



NATIONAL ATMOSPHERIC DEPOSITION PROGRAM

A research program sponsored by the
Association of State Agricultural Experiment Stations
of the North Central Region • NC-141



M E M O R A N D U M

TO: NADP Site Operators

FROM: Mark E. Peden, CAL Laboratory Manager

SUBJECT: NADP Intersite Comparison Study IV

The Fourth NADP Intersite Comparison Study of pH and specific conductance measurements has been completed. Rainwater solutions were simulated with a formulation of dilute HNO_3 . The calculated values for pH and specific conductance are 4.25 pH units and 25 $\mu\text{mhos/cm}$, respectively.

The results reported from your site are as follows:

Site No. A706
pH 6.56 Specific Conductance 22.9

Figure 1 summarizes the results of 57 sites which completed the pH measurements with values ranging from 3.50 - 7.20 units and a median pH of 4.30. The median value shows good agreement with the calculated value, and 75% of the reporting sites are within 0.2 units of the calculated value. The Central Laboratory measured a pH of 4.25 on this solution.

The specific conductance measurements made at 57 sites are illustrated in Figure 2. The range of values was from 10 - 42.3 $\mu\text{mhos/cm}$ with a median value of 22.5. The calculated value of 25 is in close agreement with both the Central Laboratory measurement of 24.5 and the sites median value. If we assume an acceptable range of values from 21 - 29 $\mu\text{mhos/cm}$, 74% of the reporting sites recorded acceptable measurements.

A look at the results from the Third Intersite Comparison reveals that pH measurements have improved by 8% while conductance measurements have remained at the same level of accuracy. If your values lie outside of the recommended ranges, it is likely that you have an operational problem that should be investigated. Please contact me at the Central Analytical Laboratory for any questions you have regarding these results.

I am excited about the improvements in our field measurement program and confident that the next Intersite Comparison will yield even better results. Thank you for your continued interest and enthusiasm in this important research program.

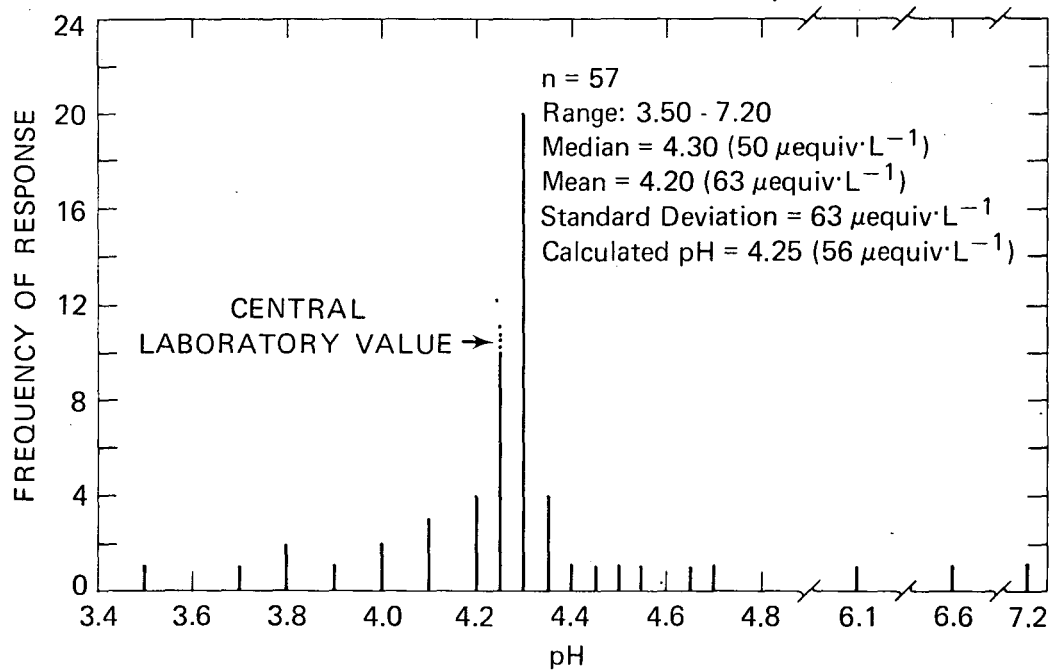
Mark E. Peden
Laboratory Manager, CAL
217/333-8325

MEP/ds

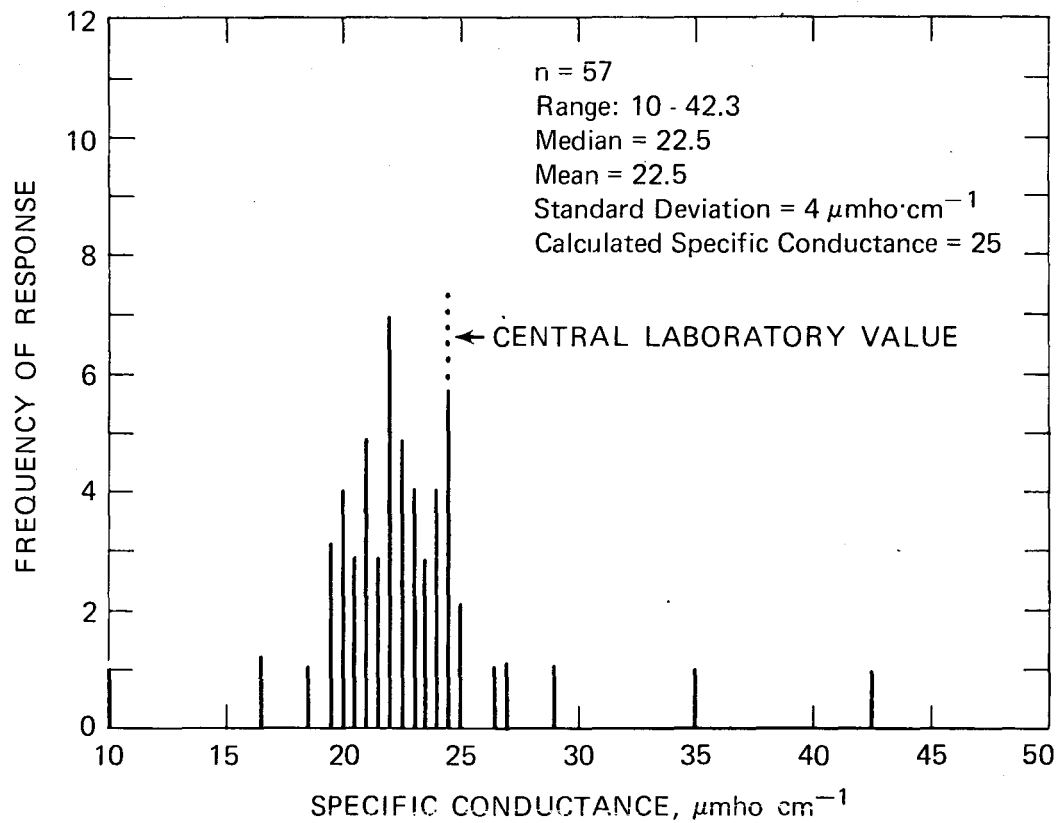
NATIONAL ATMOSPHERIC DEPOSITION PROGRAM

4th Intersite Comparison Study — pH

June, 1980



NATIONAL ATMOSPHERIC DEPOSITION PROGRAM
4th Intersite Comparison Study - Specific Conductance
June, 1980





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Site No. AZ 06
pH 6.56 • Specific Conductance 22.9

