | ME Dept Environmental Protection |
| ME09-Greenville Station | Llew Wortman | 11/20/79 | SAES-University of Maine |
| OR10-HJ Andrews Exp Forest | John Moreau | 05/13/80 | USDA-Forest Service |

Reports —

Administrative Advisors -

Wayne Banwart - Lead Administrative Advisor, Northcentral Region

- Expressed the need to look at the review and renewal process and get clarification on due dates and requirements over the next year.
- Urged everyone to continue to get the word out about NADP and improve the program's visibility, as opportunities arise.

CSREES -

Dan Jones - CSREES NRSP-3 Program Leader

- Indicated that agency procedures for program reviews have not yet been set.
- Stated that he will work with the Program Office to conduct the review in the next year.
- Reported that CSREES Administrator Dr. Charles Laughlin had resigned and that Dr. Colien Hefferan had been named as the new Administrator.
- Suggested that NADP make a presentation at a CSREES Executive Council meeting, which includes the Administrator and eight Deputy Administrators. This would provide a venue for informing the new Administrator and her Deputies of the scope, activities, and accomplishments of the NADP.

NTN Advisor -

Mark Nilles - USGS

- Complimented the CAL for getting the data delivery back on schedule in 2000.
- Commended NADP's on-line database for its ease of use and completeness.
- Expressed his ongoing support for the equipment modernization initiative and encouraged Technical Committee data users and researchers.

AIRMoN Advisor -

Rick Artz - NOAA Air Resources Laboratory

- Expressed a desire to have on-line trajectories for AIRMoN data on the web in the next month.
- Mentioned the continuing struggle to secure funding for AIRMoN operations.
- Pleased with AIRMoN data quality.

CASTNet -

Gary Lear - U.S. Environmental Protection Agency Clean Air Markets Division

- Reported that CASTNet data through May 2000 are available at www.epa.gov/acidrain/castnet.

Program Office -

Van Bowersox, NADP Coordinator - Illinois State Water Survey

- Mentioned the requirement for a program review this year and submission of a renewal proposal at the Agricultural Experiment Station Directors' spring meetings.
- Displayed NTN status map with 226 active sites as of October 2000.
 - New sites: MN32-Voyageurs NP (Sullivan Bay), CA96-Lassen Volcanic NP (Manzanita Lake), MD18-Assateague Island, CA67-Joshua Tree NP (Black Rock)
 - Inactive sites: NM09-Cuba
 - Pending sites: SC05-Cape Romain NWR, HI99-Hawaii Volcanoes NP (Thurston), MI46-Seney NWR (Headquarters) with 8 sites under consideration
- Displayed AIRMoN status map with 9 active sites as of October 2000.
 - New site: WV99-Canaan Valley Institute
 - Inactive site: OH09-Oxford

- Listed the products developed and distributed by the Program Office in 2000: *Nitrogen in the Nation's Rain* brochure (distributed 2300), *National Atmospheric Deposition Program 1999 Annual Summary*, *2001 CALendar*, *NADP 2000 - Ten Years After the Clean Air Act Amendments*, *Adirondacks in the Balance*, and *Quality Assurance Report, National Atmospheric Deposition Program, 1998, Laboratory Operations, Central Analytical Laboratory*.
- Showed the issue of the journal *Atmospheric Environment* with its Special NADP Section containing seven articles from the 1998 Technical Committee Meeting in St. Petersburg, FL.
- Reported on recent government reports using NADP data: 1) US EPA's *Deposition of Air Pollutants to the Great Waters - Third Report to Congress*, 2) US EPA's *National Air Quality and Emissions Trends Report, 1998*, and 3) US GAO's *ACID RAIN - Emissions Trends and Effects in the Eastern United States*.
- Acknowledged USGS support for the recently completed National Science Teachers Association's *INSIDE RAIN - Working with Precipitation Chemistry Data* curriculum for students in grades 9 - 12. This curriculum has seven sets of activities, all involving use of data and information from the NADP web site.
- Reported that the NADP web site received the Internet Scout Project's special recognition for its "high-quality, accurate, up-to-date, well-organized, and easy-to-navigate web site, presented in a stylistically and graphically pleasing manner." The *Scout Science and Engineering Report* twice featured the NADP web site: (1) the entire web site in September 1999 (Volume 2, Number 25), and (2) the brochure *Nitrogen in the Nation's Rain*, available as a pdf document, in July 2000 (Volume 3, Number 22).

