

# Thirty Years Down and a Century to Go

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

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## 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?**

# Thirty Years Down and a Century to Go

## Historical Scientific Context – Europe

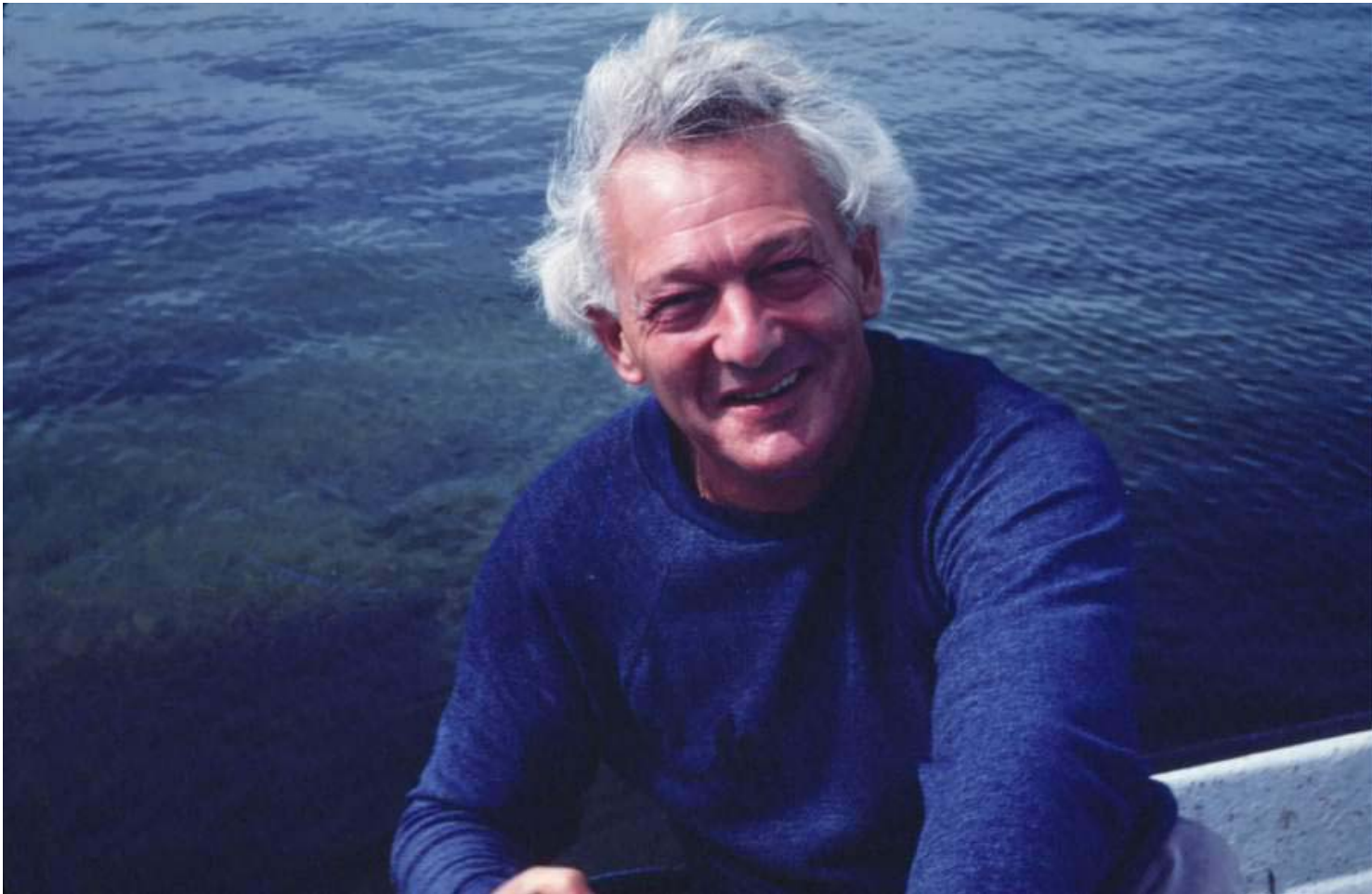


# Thirty Years Down and a Century to Go

## 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”

# Thirty Years Down and a Century to Go



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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.”**

# Thirty Years Down and a Century to Go

## 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

# Thirty Years Down and a Century to Go

## 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



# Thirty Years Down and a Century to Go

## 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

# Thirty Years Down and a Century to Go

## 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.

# Thirty Years Down and a Century to Go

## 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

# Thirty Years Down and a Century to Go!

## 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

# Thirty Years Down and a Century to Go

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

- **Curtis Jackson**, Georgia Ag Experiment Station
- **Keith Huston**, Minnesota Ag Experiment Station
- **Sylvan Wittwer**, Michigan Ag Experiment Station
- **John Fulkerson**, CSRS – USDA Washington DC
- **James Galloway**, University of Virginia, Charlottesville, VA
- **Herbert Volchok**, DOE Health and Safety Lab, New York, NY
- **John Robertson**, US Military Academy, West Point, NY
- **Stephen Lindberg**, Oak Ridge National Laboratory, TN
- **Jim Lynch**, Pennsylvania State University,
- **Thomas Buchanan**, USGS – Reston, VA
- **Eville Gorham**, University of Minnesota, St. Paul, MN
- **Bill McFee**, Purdue University, West Lafayette, IN
- **Kay Jones**, President's Council on Environmental Quality, Washington DC
- **Senator Patrick Moynehan**, US Senate
- **Congressman George Brown**, US House of Representatives

# Thirty Years Down and a Century to Go

## **NADP Achievements Worth Celebrating**

- **Use of Single Central Analytical Laboratory**

Richard Semonin of the Illinois State Water Survey was convinced that a single Central Analytical Lab was crucial to the success of NADP. He insisted on a competitive lab-selection process, and was pleased that his own laboratory won this competition.