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217/333-8325

MEP/ds

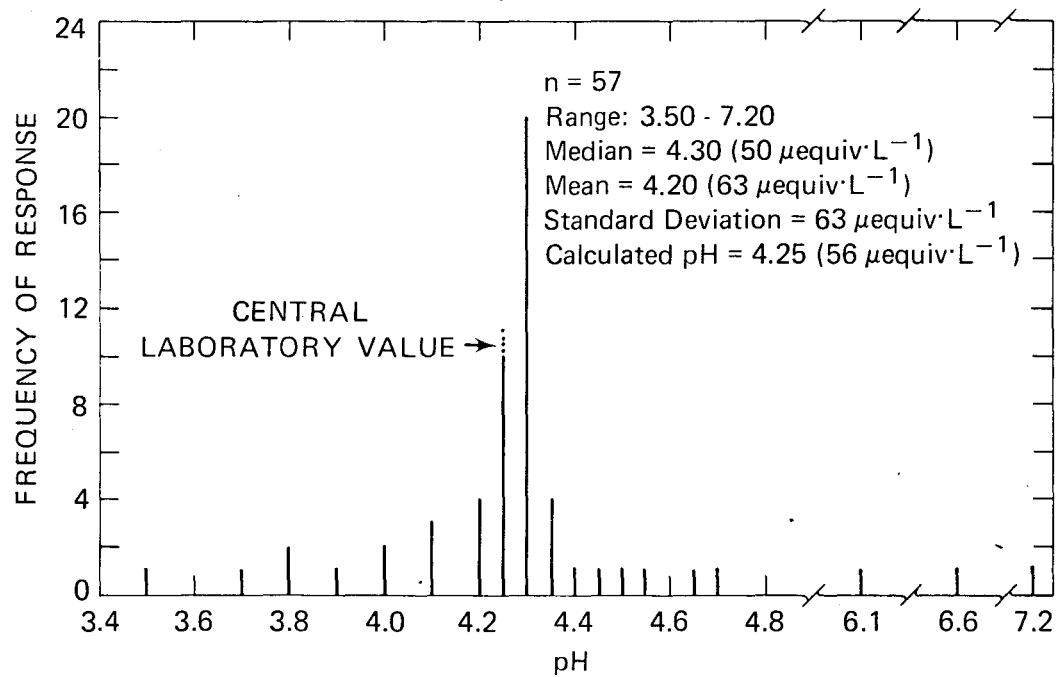
*Should have
been ~
4.25*

*We did not
allow the
probe to stabilize
for a long enough
time in this
weakly rinsed
solution
(the sample)*

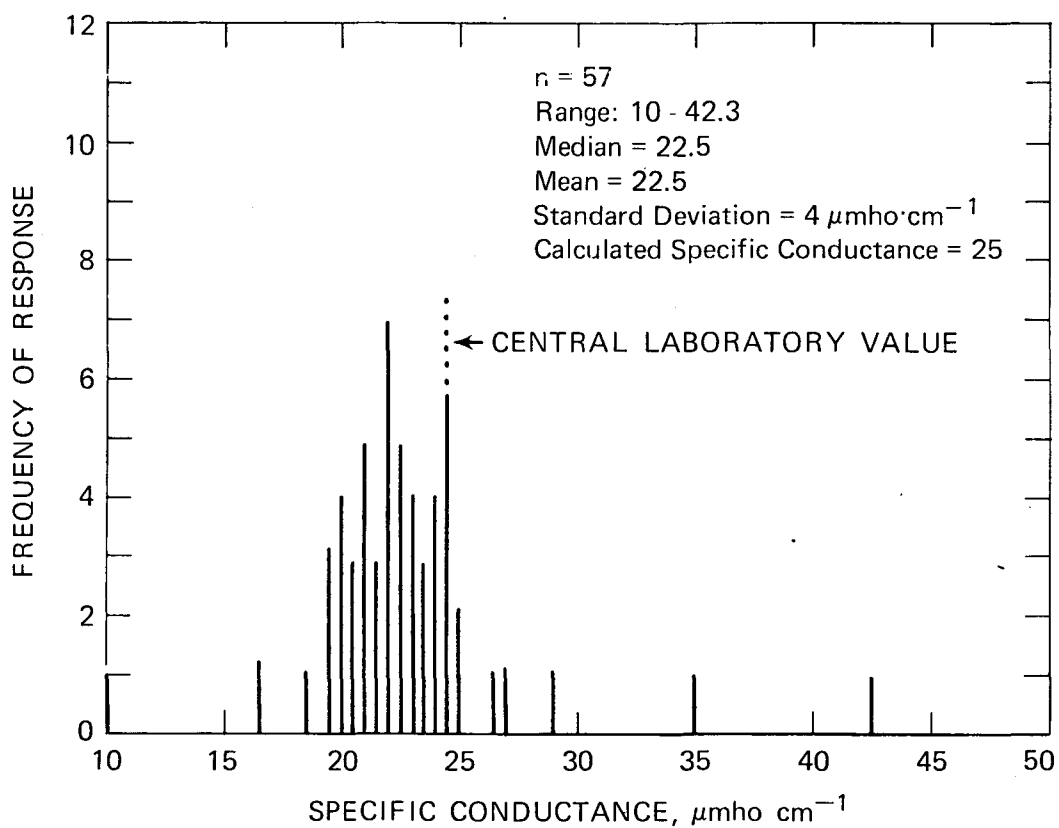
NATIONAL ATMOSPHERIC DEPOSITION PROGRAM

4th Intersite Comparison Study - pH

June, 1980



NATIONAL ATMOSPHERIC DEPOSITION PROGRAM
4th Intersite Comparison Study — Specific Conductance
June, 1980



THE CHANGING CHEMISTRY OF ATMOSPHERIC DEPOSITION AND ITS
EFFECTS ON AGRICULTURAL AND FOREST LANDS AND SURFACE WATERS IN
THE UNITED STATES

Ellis B. Cowling
Chairman of Technical Committee

James H. Gibson
Program Development Coordinator

Background

The nutrient status, growth, and development of terrestrial and aquatic plants are influenced by the abundance of beneficial nutrient elements and injurious substances dispersed into the atmosphere and subsequently deposited on the land and in the surface waters. Similarly, the health and reproductive capacity of wildlife and fish are influenced by the transfer of substances from the atmosphere to the biosphere of the earth. These influences may be by direct exposure or through the food chain.

Earlier, it was believed that most nutrient elements essential for the growth of plants were obtained after release from decomposing organic matter, weathering of soil minerals, or addition as fertilizers. Now it is recognized that substances deposited as precipitation, dry particulate matter, aerosols, and gases significantly augment the supply of both beneficial elements and injurious substances. Natural sources of airborne matter include biogenic particles such as spores and pollen; salt spray from oceans and large lakes; dust particles resulting from wind erosion of soil, volcanic eruptions, and cosmic sources; and nitrogenous and sulfurous gases from decomposing organic matter.

In recent decades human activities have greatly increased both the abundance of substances dispersed in the atmosphere and their impact on the biosphere of the earth. These changes have resulted mainly from increases in 1) combustion of fossil fuels in power production, space heating, and transportation; 2) emissions of dusts, aerosols, and gases from industrial and land-management activities; 3) use of fertilizers and other chemicals in intensive agriculture and forestry; and 4) decomposition and combustion of industrial, urban, and agricultural wastes.

Previously it was believed that most of these substances were removed from the atmosphere near the site of emission. Now we know that atmospheric processes can lead to extensive mixing accompanied by chemical and physical interactions leading to transformations of atmospheric particles, aerosols, and gases. Furthermore, these substances and their reaction products are dispersed by meteorological processes and finally are deposited in fields of deposition that extend hundreds and even thousands of kilometers from the source of emission. Thus, the chemical composition of atmospheric deposition within a given state or region is a function of all the airborne substances which are dispersed, mixed, transformed, and transported through atmospheric processes and deposited on the agricultural and forest land and surface waters within that region. Projected increases in the use of coal as a primary source of energy in the United States will add still further to the total atmospheric burden in many states.

Knowledge as to the ultimate short term and long term consequences of the large quantities of substances introduced into the atmosphere by the burning of fossil fuels is extremely limited. Studies in the U.S. and Europe, particularly Sweden have demonstrated the significant degradation of aquatic ecosystems as a result of the increased acidity of rainfall. As a response to the critical need to understand the impact of atmospheric deposition, the North Central region of the State Agricultural Experiment Stations established a program (NC-141) to conduct research on the effects on agricultural and forest lands and surface waters. The specific objectives of this project include the following:

- 1) Establishing a national atmospheric deposition network to determine spatial and temporal trends in the supply of beneficial nutrient elements and injurious substances in precipitation and dry particulate matter in various regions of the United States;
- 2) Determining the relative importance and contribution of precipitation, dry particulate matter, aerosols, and gases to the total atmospheric deposition in various states and regions; and
- 3) Coordinating research on the effects of changes in atmospheric deposition on: a) the productivity of agricultural crops, forests, range lands, wet lands, and surface waters; b) the health and productivity of domestic food animals, wildlife and fish; and c) corrosion of metals, painted surfaces, masonry, and materials in machinery or structures.

