

Thirty Years Down and a Century to Go

**A Narrative History of the
Origins and Early Development of the
National Atmospheric Deposition Program**

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Madison, Wisconsin October 15, 2008

Thirty Years Down and a Century to Go

- **What are the major achievements of NADP?**
- **What persons and organizations contributed to these achievements?**
- **How can NADP build on these achievements and thus serve our society more fully in the future?**

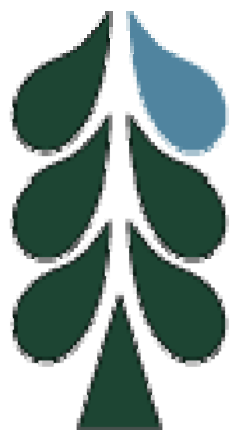
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Historical Scientific Context – Europe

(The original logo for NADP was inspired by this image)



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NATIONAL ATMOSPHERIC DEPOSITION PROGRAM



A Cooperative Research Support Program of the
State Agricultural Experiment Stations (NRSP-3)
Federal and State Agencies
and Non-Governmental Research Organizations

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Historical Scientific Context – Europe

- In 1947, Hans Egnér began a regional precipitation chemistry research project. It grew into European Air Chemistry Network
- During the 1960s, Karl Gustav Rossby and Erik Eriksson founded the science of atmospheric chemistry. They advanced a general theory of biogeochemical circulation of matter in the Earth
- Svante Odén developed a Surface Water Network in Sweden
 - Achieved a major integration of knowledge in agriculture, limnology, and atmospheric chemistry which he published in 1968 and included his provocative assertion that there was
 - “an insidious chemical warfare among the nations of Europe”

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Historical Scientific Context – United States

- In 1975, the US Forest Service sponsored the “First International Symposium on Acid Precipitation and the Forest Ecosystems” at Ohio State University
- Workshops held after this Symposium recommended **“establishment of a permanent network of precipitation chemistry monitoring stations throughout the United States.”**

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Odén summarized four lessons from the European Air Chemistry Network

- Clear definition of purpose
- Informal organizational arrangements
- Low cost of analyses
- Frequent use and interpretation of data

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Characteristics of Proposed US Network

- **Organizational Structure:** Regional Research System of the State Agricultural Experiment Stations. This idea was first proposed by Walter Heck and Lawrence Apple and later endorsed by NC State Experiment Director J. C. Williamson
- **Title:** An Experiment Station Network to Measure Changes in the Chemistry of Atmospheric Deposition on Agricultural and Forested Land and Surface Waters in the United States
- **Objective:** Measure spatial and temporal changes in the supply of beneficial nutrient elements and injurious air-borne chemicals deposited from the atmosphere into agricultural, forest, and aquatic ecosystems

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Chronology of Proposal Development

- Briefing for the “Committee of Nine” December 1975
- Initial draft sent to all State Agricultural
Experiment Station Directors January 1976
- Proposal-improvement meetings were held at:
 - USDA Headquarters February 1976
 - National Academy of Sciences September 1976
 - Minnesota Experiment Station March 1977
- Project approved for initiation, first as NCT-115 then
as North Central Regional Project NC-141 October 1977

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Federal Agency Review of NC-141 Proposal

- A Federal Interagency Working Group on Precipitation Quality led by Vance Kennedy of USGS
 - Endorsed the NC-141 project plan
 - Recommended both cooperation and financial support of NC-141 by each of its member agencies including USGS, NOAA, ERDA, ARS, FS, EPA, and NSF.

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Founding Organizations in NC-141 Project

- North Central Region – 11 SAES
- Western Region – 3 SAES
- Southern Region – 4 SAES
- Forest Service – 5 sites in NE and NC regions
- Seven Federal or State Agencies: DOE, EPA, NOAA, USGS, USDA, Illinois State Water Survey
- Two Canadian Universities – McMaster in Ontario and Calgary in Alberta

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Chronology of NADP Project Designations

1978-83 - North Central Regional Project	NC-141
1983-93 - Interregional Project	IR-7
1993-08 - National Research Support Project	NRSP-3

Chronology of NADP Networks

1982-2008 - National Trends Network	NADP-NTN
1992-2008 - Atmospheric Integrated Research Monitoring Network	NADP-AIRMoN
1995-2008 - Mercury Deposition Network	NADP-MDN

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Major Contributors to Development of NC-141 in '75-'78