Clyde Sweet, NADP Associate Coordinator, Toxics - Illinois State Water Survey

- Displayed MDN status map with 48 active sites as of October 2000.
 - New sites: AL03-Centreville, GA40-Yorkville, MS22-Oak Grove, NF09-Newfoundland, PA30-Erie, PA72-Milford
 - Inactive sites: NH00-Laconia & NH05-New Castle
 - Pending sites: 12 under consideration
- Projected 55 active sites by the end of calendar year 2000 with several sites interested in following a daily sampling protocol.
- Reported that MDN data through June 2000 were delivered to the Program Office.
- Conducted a HAL review in June and the final report is available. Review team members were Mary Ann Allen, John Robertson, Mark Peden, and Greg Lawson.
- Reported on three documents in preparation, a journal article on 1995-1999 MDN data, an informational brochure describing the MDN, and a white paper addressing trace metal issues.

Subcommittee Reports —

Network Operations Subcommittee (NOS) -

Jane Rothert, NOS Chair, Illinois State Water Survey

- Elected 2000-2001 officers: John Shimshock (Chair), Susan Johnson (Vice Chair), Kristi Morris (Secretary).
- NOS actions
 - (1) HAL audit report to be stored as pdf document and made available on request.
 - (2) Set an external review team (someone from Dave MacTavish's office and someone from the Data Management and Analysis Subcommittee, possibly Gary Stensland) for the CAL QA plan, which is currently under internal CAL review.
 - (3) Established a team (Scott Dossett, Dennis Lamb, Mark Nilles, and Rick Artz) which will monitor the progress of the new collector design and development.
 - (4) Named an ad hoc committee (Scott Dossett, Luther Smith, Bob Larson, and Clyde Sweet -chair) that will prepare a document on site characterization, looking at urban, non-urban and coastal classifications.
 - (5) Approved the Water Survey's sensor heater design with the stipulation that the performance of the 11 sensors now available be comparable to the ACM sensor.
 - (6) Accepted the Loda-built collector as a comparable replacement for the ACM collector.
 - (7) Approved a daily sampling protocol for MDN with the amendment that daily data cannot be compiled into weekly totals without NOS approval of equivalency of composite daily and weekly measurements.
 - (8) Approved a new AIRMoN Field Observer Form.

Motion: Scott Dossett moved to accept the NOS report. Dennis Lamb seconded.

Discussions: Questions were raised about whether the Loda-built collector can be used in MDN and the sense of the discussion was that it can.

Motion carried.

Data Management & Analysis Subcommittee (DMAS) -

Bob Brunette, DMAS Chair, Frontier Geosciences, Inc.

- Elected 2000-2001 officers: Gary Lear (Chair), Bob Larson (Vice-Chair/Secretary).
- DMAS actions
 - (1) Changed two sample validation rules - A) samples with sampling periods shorter than 6 days will now be valid, as long as all other validation criteria are met;
B) sampling periods (i.e., on to off time intervals of samples) with 0.02 inches or less of precipitation are considered valid for calculating data completeness, whether or not the sample chemistry is valid; if the chemistry is valid, the sample is used in calculating averages, otherwise it is not. Calculation of annual completeness criteria by the Program Office will be amended to account for these new rules.
 - (2) Set the spring 2001 meeting as the target for applying a draft site classification scheme on a sub-set of NTN sites.
 - (3) Reported that back trajectories for AIRMoN data points will soon be available on the web site and back trajectories for NTN samples will follow by the spring meeting.
 - (4) Encouraged the Program Office to extend the trends plots now available for NTN data to AIRMoN and MDN data.