National Atmospheric Deposition Program

This program known as the National Atmospheric Deposition Program (NADP) consists of an interdisciplinary team of about 100 research scientists and an initial planned network of 75-100 collection sites throughout the U.S. The attached map indicates presently operating sites (numbered plots) and sites planned to be operational in 1979 (X). The participating institutions and agencies include 21 State Agricultural Experiment Stations (SAES), 4 U.S. Forest Service Experiment Stations, The Illinois State Water Survey and 7 other state or private research organizations and universities in the United States and Canada. In addition, the following agencies are contributing personnel and/or financial support to the Project: the Agricultural Research (SEA/AR), the U.S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), the Department of Energy (DOE), the Environmental Protection Agency (EPA), the Tennessee Valley Authority (TVA), the National Aeronautics and Space Administration (NASA), the Canadian Atmospheric Environment Service (CASES), the Sulfate Regional Experiment (SURE) of the Electric Power Research Institute (EPRI), and the Multistate Atmospheric Power Production Pollution Study (MAP3S) of DOE. The Cooperative State Research Service of the USDA is coordinating the development of interagency relationships and resources for research in the field of atmospheric deposition.

Monitoring Network

The map shows the states and regions in which collection sites were established as of April 1, 1979 to implement objective 1). All collection sites have been selected to give accurate and representative information

concerning spatial and temporal variations in the chemistry of precipitation and dry particulate matter within the major physiographic regions of each participating state and region.

Each site is equipped with an identical collector of the wet/dry deposition type (Aerochem Metrics Model 301, Miami, Florida) a recording rain gauge, and pH and conductivity meters. Samples of precipitation and dry particulate matter are collected at each site on a regular weekly basis and shipped to the Central Analytical Laboratory for analysis.

Analyses and Analytical Services

During the first phase of Network operation, analyses will be made for the following elements, ions, or other properties of each sample: $\text{SO}_4^{=}$, NO_3^- , $\text{PO}_4^{=}$, Cl^- , NH_4^+ , K^+ , Na^+ , Ca^{++} , Mg^{++} , pH, total and free acidity or alkalinity, and electrical conductivity. Later certain additional elements will be added including F, Br, Mn, Zn, Cu, Fe, Mo, B, Pb, Hg, I, Ni, Cd, V, and other elements, various pesticides, asbestiform fibers, and radioactive materials.

To insure that the network data are of such high quality that they provide maximum credibility for a wide variety of fundamental research and mission oriented purposes, a Quality Assurance Committee of impartial experts is critically overseeing the selection and operation of each collection site, as well as the operation of the Central Analytical Laboratory (Illinois State Water Survey). The U.S. Geological Survey (USGS) with the cooperation of the Environmental Protection Agency (EPA) and the Department of Energy (DOE) laboratories has agreed to conduct an extensive quality assurance program to meet criteria established by the Quality Assurance Committee.

Availability of Data

Data obtained by the Network is provided to all participating agencies. Any portion or all of the data will be provided upon request for any purpose of analysis and interpretation by personnel of any agency, public or private, which may wish to use the data. A highly flexible computerized print-out system will provide the data in maximally useful forms. This will be achieved by providing various types of sums, averages, correlations, time-course plots and spatial variation plots. A hard-copy of trends in the amount of each element of ion deposited at each collection site will be produced at least every 3 months. Tabular data should be available early 1979 and the data management systems should be functional in mid to late 1979. A proposal has been received from EPA to develop and support a data system to serve NADP and other atmospheric monitoring programs.

Financial Support

Funds for the coordination of the Project as a whole have been provided by the North Central Regional Association of Directors, the Cooperative State Research Service, the U.S. Geological Survey, the U.S. Forest Service, and the Agricultural Research. The costs of establishment and operation of each collection site and analyses of precipitation and dry particulate matter are borne by each Experiment Station or institution participating in the Project. (See following Budget estimate).

The cost of research on the effects of atmospheric deposition on plants, soils, wildlife and fish are borne by various granting agencies and the Experiment Stations and other agencies affiliated with the Project.

Organization

The Regional Project is governed by a Technical Committee including representatives from each participating institution or agency. The project is operated by an Executive Committee under the authority of the Technical Committee. Five subcommittees have been organized to provide technical direction for each of the programs major phases. Program organization and a listing of Sub-Committee Chairman and Executive Committee membership is attached.

Any person or agency wishing to participate in this Regional Project should contact the Project Development Coordinator (J. H. Gibson) or any member of the Executive Committee.

BUDGET FOR ESTABLISHING AND OPERATING MONITORING SITE

A frequently asked question is the cost for establishing and operating a monitoring site. Exact figures for a given site depend on location, available personnel and available equipment. The following figures are presented to help in estimating the initial and recurring expenses that may be incurred. It is assumed that the available site has 110 volt power, personnel to collect samples weekly, and no unusual problems in locating the sampler. The cost of certain items may vary depending on the manufacture selected.

Initial Costs

*Aerochem Metrics Model 301 Collector (including estimated postage)	\$1,500
Belfort recording rain gauge	\$ 500
pH meter	\$300-400
Conductivity meter	\$300-400

Recurring Costs

Chemical analysis (58 samples x \$58.50) ^{**}	\$ 3,400
Postage (estimate)	\$ 240