# Thirty Years Down and a Century to Go

## **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.

# Thirty Years Down and a Century to Go

## **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



# Thirty Years Down and a Century to Go

## NADP Achievements Worth Celebrating

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

# Thirty Years Down and a Century to Go

## 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 range from members of Congress to school children doing science projects.

# Thirty Years Down and a Century to Go

## NADP Achievements Worth Celebrating

- **Contributions to Other Programs**

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

- National Acid Precipitation 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

# Thirty Years Down and a Century to Go

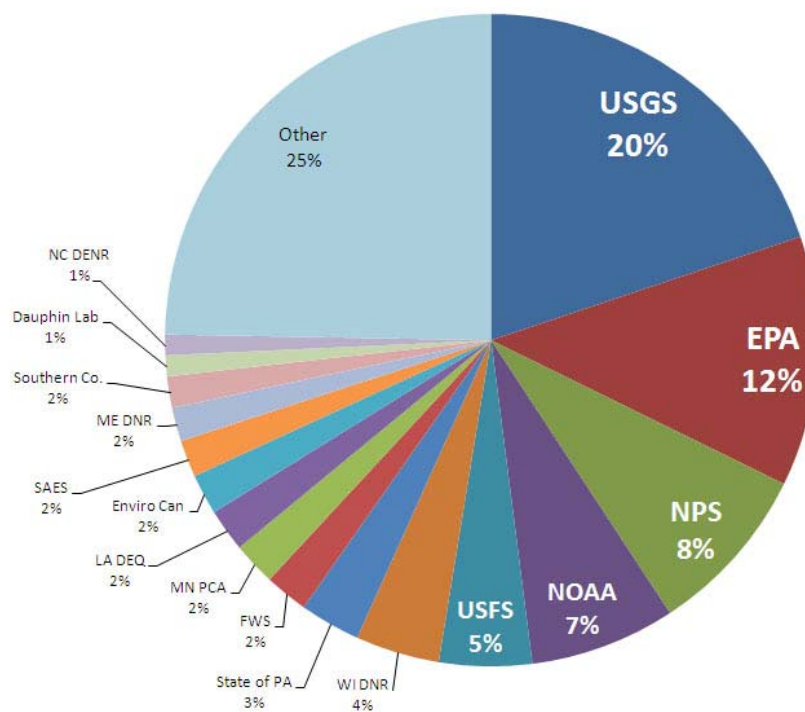
## **NADP Achievements Worth Celebrating**

- **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.

# Thirty Years Down and a Century to Go

FY 2008 NADP Funding by Agency



# Thirty Years Down and a Century to Go

## NADP Achievements Worth Celebrating

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

Based on a democratic system perfected through more than 50 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.

# Thirty Years Down and a Century to Go

## NADP Achievements Worth Celebrating

- **Scientifically Rewarding Collaborations**

One of the most important reasons why NADP has been so successful in the past (and will continue to be so in the future) is the satisfaction many of us have 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 have found it fun being a part of NADP!**