Motion: John Sherwell moved to accept the DMAS report. Van Bowersox seconded.

Discussion: Gary Lear asked if the entire data set would be re-validated following the rule change for short duration samples. Bob Larson said that it would. Bob determined that the rule change affects 270 samples.

Motion carried.

Environmental Effects Subcommittee (EES) -

John Sherwell, EES Co-Chair, Maryland Department of Natural Resources

- EES actions
 - (1) Endorsed the site classification efforts begun by the Data Management and Analysis Subcommittee as a way to identify existing sites that do not meet all NADP siting criteria.
 - (2) Discussed the proposed list of trace metals (As, Cd, Cu, Cr, Mn, Ni, Pb, & Zn) that are under consideration for MDN sites. These metals are consistent with EPA's list of toxic metals. Formate may also be of interest to researchers looking for a signal for natural gas combustion.
 - (2) Need a concise informational brochure that describes the MDN and discussed plans for an educational brochure, similar to *Nitrogen in the Nation's Rain*, but for mercury.
- Expressed a need to measure total nitrogen to determine how much nitrogen is missed by measuring only the inorganic nitrogen from nitrate and ammonium, as is the case for NTN and AIRMoN.

Motion: Gary Lear moved to accept the EES report. Gary Stensland seconded.

Discussion: There were questions about the scope of the informational mercury brochure and whether it would include other metals, such as lead or cadmium, etc. The conclusion was that the brochure would focus on mercury. Interest was expressed in adding pesticides to the list of organic pollutants of interest to the research community. This was acknowledged as a good addition to the list.

Motion carried.

Nominating Committee —

Joel Frisch reported the deliberations of the nominating committee, which had been appointed by Technical Committee Chair Jim Lynch. Nominating committee members were Joel Frisch (U.S. Geological Survey), Dennis Lamb (Penn State University), and Wayne Banwart (Lead Administrative Advisor). Richard Grant of Purdue University was nominated for Technical Committee Secretary for the 2000-2001 term. He agreed to the nomination.

Motion: Van Bowersox moved the nominations be closed. Jim Lynch seconded.

Motion carried.

Rich was approved by acclamation.

Technical Committee Officers for 2000-2001 are:

Chair: Rick Artz

Vice Chair: Kathy Tonnessen

Secretary: Richard Grant

Past Chair: James Lynch

2001 Technical Committee Meeting —

Jim Lynch presented possible meeting places suggested by Kathy Tonnessen for the 2001 meeting: Double Tree Inn, Missoula, MT; Fisherman's Wharf Holiday Inn in San Francisco; Asilomar Conference Center in Pacific Grove, CA; YMCA in Estes Park, CO; Marconi Conference Center in Port Reyes, CA; a conference center in Seattle, Salt Lake City, or Park City, UT; or Minneapolis.

The N2001, The Second International Nitrogen Conference, is being held at the Bolger Conference Center near Washington, D.C., October 14-18, 2001. Organizers are Jim Galloway and Ellis Cowling, who are long-time members of the NADP Technical Committee. Jim has suggested that NADP hold its 2001 scientific meeting in conjunction with this nitrogen conference.

Closing —

Jim Lynch thanked everyone for their efforts and introduced Rick Artz as NADP Chair for 2000/2001. Rick adjourned the meeting.

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Sue Bachman - Illinois State Water Survey

Wayne L. Banwart - University of Illinois

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Martha Beach - N-Con Systems Co. Inc.