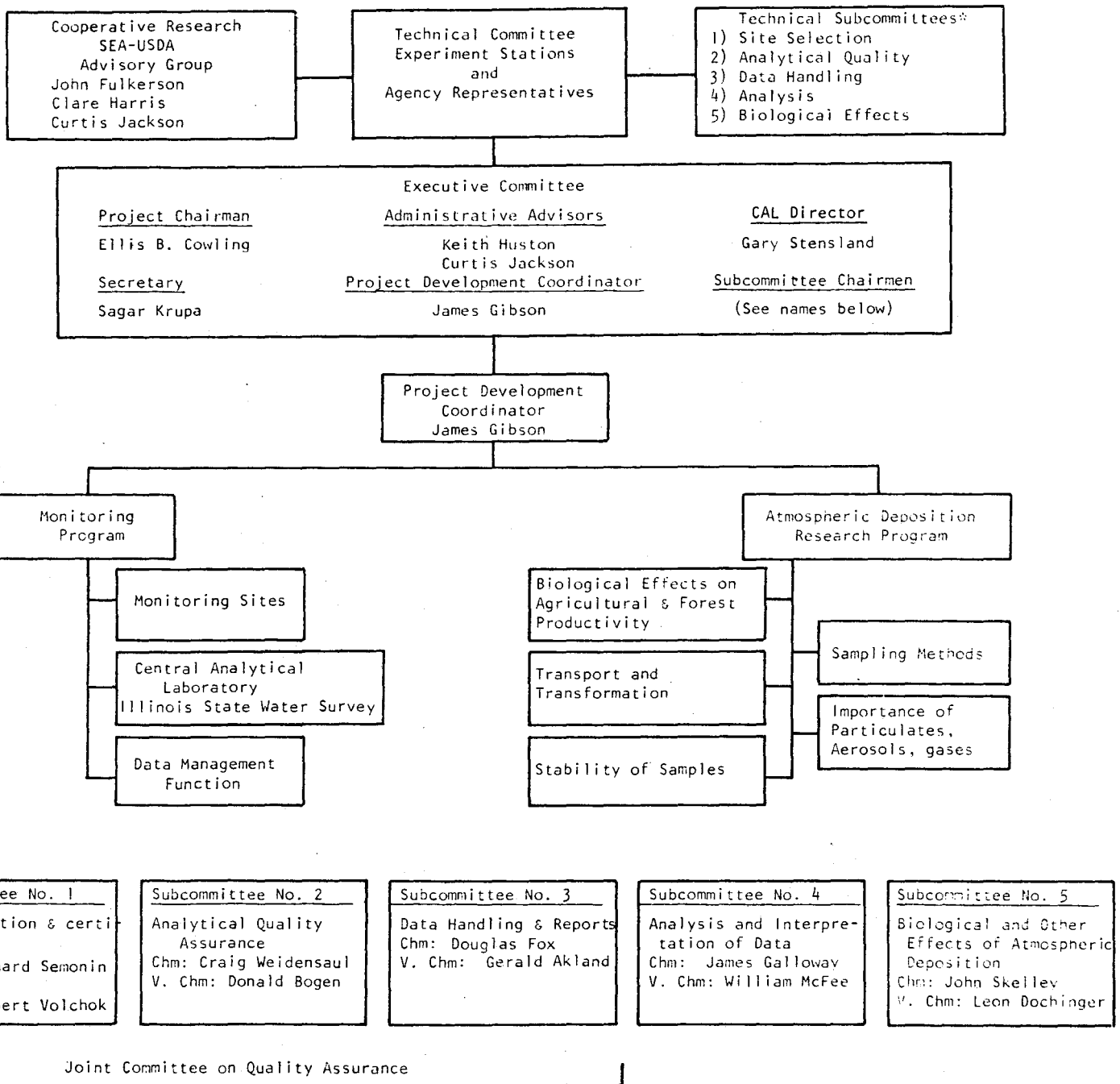
*Required manufacture and model

**Cost for period of July 1, 1978 to June 30, 1979

NATIONAL ATMOSPHERIC DEPOSITION PROGRAM

NC-141 NORTH CENTRAL REGIONAL PROJECT ON ATMOSPHERIC DEPOSITION

ORGANIZATION



EXECUTIVE COMMITTEE

NATIONAL ATMOSPHERIC DEPOSITION PROGRAM

Project Chairman:	Ellis B. Cowling	Associate Dean for Research School of Forest Resources North Carolina State University Raleigh, NC 27650	(919) 737-2883
Project Secretary:	Sagar Krupa	Department of Plant Pathology University of Minnesota St. Paul, MN 55108	(612) 376-3871
Administrative Advisors:	Keith Huston	Minnesota Agricultural Experiment Station 220 Coffey Hall 1420 Eckles Avenue St. Paul, MN 55108	(612) 373-0751 FTS 786-0751
	Curtis Jackson	Resident Director Georgia Experiment Station Experiment, GA 30212	(404) 228-7263
Project Development Coordinator:	J. H. Gibson	Natural Resource Ecology Laboratory Colorado State University Fort Collins, CO 80523	(303) 491-5571
Central Analytical Laboratory Director:	Gary Shussland	Illinois State Water Survey P. O. Box 232 Urbana, IL 61801	(217) 333-2213
<u>Site Selection and Certification Subcommittee</u>			
Chairman:	Richard Semonin	Illinois State Water Survey P. O. Box 232 Urbana, IL 61801	(217) 333-4967
Vice Chairman:	Herbert Volchok	HASL - ERDA 376 Hudson Street New York, NY 10014	(212) 620-3619
<u>Analytical Quality Assurance Subcommittee</u>			
Chairman:	Craig Weidensaul	Ohio Agricultural Research and Development Center Wooster, OH 44691	(216) 264-1021
Vice Chairman:	Donald Bogen	Department of Energy Environmental Measurements Laboratory 376 Hudson Street New York, NY 10014	(212) 620-3637
<u>Data Handling and Reporting Subcommittee</u>			
Chairman:	Douglas Fox	Rocky Mountain Forest and Range Experiment Station 240 West Prospect Street Fort Collins, CO 80521	(303) 482-7332 FTS 323-1254 or 1259
Vice Chairman:	Gerald Akland	US/EPA Environmental Monitoring and Support Laboratory Research Triangle Park, NC 27711	(919) 541-2346
<u>Analysis and Interpretation of Data Subcommittee</u>			
Chairman:	James Galloway	Department of Environmental Science University of Virginia Charlottesville, VA 22903	(804) 924-7761
Vice Chairman:	William McFee	Agronomy Department Purdue University West Lafayette, IN 47909	(317) 749-2891
<u>Biological and Other Effects of Atmospheric Deposition Subcommittee</u>			
Chairman:	John Skelly	Department of Plant Pathology and Physiology Virginia Polytechnic Institute and State University Blacksburg, VA 24061	(703) 951-6361
Vice Chairman:	Leon Dochinger	USDA, Forest Service Box 365 Delaware, OH 43015	(614) 369-4471

ANNUAL REPORT OF COOPERATIVE REGIONAL PROJECTS
January 1 to December 31, 1978

PROJECT: NC-141-NADP, Chemical Changes in Atmospheric Deposition and Effects on Land and Surface Waters

PROGRESS OF THE WORK AND PRINCIPAL ACCOMPLISHMENTS: The Technical Committee of NC-141 adopted the general name "National Atmospheric Deposition Program" at its annual meeting in November 1978. This decision was made to reduce prevalent confusion about the national (as opposed to the regional) character of NC-141. During 1978 major progress was made toward Project Objectives 1 and 6 (see below). Some progress also was made toward Objective 2-4. In January 1978 James Gibson (NREL, Colorado) was appointed Project Development Coordinator one-third to one-half time.

Objective 1 - Determine spatial and temporal trends in the supply of beneficial nutrient elements and potentially injurious substances in precipitation and dry particulate matter in various regions of the U.S.

Major steps toward this objective were as follows:

A) The Subcommittee of Site Selection and Certification, with leadership provided by R. Semonin (ISWS, Illinois) and H. Volchok (DOE, New York), developed a detailed Manual of criteria for selection, certification, operation, and maintenance of collection sites. The final draft was approved by the Executive Committee on March 2, 1979.

B) The Subcommittee on Analytic Quality Assurance, led by C. Weidensaul (OARDC, Ohio) and D. Bogen (DOE, New York) evaluated five candidate laboratories, made two visits, and recommended the Illinois State Water Survey (ISWS). This decision was also approved on March 2, 1979.

C) Cooperative agreements were negotiated between the ISWS, the Colorado Agricultural Experiment Station, and each of the participating State Agricultural Experiment Stations, the U.S. Forest Service and other institutions and agencies. In some cases, cost-sharing subagreements with the State District Offices of the U.S. Geological Survey (USGS) were also negotiated. The first agreements were signed on September 22, 1978. (Establishment of new agreements will be a continuing process with the addition of each new collection site.)

D) Letter requests for assistance in the development of systems for analytical quality assurance and data processing and storage were extended to the U.S. Geological Survey (USGS) and the U.S. Environmental Protection Agency (USEPA). The purpose of these requests was to ensure quality site operations, quality chemical analyses, quality data processing, and direct comparability between the NADP (NC-141) Network data and that of other networks in the US, Canada, and abroad. Final recommendations to the Executive and Technical committees during the spring of 1979.

E) As of December 31, 1978, 46 collection sites in 25 states were planned, 31 sites in 19 states were approved, and 21 sites in 15 states became operational (see map). The remaining sites (and others still in planning stages) are expected to become operational in 1979. To illustrate the value of the initial network data a few examples may be useful:

- 1) A steep east-west gradient in acidity of precipitation was found with pH decreasing from west to east across the Mississippi Valley.
- 2) Acidity of rain across the entire network varied from a low of pH 3.5 in central Ohio to a high in northern Minnesota of pH 6.9. Both of these extreme values were observed during the same week--31 October to 7 November 1978. The low pH sample contained 17 times more sulfate and 18 times more nitrate ion than the highest pH sample.
- 3) Phosphate deposition was generally greater in dry than wet deposition. Most rain samples across the network deposit less than 0.2 mg $\text{PO}_4/\text{m}^2/\text{week}$ although two phosphate-rich samples of rain were observed--one in western Virginia deposited 2.7 mg/m^2 and another in northern Minnesota deposited 5.7 $\text{mg}/\text{m}^2/\text{week}$. Samples of dry deposition were relatively rich in phosphate; across the whole network samples varied from a low of 1.87/ m^2/week in north Florida through 6.9 in central California and 7.2 in northern Minnesota to a high of 52 $\text{mg}/\text{m}^2/\text{week}$ in western Virginia.
- 4) Individual sites varied markedly in wet deposition--both one from another and week-by-week at the same location (note ranges):

Site Location	pH	Mg/M ² /Week		
		Sulfate	Nitrate	Calcium
New Hampshire	3.5-4.5	6-230	4-88	0.2-6
Ohio	3.6-5.9	26-176	18-105	2-41
North Carolina	3.9-6.2	3-60	2-24	1-3
Nebraska	5.0-6.7	3-35	1-35	0.5-23
Minnesota	4.8-6.9	3-70	1-52	0.6-17
Colorado	5.6-6.2	0.8-4	0.1-4	0.2-1.2
Florida	5.5-6.6	2-10	0.8-4	0.4-2.7

Note that northeastern precipitation was generally more acid, and higher in sulfate and nitrate than western or very southern precipitation.

- 5) Substantial variation within the same week was also discernible both within states and across the country. For example, during the week of November 7 to 14 rain samples from North Carolina varied 4-fold in conductivity, 3-fold in sulfate, 5-fold in nitrate, and 6-fold in calcium concentration. Similarly, across the rest of the network rain samples in the same week varied 20-fold in conductivity, 10-fold in sulfate, 50-fold in nitrate, and 5-fold in calcium concentration.