- **Curtis Jackson**, Georgia Ag Experiment Station
- **Keith Huston**, Minnesota Ag Experiment Station
- **John Fulkerson**, CSRS – USDA Washington DC
- **Sylvan Wittwer**, Michigan Ag Experiment Station
- **Ted Hullar**, New York (Cornell) Ag Experiment Station
- **James Galloway**, University of Virginia, Charlottesville, VA
- **Herbert Volchok**, DOE Health and Safety Laboratory, New York, NY
- **John Robertson**, US Military Academy, West Point, NY
- **Stephen Lindberg**, Oak Ridge National Laboratory, TN
- **James Lynch**, Pennsylvania State University,
- **Thomas Buchanan**, USGS – Reston, VA
- **Eville Gorham**, University of Minnesota, St. Paul, MN
- **William McFee**, Purdue University, West Lafayette, IN

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Major Contributors to NC-141 in '75-'78

- **James Gibson**, Colorado State Univ., Fort Collins, CO
- **Kay Jones**, President's Council on Environmental Quality, Washington DC
- **Senator Patrick Moynihan**, US Senate, Washington DC
- **Congressman George Brown**, US House of Representatives, CA
- **Vance Kennedy**, USGS – Menlo Park, CA
- **Ellis Cowling**, NC State University, Raleigh, NC
- **Leon Dochinger**, US Forest Service, NE Station, Delaware, OH
- **Thomas Seliga**, Ohio State University, Columbus, OH
- **Richard Semonin**, Illinois State Water Survey, IL
- **John Miller**, NOAA Silver Spring Laboratory, MD
- **Volker Mohnen**, State University of New York in Albany, NY
- **Paul Kapinos**, US Geological Survey, Reston, VA

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Major Contributors to NC-141 in '75-'83

- **Boyd Post**, CSRS – USDA Washington DC
- **Richard Aldridge**, CSRS – USDA Washington DC
- **Stanley Changnon**, Illinois State Water Survey, Urbana Champaign, IL
- **Mark Peden**, Illinois State Water Survey, Urbana Champaign, IL
- **Estel Cobb**, CSRS – USDA Washington DC
- **John Ficke**, USGS – Reston, VA
- **Radford Byerly**, US Congress, Staff to Congressman George Brown
- **Roy Lovoorn**, CSRS – USDA Washington DC
- **Robert Goldstein**, EPRI, Stanford, CA
- **Chuck Hakarienen**, EPRI, Stanford, CA
- **Richard Thompson**, USEPA, Research Triangle, NC
- **Jack Barnes**, CSRS – USDA Washington DC

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NADP Achievements Worth Celebrating

- **Use of a Single Central Analytical Laboratory**

Richard Semonin of the Illinois State Water Survey and James Galloway of Cornell University and later the University of Virginia were convinced that a single Central Analytical Lab was crucial to the success of NADP. Semonin insisted on a competitive lab-selection process, and was pleased that his own Water Survey Laboratory in Illinois won this competition.

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NADP Achievements Worth Celebrating

Selection of Jim Gibson as NADP Program Coordinator from 1978-1997

- Jim Gibson brought a wealth of program-development experience from his role as Director of the Natural Resource Ecology Laboratory at Colorado State University.
- He worked tirelessly to facilitate growth in number, geographical distribution, and stability of collection sites and increased support from federal, state, and industry organizations.

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NADP Achievements Worth Celebrating

- **Personnel of the Central Analytical Laboratory and later the Program Development Office at the Illinois State Water Survey who devoted most of their professional lives to NADP:**
 - Richard Semonin
 - Van Bowersox
 - Kathy Douglas
 - Jane Rothert
 - Scott Dossett
 - Mark Peden

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NADP Achievements Worth Celebrating

- **Evaluation of NADP Data Quality by the World Meteorological Organization (WMO)**
- John Miller of NOAA and Volker Mohnen of the State University of New York in Albany insisted that NADP should meet the high data-quality standards of the WMO.
- After repeated rounds of rigorous international evaluation Miller and Mohnen asked NADP's Central Analytical Laboratory to prepare known samples for evaluation of other chemistry laboratories around the world.

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NADP Achievements Worth Celebrating

- **Production of Annual Isopleth Maps**

Dissemination of multi-colored maps of NADP data and analyses of both spatial and temporal trends have served a wide array of scientific purposes and built a large group of satisfied public-interest users of NADP data.