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Rosemary Wolfe - U.S. Environmental Protection Agency

USES OF NATIONAL ATMOSPHERIC DEPOSITION PROGRAM / NATIONAL TRENDS NETWORK DATA, MAY 1998 TO JUNE 1999

U.S. GEOLOGICAL SURVEY



Open-File Report 00-52

INSIDE RAIN

Working with Precipitation Chemistry Data

Activities for
investigating
rain—
in the lab,
outdoors,
and online

TEACH WITH
DATABASES

NSTApress



National Research Support Project - 3 Publications by NRSP-3 Scientists - 2000

NADP Program Office Publications

- National Atmospheric Deposition Program. 2000. *NADP 2000 - Ten Years after the Clean Air Act Amendments: Adirondacks in the Balance*. (prepared by Douglas, K.E. and P.S. Bedient) NADP Proceedings 2000-01, October 17-20, 2000, Saratoga Springs, NY. NADP Program Office, Champaign, IL. 150 pp.
- National Atmospheric Deposition Program. 2000. National Atmospheric Deposition Program 1998 Wet Deposition. NADP Data Report 2000-01. NADP Program Office, Champaign, IL. 16 pp.
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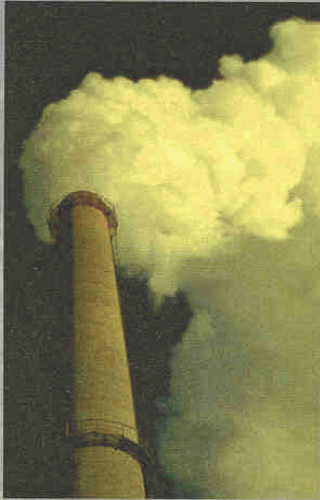
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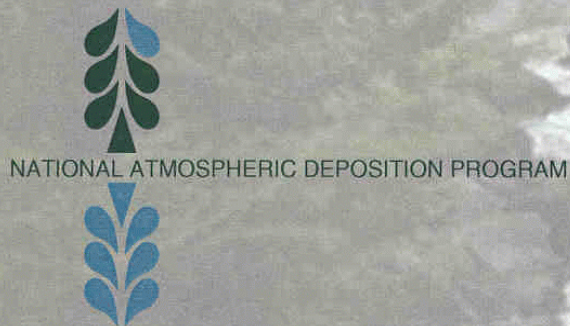
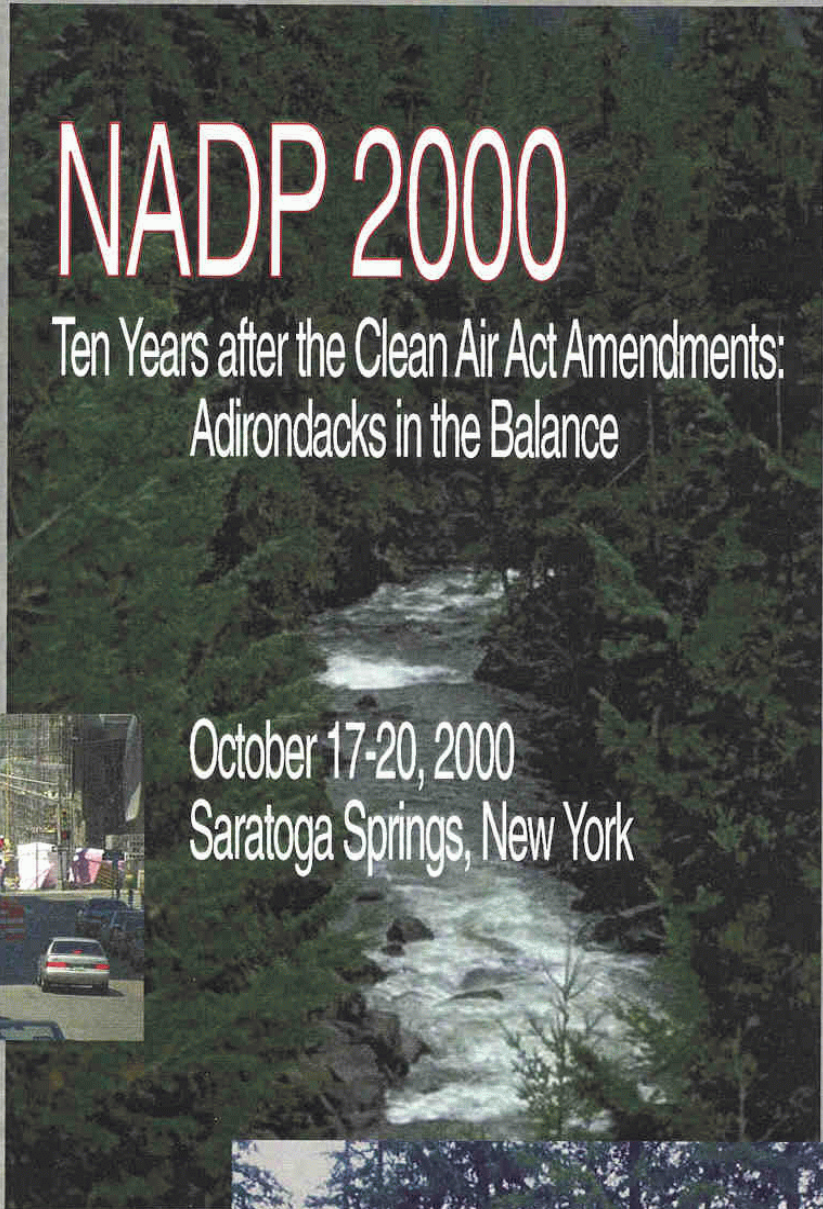
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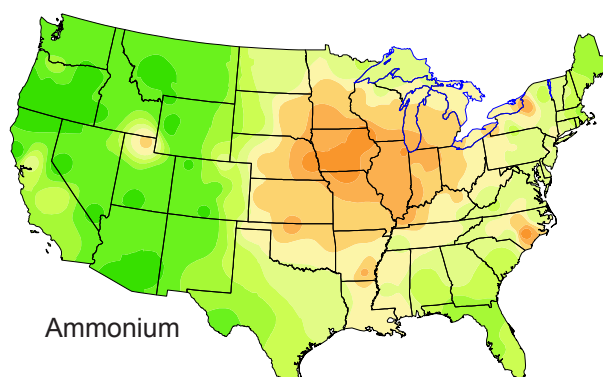
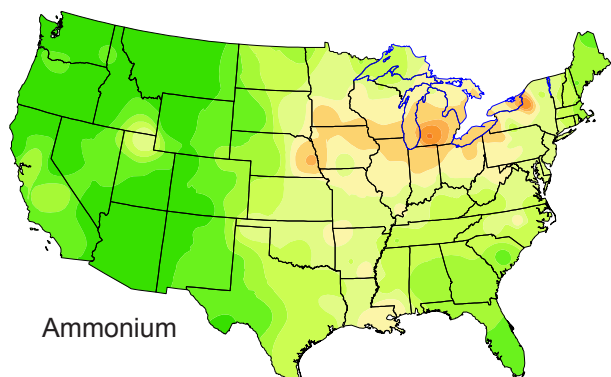
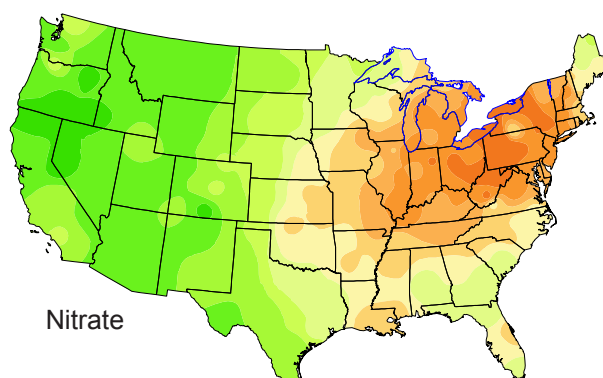
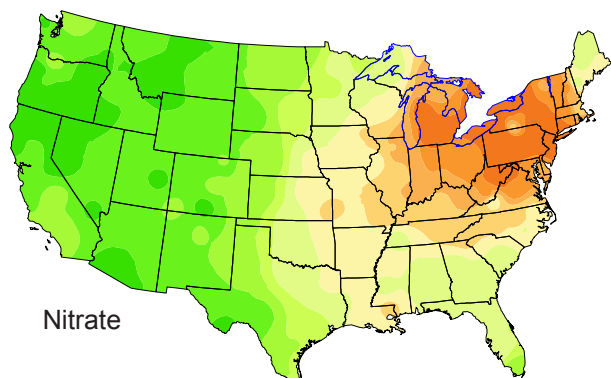
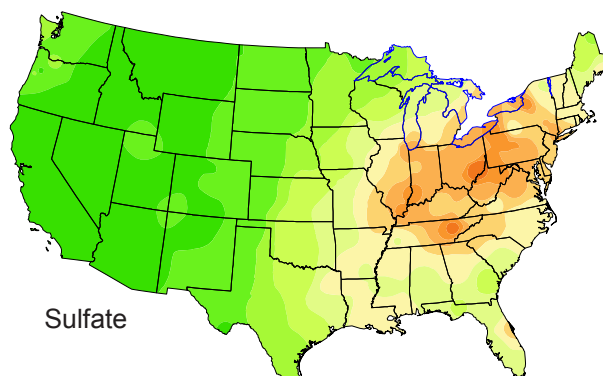
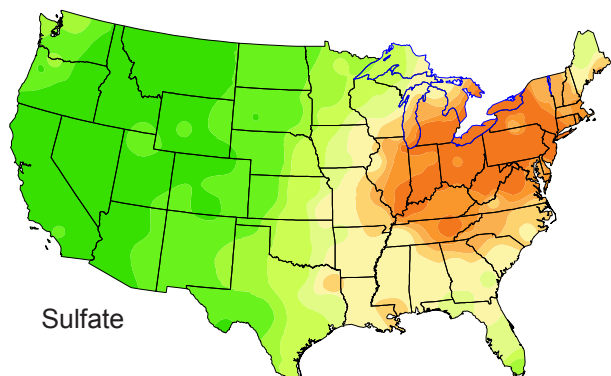
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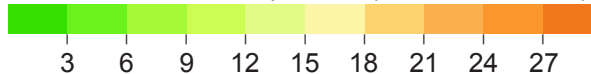
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1985 - 1989