Objective 6 - Organize and coordinate research on the effects of changes in atmospheric deposition on: a) the productivity of agricultural crops, forests, rangelands, wet lands, and surface waters; b) the health and productivity of domestic food animals, wildlife, and fish; and c) corrosion of metals, painted surfaces, masonry, and other materials.

Progress toward this objective took three major forms:

- 1) Preparation of an Overview Issue Analysis Paper on the Acid Precipitation Problem by C. Harris (SEA-CR) with assistance from C. Jackson (Georgia). The major policy issue developed in this document was: "How can the capabilities of many different and highly relevant government agencies be drawn together into a cohesive program of monitoring and research?"
- 2) At the request of the Presidents' Council on Environmental Quality (CEQ) a special subcommittee of the project led by J. Galloway (Virginia), W. McFee (Indiana), E. Gorham (Minnesota), and E. Cowling (North Carolina) completed a major report entitled: "A National Program for Assessing the Problem of Atmospheric Deposition." This report recommends a well coordinated national program of research and monitoring with an annual cost of about \$8,900,000 (excluding research on chemical transformations and transport). The NADP was projected to play a central role in this proposed interagency program. A coordinating committee of agency leaders and an advisory committee of scientists were suggested as a mechanism for achieving the desired level of scientific coordination and interagency financial support.
- 3) Beginning in November 1978, The Subcommittee on Biological and Other Effects led by J. Skelly (Virginia) and L. Dochinger (USFS-Ohio) requested project participants to submit brief (two page) proposals for research on the biological effects of atmospheric deposition. In 1979 these proposals will be developed into a Plan of Research comparable with the Plan now being followed in the development of the network phase of the NADP.

USEFULNESS OF FINDINGS: The initial results show that biologically significant amounts of many crop nutrients and potentially injurious acidic substances are being deposited on agricultural and forest lands in all states now participating in the NADP (NC-141).

WORK PLANNED FOR NEXT YEAR

Whereas project efforts so far have been aimed primarily at establishment of collection sites and the operation of the Central Analytical Laboratory (Objective 1, above), during 1979 greater emphasis will be placed on analysis and interpretation of the deposition data (Objectives 25) and research on the biological effects of atmospheric deposition (Objective 6). A major effort will be made to obtain federal agency support for the costs of analyses by the Central Analytical Laboratory and for research on biological effects. In this way, more of the State Agricultural Experiment Station funds now invested in chemical analytical work can be shifted to biological effects research.

PUBLICATIONS ISSUED ON MANUSCRIPTS APPROVED DURING 1978

See list in Appendix III. Minutes of Technical Committee and Executive Committee meetings, the Overview Issues Analysis Paper, the Report to the Council on Environmental Quality have been filed with the office of the Regional Research Coordinator, Dr. Estel Cobb in SEA-CR.

APPROVED:

March 12, 1929

Ellis B. Cowling
Chairman, Technical Committee

March 19, 1929

Keith Huster
Administrative Advisor

PROJECT: NC-141-NADP, Chemical Changes in Atmospheric Deposition and Effects on Land and Surface Waters

COOPERATING AGENCIES AND PRINCIPAL LEADERS:

Agricultural Experiment Stations

North Central Region

Illinois	A. R. Gilmore
Indiana	W. W. McFee*
Iowa	M. A. Tabatabai*
Michigan	J. H. Hart*
Minnesota	S. V. Krupa*
	E. Gorham
	S. Eisenreich
Missouri	W. L. Decker*
Nebraska	S. B. Verma*
	N. J. Rosenberg
North Dakota	J. W. Enz*
Ohio	T. C. Weidensaul*
South Dakota	W. F. Lytle*
Wisconsin	P. A. Helmke

Southern Region

Florida	Hans Riekerk*
	W. H. Smith
Georgia	J. T. Walker *
North Carolina	E. B. Cowling*
	C. J. Wells
South Carolina	U. S. Jones*
Virginia	J. M. Skelly*

Western Region

Arizona	H. L. Bohn*
California	R. H. Burgy*
Colorado	J. H. Gibson*
	R. G. Woodmansee
Montana	F. J. Munshower*

Northeastern Region

Maine	S. A. Norton*
	R. B. Davis
	R. J. Campana
	R. C. Glenn
	N. E. Young
New York	W. W. Knapp*
(Cornell)	W. J. Kender
	J. S. Jacobson
	G. E. Likens
New York	D. L. Dindal*
(Syracuse)	D. F. Behrend
Pennsylvania	J. Lynch*