- In 2007, NADP provided 24,554 data sets and 126,256 atmospheric deposition maps to a total of 89,108 “customers” that ranged from members of Congress to school children doing science projects.

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NADP Achievements Worth Celebrating

- **Contributions to Other Programs**

NADP spawned (or helped spawn) a diverse array of national and regional research programs

- National Acid Precitation Assessment Program
- National Surface Water Survey
- NADP National Trends Network
- NADP Mercury Deposition Network
- International Nitrogen Initiative (INI)
- Integrated Nitrogen Committee of EPA's Science Advisory Board
- NADP Critical Loads (CLAD) Ad Hoc Committee

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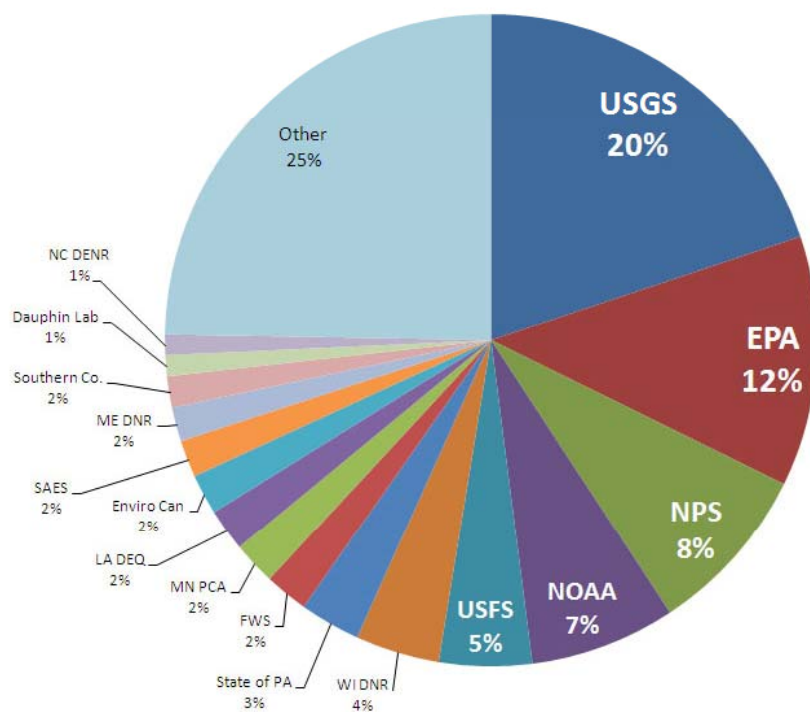
NADP Achievements Worth Celebrating

- **Investment by a Diversity of Funding Sources**

Stability of funding has been the result of a diverse array of organizations that have confidence in NADP and thus continue to lend their creative scientists and invest their financial resources in support of NADP.

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FY 2008 NADP Funding by Agency



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NADP Achievements Worth Celebrating

- **Use of a “Scientist-driven,” “Bottom-up” System of Governance**

Based on a democratic system perfected through more than 60 years of experience by the State Agricultural Experiment Stations, NADP is a voluntary association of scientists from many different public and private research institutions and agencies that share a common vision about important scientific problems that are continental in scope.

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NADP Achievements Worth Celebrating

- **Scientifically Rewarding Collaborations**

One of the most important reasons why NADP has been so successful is the satisfaction many of us found in working together to fulfill a variety of important scientific purposes that no individual or group could accomplish without the dedicated efforts of many other scientists.