# Thirty Years Down and a Century to Go

## Background for the Future of NADP

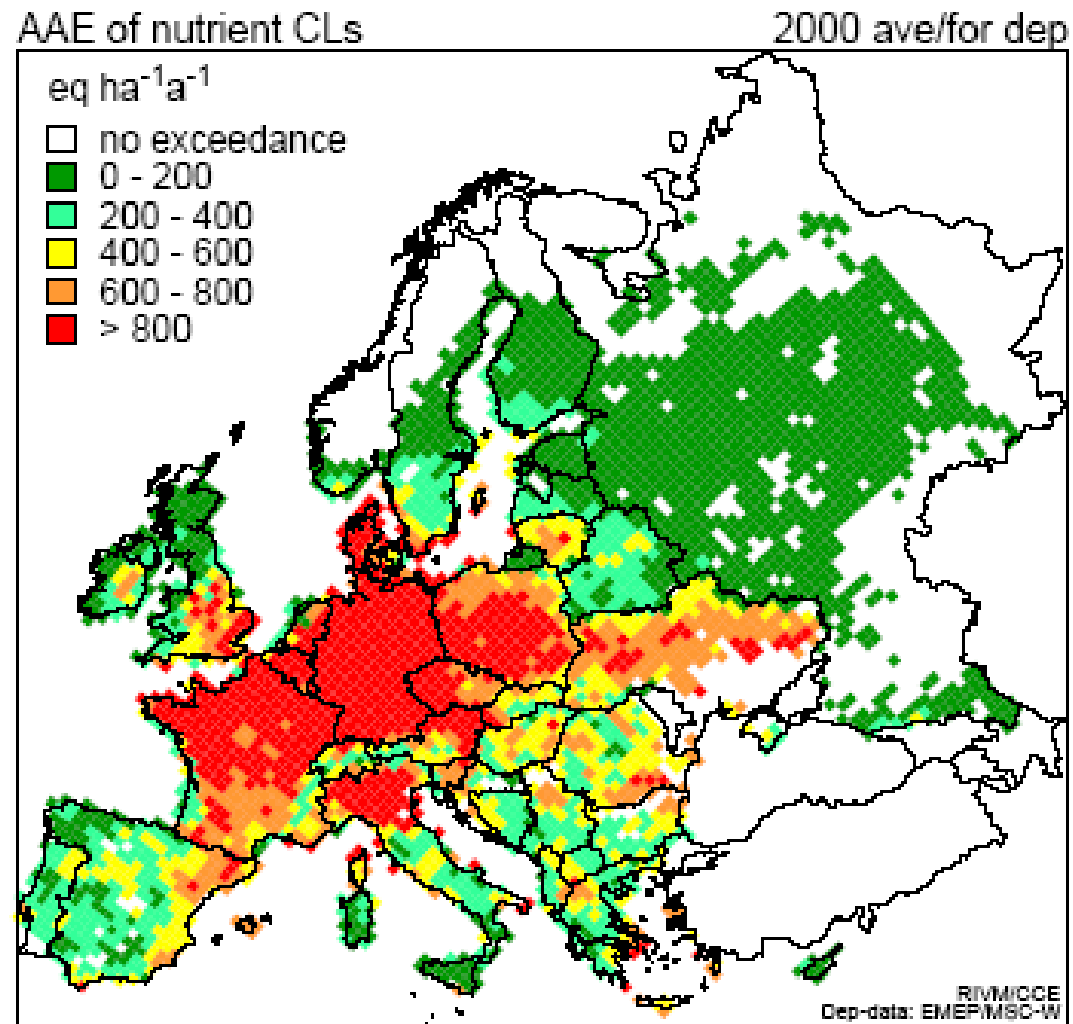
- **Nitrogen-Related Pollution Issues**

- Acidification: **SO<sub>x</sub>, NO<sub>x</sub>, NH<sub>x</sub>**
- Nutrient enrichment: **NO<sub>x</sub>, NH<sub>x</sub>**
- Increased ozone: **NO<sub>x</sub>, VOC, CO**
- Particulate matter: **SO<sub>x</sub>, NO<sub>x</sub>, NH<sub>x</sub>**



# Exceedance of Critical Loads for Nutrient Nitrogen

[Developed by H. Rodhe, Sweden]



# Thirty Years Down and a Century to Go

## 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

# Thirty Years Down and a Century to Go

## 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!



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

- **J. C. Williamson**, NC Ag Experiment Station
- **Curtis Jackson**, GA Ag Experiment Station
- **Keith Huston**, MN Ag Experiment Station
- **Sylvan Wittwer**, MI Ag Experiment Station
- **John Fulkerson**, CSRS – USDA Washington DC
- **Vance Kennedy**, USGS – Menlo Park, CA
- **James Galloway**, U of Virginia, Charlottesville, VA
- **Ellis Cowling**, NC State University, Raleigh, NC

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

- **Leon Dochinger**, US Forest Service, NE Station
- **Thomas Seliga**, Ohio State University, Columbus
- **Richard Semonin**, Illinois State Water Survey
- **John Miller**, NOAA Silver Spring Lab
- **Herbert Volchok**, DOE Health & Safety Lab, NYC
- **John Robertson**, US Military Academy, West Point
- **Paul Kapinos**, US Geological Survey, Reston, VA
- **Boyd Post**, CSRS – USDA Washington DC
- **Richard Aldridge**, CSRS – USDA Washington DC



# Thirty Years Down and a Century to Go

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

- **Stanley Changnon**, Illinois State Water Survey
- **Mark Peden**, Illinois State Water Survey
- **Estel Cobb**, CSRS – USDA Washington DC
- **John Ficke**, USGS – Reston, VA
- **Thomas Buchanan**, USGS – Reston, VA
- **Radford Byerly**, US Congress, Staff to George Brown
- **George Brown**, US House of Representatives, CA
- **Roy Lovoorn**, CSRS – USDA Washington DC
- **Robert Goldstein**, EPRI, Stanford, CA

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## Major Contributors to NC-141 in '78-'83

- **James Gibson**, Colorado State Univ., Fort Collins, CO
- **Chuck Hakarienen**, EPRI, Stanfird, CA
- **Richard Thompson**, USEPA, Research Triangle, NC
- **Stephen Lindberg**, Oak Ridge National Laboratory
- **Jack Barnes**, CSRS – USDA Washington DC
- **Eville Gorham**, University of Minnesota, St. Paul, MN
- **Bill McFee**, Purdue University, West Lafayette, In
- **Kay Jones**, Council on Environmental Quality