Federal Agencies

FS-NEFES

L. S. Dochinger*
R. S. Pierce
J. W. Hornbeck
C. W. Martin
C. A. Federer
J. H. Patric

FS-NCFES

E. S. Verry*
D. H. Urie
I. L. Sandor
D. T. Funk

FS-SEFES

J. E. Douglass*
C. J. Wells

FS-RMFES

D. G. Fox*
A. J. Bjugstad
E. F. Aldon

DOE-HASL

H. Volchok*

DOE-ORNL

D. Bogen

DOE-MAP3S

D. S. Shriner*

EPA

J. N. Galloway*

NOAA

J. Hales
F. Burmann*

D01-NPS

A. Eckles

USGS

J. M. Miller*
N. L. Canfield
(alternate)

TVA

Ray Herrmann*

ARS-USDA

R. J. Pickering*
B. Malo

SCS-USDA

J. M. Kelly*
W. W. Heck*

NASA

D. M. Hershfield
A. S. Heagle

U.S. Military Academy

R. B. Daniels
G. A. Margheim

P. Buchanan
J. K. Robertson*

T. W. Dolzine

State Agencies

Illinois State Water Survey

R. G. Semonin*

Southern Illinois University

F. Gatz

Michigan Technological University

G. Stensland

G. M. Aubertin*

G. T. Weaver

R. E. Dohrenwend*

Industry

ESEERCO

K. Juris*

Canadian Cooperators

University of Calgary
McMaster University
Canadian AES

A. H. Legge

J. R. Kramer

M. Kwizak

D. M. Whelpdale

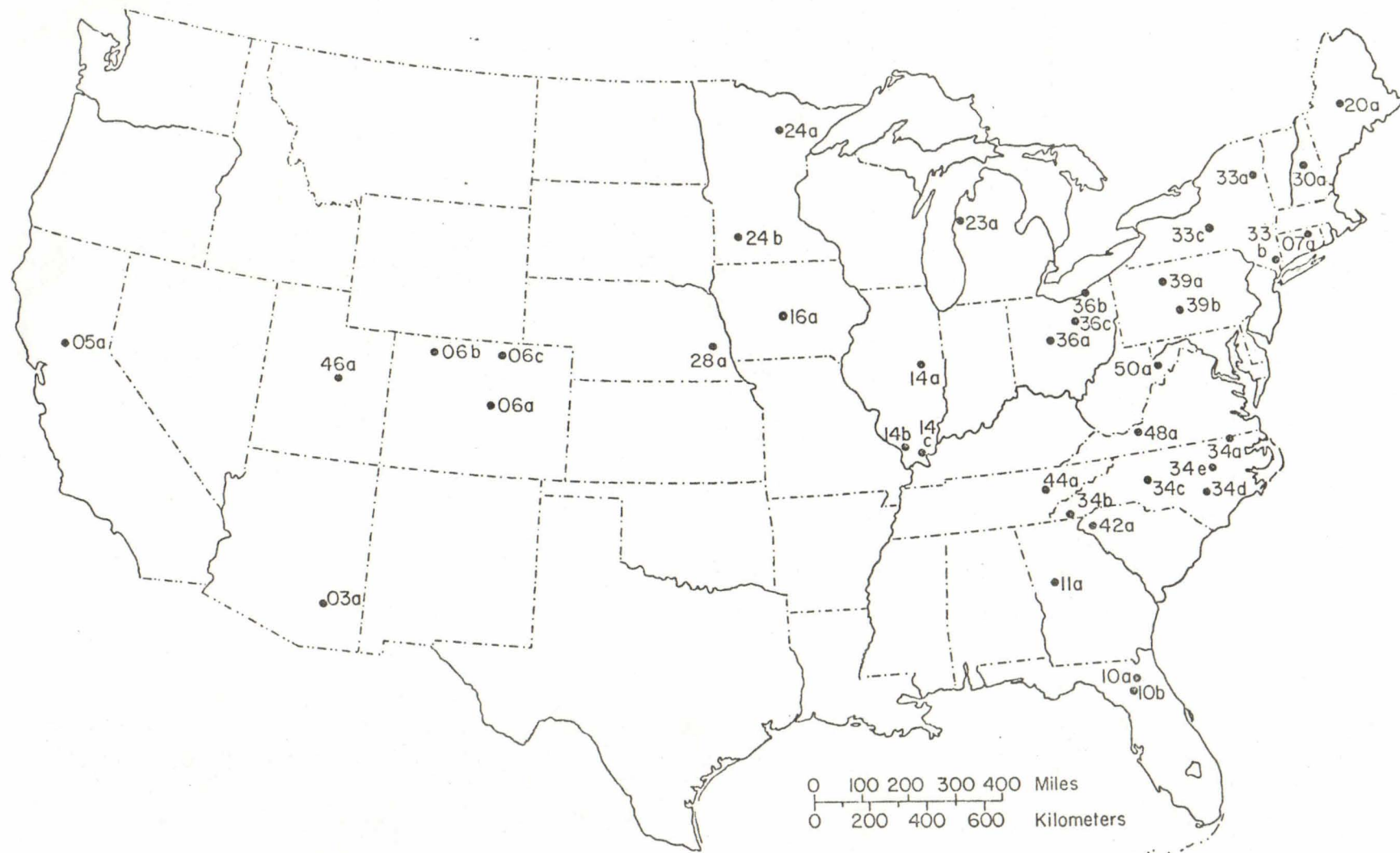
Nova Scotia Dept. of Environment

J. K. Underwood

*Members of Technical Committee.

Appendix III - 1978 Publications of the NADP (NC-141) Regional Project
on Atmospheric Deposition

- Harris, C. 1978. Overview Issue Analysis Paper: Acid Precipitation Problem. Unnumbered report to the Council on Environmental Quality, SEA-CR, USDA, Washington, D.C. 20250. 23 p.
- Heck, W. W., Heagle, A. S., and Cowling, E. B. 1978. Impact of air pollutants on soil, water, flora, fauna. Proceedings Soil Conservation Society of America 32:193-203.
- Galloway, J. N., and Cowling, E. B. 1978. The effects of precipitation on aquatic and terrestrial ecosystems--A proposed precipitation chemistry network. J. Air Pollut. Control Assoc. 28:229-235.
- Cowling, E. B., and Dochinger, L. S. 1978. The changing chemistry of precipitation and its effects on vegetation and materials. In R. L. Byers, D. W. Cooper, and W. Licht, eds. Control and Dispersion of Air Pollutants: Emphasis on NO_x and Particulate Emissions. Am. Inst. Chem. Eng. Symposium Series 74:134-142.
- Galloway, J. N., Cowling, E. B., Gorham, E., and McFee, W. W. 1978. A national program for assessing the problem of atmospheric deposition (acid rain). A Report to the President's Council on Environmental Quality, Washington, D.C. 152 p.



NATIONAL ATMOSPHERIC DEPOSITION PROJECT SITE LOCATION

Map #	Site Name	State	County	Agency	Code #	Individual	Latitude	Longitude
03a	Tombstone	Arizona	Cochise	Univ. of Arizona	030180	H. Bohn		
05a.	Davis Site	California	Yolo	U. of CA	058840	R.H. Burgy	38°32'	121°46'
06a.	Manitou	Colorado	Teller	Forest Service	062120	D.G. Fox	39°06'	105°05'
06b.	Sand Spring	Colorado	Moffat	USDI-BLM	061560	David Bray	40°30'	107°42'
06c.	Pawnee	Colorado	Weld	NREL-CSU	062220	J.H. Gibson	40°47'	104°45'
07a.	Coventry	Connecticut	Tolland	U. of Ct.	071155	D.R. Miller	41°47'	72°22'
10a.	Bradford Forest	Florida	Bradford	U. of Fl.	100360	W.H. Smith	29°58'	82°12'
10b.	Austin-Cary Forest	Florida	Alachua	U. of FL	100020	W.L. Pritchett	29°45'	82°15'
11a.	Georgia Station	Georgia	Pike	U. of GA Exp. Stn.	114140	J.T. Walker	33°11'	84°24'
14a.	Bondville	Illinois	Champaign	IL St. Water Survey	141160	G.J. Stensland	40°03'	88°22'
14b.	SIU	Illinois	Jackson	So. IL Univ.	143580	G.M. Aubertin	37°42'	89°16'
	Dixon Springs Ag. Ctr.	Illinois	Pope	U. of IL	146340	C.J. Kaiser	37°26'	88°40'
	DeKalb	Illinois	DeKalb	U. of IL	141800	R. Bell		
16a.	Ames	Iowa	Boone	Iowa State Univ.	160400	M.A. Tabatabai	42°02'	93°48'
20a.	Greenville Station	Maine	Piscataquis	U. of ME Exp. Stn.	200935	V. Thornton	45°29'	69°40'
23a.	Wellston	Michigan	Wexford	N. Central For. Exp. Stn.	235340	D.H. Urie	44°13'	85°51'
24a.	Marcell Exp. Forest	Minnesota	Itasca	N. Central For. Exp. Stn.	241660	E.S. Verry	47°30'	93°28'
24b.	Lamberton	Minnesota	Itasca	S.W. Exp. Station	242720	S.V. Krupa	44°15'	95°19'
28a.	Mead	Nebraska	Saunders	U. of NB Exp. Station	281520	S.B. Verma	41°09'	96°30'
30a.	Hubbard Brook	New Hampshire	Grafton	For. Serv. Exp. Stn.	300240	J. Hornbeck	43°57'	71°42'
33a.	Huntington Wildlife	New York	Essex	State U. of NY, Syracuse	332020	D.J. Raynal	44°00'	74°13'
33b.	Stillwell Lake	New York	Putnam	West Point Military Acad.	335640	Cpt. J.K. Robertson	41°21'	74°02'
33c.	Aurora	New York	Cayuga	Cornell - College of Agric.	330860	W.W. Knapp	42°44'	76°39'
34a.	Lewiston	N. Carolina	Bertie	NC Exp. Station	340320	R.D. Coltrain	36°08'	77°10'
34b.	Coweeta	N. Carolina	Macon	USDA-FS	342500	J.E. Douglass	35°03'	83°27'
34c.	Piedmont Research Stn.	N. Carolina	Rowan	NC Exp. Stn.	343460	C.Z. McSwain	35°40'	80°34'
34d.	Clinton Crops Res. Stn.	N. Carolina	Sampson	NC Exp. Station	343560	B.N. Ayscue	35°01'	78°17'
34e.	Finley (Raleigh)	N. Carolina	Wake	USDA-SEA	344160	A.S. Heagle	35°44'	78°41'
36a.	Delaware	Ohio	Delaware	USDA-FS	361760	L.S. Dochinger	40°17'	83°04'
36b.	Caldwell	Ohio	Noble	OH Agric. Res. & Dev. Ctr.	364900	T.C. Weidensaul	41°48'	81°31'
36c.	Wooster	Ohio	Wayne	OH Agric. Res. & Dev. Ctr.	367160	T.C. Weidensaul	40°46'	81°56'
39a.	Kane Exp. For.	Pennsylvania	Elk	Forest Service	392940	D.A. Marquis	41°33'	78°46'
39b	Leading Ridge	Pennsylvania	Huntingdon	Penn. State Univ.	394200	J.A. Lynch	40°39'	77°56'
	Clemson	S. Carolina	Pickens	Clemson University	421875	U.S. Jones	34°40'	82°50'
	Walker Branch Watershed	Tennessee	Roane	Oak Ridge	442880	S. E. Lindberg	35°58'	84°17'
46a	Cedar Mountain	Utah		BLM		W. W. Wagner		
48a.	Horton's Station	Virginia	Giles	VPI & SU Exp. Stn.	481300	J. Skelly	37°11'	80°25'
50a.	Parsons	W. Virginia	Tucker	NE For. Exp. Station	501860	J.H. Patric	39°06'	79°39'

May 23.19



NATIONAL ATMOSPHERIC DEPOSITION PROGRAM

A research program sponsored by the
Association of State Agricultural Experiment Stations
of the North Central Region • NC-141



N3615

M E M O R A N D U M

June 2, 1980

TO: NADP Site Operators

FROM: Mark E. Peden, CAL Laboratory Manager

The enclosed solution is for your participation in the Fourth NADP Intersite Comparison Study. Please determine the pH and specific conductance of this sample in the same manner that you normally measure your rain samples. Make certain that you withdraw no more than 70 mL for your determinations.