- **In short, we found it fun being a part of NADP!**

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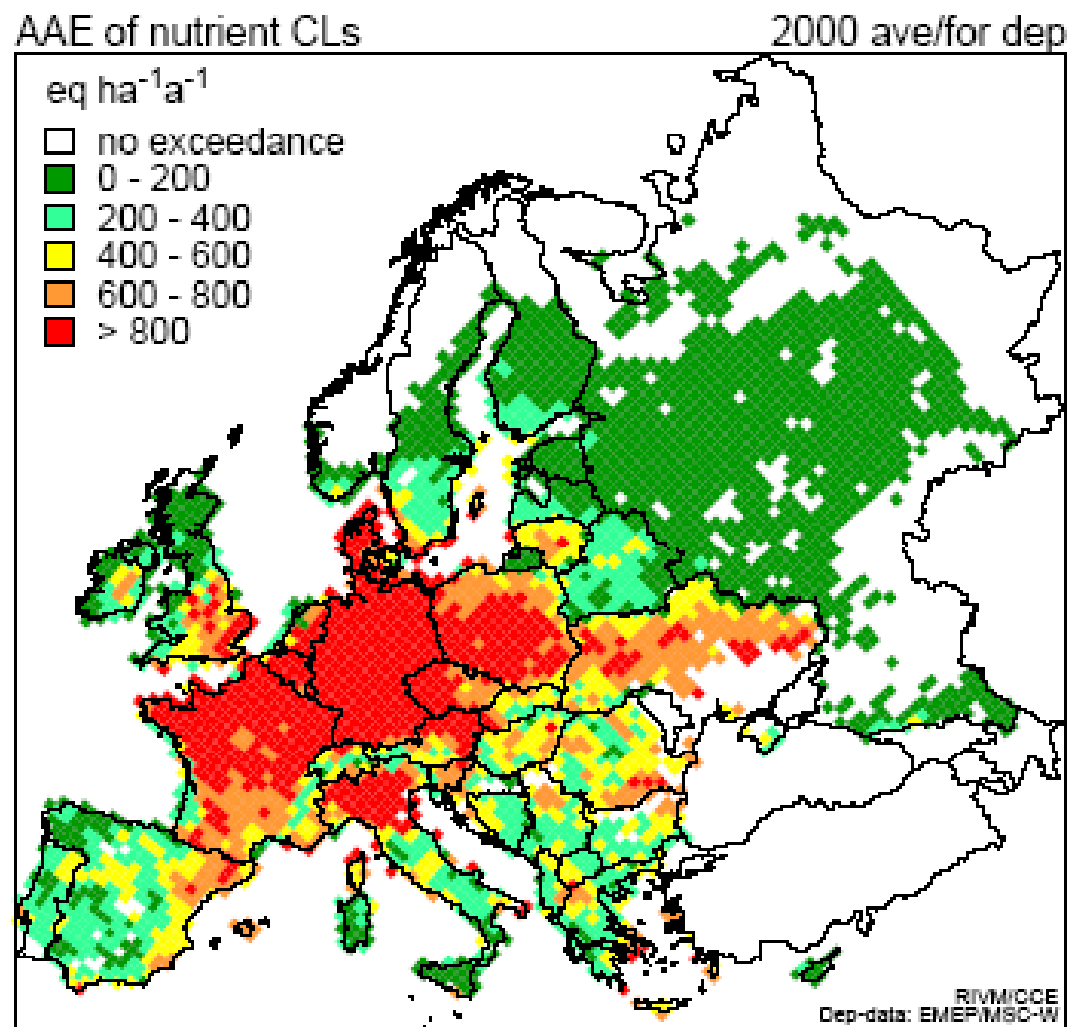
Background for the Future of NADP

- **Nitrogen-Related Pollution Issues**

- Acidification: **SO_x, NO_x, NH_x**
- Nutrient enrichment: **NO_x, NH_x**
- Increased ozone: **NO_x, VOC, CO**
- Particulate matter: **SO_x, NO_x, NH_x**

Exceedance of Critical Loads for Nutrient Nitrogen

[Developed by H. Rodhe, Sweden]



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Recommendations for the Future of NADP

- Cultivate the Ag Experiment Director in your State!
- Seek renewal of NADP as NRSP-3
- Seek continued financial support from
SAES Multistate Research Project Funds
- Build an NADP contingency fund for support of “endangered” collection sites and essential program development activities
- Seek support for research on air emissions of chemically reduced and organic forms of reactive nitrogen

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Recommendations for the Future of NADP

- Get to know the Chief Air Quality Manager in your State!
- Be alert to emerging regional and national needs to which future NADP measurements can be related
- Give increased attention to determination of critical loads for airborne N, P, S, Ca, etc.
- Develop linkages between NADP and the National Global Change Research Program

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Epilogue

- Thanks for the chance to present this initial “Narrative History of the NADP Program!”
- Selecting particular events, leading persons, and accomplishments for inclusion in a narrative history is a risky business since some important contributions may not be given the credit or priority they deserve.
- Thus, I hope you will join in helping describe the history of NADP more adequately! Perhaps it could be added as an appendix to the NADP Governance document.

Thirty Years Down and a Century to Go!

- On you go
NADP!