1995 - 1999

Estimated Annual Deposition (millimoles/meter²)



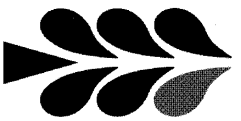
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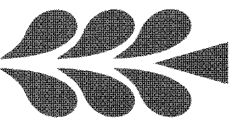


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NATIONAL ATMOSPHERIC DEPOSITION PROGRAM



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Front Row (left to right): Gary Heet-MI48, Karla Johnston-KY99, Jay Matt-MI51, Amy Bullock-NJ00, Dawn Plummer-WA19. Second Row: Mike Magnuson-CA96, Margaret Pierce-NC03, Kathy McAlister-OK17, Patricia Butler-NC35, Denise Dickson-MI51, Heidi Lindsay-WV05, Michael Broschart-MN32. Third Row: Dale Krueger-MN01, Natalie Latsysh-USGS, Noel Mays-AR16, Joe Woycke-OH09, John Horner-NJ99, John Bithorn-PR20, Dennis Rosenkranz-ND11, Mason Kessinger-ISWS, Liz Ballenger-CA95. Back Row: Dave Scherf-NY68, John Halverson-CO93/CO97, Brendan Brokes-WA99, Robert Bagby-OK08, Gabe Asarian-WA14, Ewan Gwilliam-MA01, Jim Goeke-NE99, Marc Anderson-UT01. Not pictured: Sylvia Oliva-CO99

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