After you record your values on the bottle label along with your site name and number, tightly cap the bottle and return it to the CAL with your next bucket shipment. If you do not have enough solution for both measurements, make your conductance determination first. Also, be sure your values are temperature corrected to 25°C.

If you have any questions concerning our Fourth Intersite Comparison Study, please contact Mike Slater at 217/333-3936.

Mark E. Peden, Laboratory Manager
Central Analytical Laboratory
217/333-8325

MEP/ds

Enclosure

N. A. D. P

8/4/80

From: YAO BOWERSOCKS

SAMPLE WE RAN TEST ON
THERE AHS. PH 4.25 COND 25
OUR AHS PH 6.56 COND 22

SAYS COND. WAS GOOD
PH NOT SO GOOD

dist. H₂O 94

.001

Need. .0094

① rag to wipe table

② Chemical thermometer

.001
94
—
004
009
—
0094

9000
.001
—
9000

540
.01
—
0540

SITE SELECTION AND CERTIFICATION

NATIONAL ATMOSPHERIC DEPOSITION PROGRAM

A research program sponsored by the
Association of State Agricultural Experiment Stations
of the North Central Region • NC-141



Site Selection and Certification

1. INTRODUCTION

A change in the chemical composition of precipitation is a good indicator of changes in atmospheric composition since precipitation is a very good scavenging agent of many atmospheric substances (both solid and gaseous). The nutrient status, growth, and development of plants on land and in surface waters are influenced by the availability of beneficial nutrient elements and the deposition of injurious substances dispersed in the atmosphere. Similarly, the health and reproductive capacity of domestic and wild animals, and fish populations are influenced by atmospheric constituents.

Previously, it was believed that most nutrient elements essential for the growth of plants were obtained after release from decomposing organic matter, weathering of soil minerals, or addition as fertilizers. It is now recognized that substances deposited in precipitation, and as dry particulate matter and aerosols significantly augment the supply of both essential elements and potentially injurious substances.

Since the amount of substances dispersed in the atmosphere and deposited in precipitation, particulate matter, and aerosols is projected to increase, there is an increasing need for careful measurement of the amounts, nature, and biological effects of these substances. Such measurements are essential for responsible management of the agricultural, forest lands, and aquatic ecosystems of the United States and Canada. A total of approximately 40

precipitation collection sites are planned to be established in the U.S., primarily in the eastern two-thirds of the nation, to provide observational data for topical research on precipitation chemistry.

2. SITE SELECTION

The collection sites for the Network will be selected to give accurate and representative information concerning the temporal and spatial variation of precipitation and dry particulate deposition of important chemical constituents. The location of individual sites will be chosen to represent major physiographic regions and major agricultural, aquatic, and forested areas within each cooperating state and region. It is important that local sources not bias a sample by locating it next to a point or line source of contamination not representative of the region. However, if a region is typified by a certain type of agricultural land use or is in a heavily industrialized region, the sampler should be located within this region to provide representation of such extensive pollution sources.

The sampler should be sited to conform as nearly as possible with the following criteria:

1. No moving sources of pollution, such as routine air, ground, or water traffic shall be within 100 meters of the site.
2. No surface storage of agricultural products, fuels, or other foreign materials shall be within 100 meters of the site.
3. No continuous sources of pollution shall be within 50 kilometers in the direction of the mean wind direction for the site, and 30 kilometers in all other directions.
4. Sampler shall be installed over undisturbed land, preferably grass covered with no objects within 5 meters of the sampler.

5. No object shall project onto the sampler with an angle greater than 30° from the horizontal. Give particular attention to overhead wires.

It may not be possible to meet all of the above criteria at individual sites. The questionnaire which is described in the following paragraphs will clarify the degree of departure from the desired site requirements.

2.1 Site Description Questionnaire

A site Description Questionnaire covering the important points to consider for either selecting a new site or evaluating an existing one has been formulated and attached. The following paragraphs discuss each topic covered in the questionnaire. All measurements should be reported in the metric system and directions in degrees from north or 16 points of the compass. Throughout the questionnaire when a distance is requested the distance from the collector should be inserted. If additional space is needed for extended remarks concerning local problems, please attach additional pages. This form should be completed for each active or potential site and returned to the NC-141 Director as soon as possible.

2.1.1 A. Site Identification

The station name should be descriptive and unique. Numbers for each site will be assigned later. The elevation should be that of a specific object at the site. The needs for the requested information are obvious. The mailing address should be clear to facilitate information and data transfer between the project administration, central analytical laboratory, and the field observing participants.

2.1.2 B. Logistics

These questions are very important for the continued operation of a quality site. While not necessary, it is also desirable to provide a simple hand drawn map showing the relative location of the site to roadways and the nearest electricity transmission lines.

2.1.3 C. Equipment on Hand

The raingage is strongly recommended to provide concurrent measurement of precipitation. Specifically, the recording raingage allows the added feature of determining precipitation rates needed to interpret the deposition observations. Similarly, a wind recorder will allow correlation between observed precipitation chemistry and wind speed and direction. The pH and conductivity meters are essential for preliminary assessment of the sample chemical quality.

2.1.4 D. Background Data

The climatology of the area, as interpreted for the local site, will be useful to ascertain the regional representativeness of the location. As records are accumulated, the site climatology will be continuously updated and compared with nearby long-term records to detect anomalous behavior.

2.1.5 E. Topography

Careful evaluation of these items will determine the sampling quality of the site. The surface grade should be reported in percent positive upward and negative downward in various directions from the sampler site. If available, soil analyses close to the site will be useful to characterize the site environment. The description of physical objects in proximity to the site will permit evaluation of potential sample contamination for wind-blown precipitation.

2.1.6 F. Civilization

The questions are designed to differentiate between ground, air, and water moving sources. Stationary source locations are required to ascertain their potential influence on precipitation quality. Unusual or intermittent sources such as quarry operations, stockpiles of coal, farm wastes, and similar materials should be recognized as potential sources of contamination under high wind conditions.

3. GENERAL SITE REQUIREMENTS

The sites will be evaluated on the basis of available knowledge of wind trajectories, sources of substances in the atmosphere, prevalent forms of deposition, frequency of precipitation events (rain, snow, hail, and dust storms), and other meteorological and atmospheric processes that influence the deposition of substances in each state or region. Of critical importance at the local scale is the proximity of the collector to obstacles (disturbances to airflow around the collector opening) and consideration of land-development in future years. Since it is many times not possible to predict future land-use change, consideration should be given to alternate sites in the event that the original selection is no longer representative of the region. The collection stations should be sited, whenever possible, in the proximity to locations where research on either water resources, management, quality, or distribution is ongoing. Such judicious placement of collectors will allow additional use of the Network data by those with a direct need for the information.

3.1 Site Classification and Certification

Each site will be initially classified and certified as promptly as possible, based upon the information in the questionnaire and, if necessary, a site visit. A final certification will be made after a year or more of routine operation of each site.

Classification will be at four levels:

Class A

1. Required wet/dry collector and weighing rain gauge on site.
2. Acceptable pH and conductivity instruments on site.
3. All logistical, topographical and local source criteria are satisfactory.
4. Recording wind speed and direction instruments on site.

Class B

The same as Class A, but lacking wind instruments.

Class C

The same as Class A, but unsatisfactory (or uncertain) of logistical, topographical or local source criteria.

Class D

The same as Class A, but lacking wind instruments and also unsatisfactory (or uncertain) of logistical, topographical or local source criteria.

4. FIELD OBSERVER INSTRUCTIONS

A manual is provided for each observer to establish uniform procedures for sample handling and reporting. It is anticipated that revisions will be necessitated by field experience and will be issued periodically. The Instructions are prepared in such a way that numbered revisions can be easily inserted to keep the manual current at all times.

EXAMPLE

NC-141 SITE DESCRIPTION QUESTIONNAIRE

U. S. Dept. of Energy - Environmental Measurements Lab
Agency, Organization or Institution

A. SITE IDENTIFICATION

1. Station Chester 2. County Morris 3. State N.J.
4. Latitude 40 ° 47 ' , 5. Longitude 74 ° 40 ' , 6. Elevation 262 (m)
7. Name of Supervisory Official Dr. Herber L. Volchok
Alternate Mr. Donald Freeswick
8. Mailing Address 376 Hudson St., New York, NY 10014
(number -- street) (city -- state) (zip code)
9. Phone 212 / 620-3619, 3607 / 1660 -- 3619, 3607
(commercial) (FTS)
- =====

B. LOGISTICS

1. Is road access to proposed site in summer: X Good, Fair, Poor?
and winter: Good, X Fair, Poor?
2. Type of road surface? Dirt - gravel with tar filler
3. How far from the road will collector be sited? 90 (m)
4. How close can a vehicle approach the collector? 90 (m)
5. What electrical power is available on site? 120/240 (Volts) 200 (Amps)
If none, how soon will it be provided? N/A
(date)
6. Is there adequate security against vandalism, etc? X (Yes) (No)
7. Are there any special logistical problems? Please describe: None
- _____
- _____

C. EQUIPMENT ON HAND

1. Raingage: None _____ Recording X Non-Recording _____
Weighing X Tipping Bucket _____ Other _____
Opening 20.3 (cm) Manufacturer Belfort Model 5-780
Distance 2.4 (m)
2. Wind: None _____ Speed X Direction X Distance 15 (m)
Recording X Non-Recording _____ Manufacturer Weathermeasure
Model Skyvane II Height above ground 10 (m)
3. pH Meter: None _____ Manufacturer Orion Model 801
4. Conductivity Meter: None _____ Manufacturer Barnstead
Model PM-70CB
5. Available Lab Space: None _____ Good X Fair _____ Poor _____
Distance 60 (km)
6. Other related equipment (please list): Temperature, dewpoint, pressure,
nephelometry and various air pollutant sensors.
- =====

D. BACKGROUND DATA

1. Precipitation at the site:
Yes X Years 1½ yr Annual Precipitation 1308 mm
No _____ Nearest gage _____ (km) Years _____
Annual rain _____ (mm) Annual snow _____ (cm)
2. Wind at site: Yes X No _____ Years 1½ Distance to
(Please attach wind rose if available.) nearest measurement _____ (km)
3. If air quality or precipitation chemistry data available at or near the site,
please describe:
Air -- NO_x, SO_x, visibility, mass, solar radiation, ozone & radiation.
Precip - trace metals, major anions & cations, & radioactivity.

E. TOPOGRAPHY

1. Ground slope at site: Direction from sampler SE Amount +/- -12 %
2. Soil type: within 10 m of site ?, within 1 km ?
% Cultivated , % Orchard , % Lawn
% Pasture 100, % Forest , % Other
within 1/4 section containing site.

(Please attach standard soil analysis if available.)

3. Tall objects in area:

- A. Trees Oak, elm, maple, apple Max. Height 10 (m)
Species
Distance 80 (m) Direction S
- B. Buildings Trailer Height 3.5 (m)
Type
Use: Instrumentation Distance 10 Direction SE
- C. Other (eg overhead wires, masts, etc.)
 - (1) Object Meteor tower, Height 10 (m)
Direction N, Distance 8 (m)
 - (2) Object Telephone pole, Height 12 (m)
Direction SW, Distance 25 (m)
 - (3) Object , Height (m)
Direction , Distance (m)

F. CIVILIZATION

1. Large highways (expressways): Distance 8 (km, m) Route # 10
Direction from sampler NE.
2. Other paved roads: Distance 175 (km, m) Direction from sampler NW
traffic: Heavy _____, Medium _____, Light X.
3. Unpaved road: Distance 90 (km, m) Direction from sampler SE
traffic: Heavy _____, Medium _____, Light _____.
4. Parking lot: Distance 1 (km, m) Direction from sampler SW
Unpaved _____ Surface material Macadam Use: continuous X
intermittent _____ car volume 20 large truck volume 2
5. Lake/river or rail traffic: Distance ? (km, m) Direction from sampler _____
barge _____, lake steamer _____, ocean vessels _____, rail _____
traffic: Heavy _____, Medium _____, Light _____.
6. Airport(~~/~~): Distance 5 (km, m) Direction from sampler N
traffic: Heavy _____, Medium _____, Light X.
7. Stationary sources:
Power plant(s): Distance Not known (km) Direction from sampler _____ Fuel _____
Electrical capacity _____ (KW_e, MW_e)
Light industry: Distance _____ (km) Direction from sampler _____ Product _____
Heavy industry: Distance _____ (km) Direction from sampler _____ Product _____
8. Other sources: Significant agricultural operations: Distance _____ (km, m)
Direction from sampler _____ Other (please describe) Dairy farm

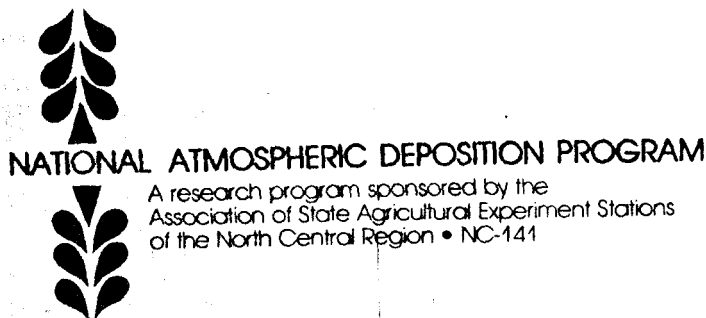
Distance 1.1 (km, m) Direction from sampler SW.

G. OTHER

It would be very useful for the Site Selection and Certification Subcommittee to have one or more of the following submitted with the questionnaire.

1. Topographic map, 1:24,000, revision year 1970 not available
2. Topographic map, 1:250,000, revision year not available
3. Aerial photograph, 1:1200, year not available
4. Photos of the site in the 8 directions.

The site and items noted in Section F should be indicated on the figures.



RECEIVED	
Organ Pipe Cactus, N. M.	
AUG 2 1980	
SUPERINTENDENT	
ADMINISTRATION	
CH. RANGER	
CH. MAINTENANCE	
CH. INTERPRETER	
RESOURCE MANAGER	
PARK TECH	
PARK TECH	
SUPT. SECRETARY	
FILE	

28 July 1980

MEMORANDUM

TO: NADP Site Operators

FROM: Van Bowersox/Kathy Eckstein *VB/KE*

SUBJECT: Raingage Inventory

In the past 12 months the network of NADP sites has doubled to a figure approaching 70 operating stations. So that an up-to-date inventory of raingage and wind instrumentations can be prepared, please complete the questionnaire below, and return it in the stamped and addressed envelope enclosed.

1. The Organ Pipe site is equipped with a
 (site name)
 Belfort (5-780) weighing-type raingage.

____ Yes, and this instrument is complete with an event marker to record the opening and closing of the Aerochem collector.

X Yes, but no event marker has been provided.

____ No, but precipitation is being measured with a

 (manufacturer)

 (model number)

____ No, and presently there is no operating raingage on site.

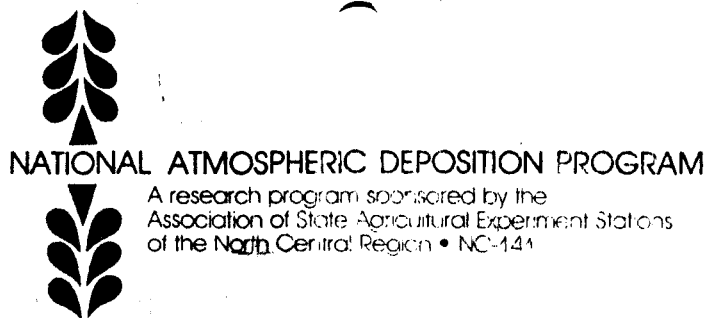
2. There are wind measuring instruments on site. Yes ____ No X

3. Comments (optional): OFFICIAL U.S. WEATHER
STATION WITHIN 200 YDS.

J. M. Logan 8/4/80
 (Signature) (Date)

Thank you for your cooperation.

Central Analytical Laboratory • Illinois State Water Survey • 605 E. Springfield • Champaign, Illinois 61820 •
 Director (217) 333-2213 Laboratory Manager (217) 333-8325



Returned
6-30-80
9

MEMORANDUM

TO: National Park Service Monitoring Sites

FROM: J. H. Gibson

DATE: June 17, 1980

RE: Equipment Serial Numbers

The contract between NPS and the NADP stipulates that upon final termination of such contractual arrangements, ownership of all equipment purchased for use at the NPS monitoring sites shall revert to the NPS, and we have been asked to provide a list of serial numbers for the equipment.

Only three pieces of the equipment provided to the sites have serial numbers. Please fill in the appropriate serial numbers as indicated below and return the form to us at your earliest convenience. If you have questions, please contact us.

Thank you for your cooperation.

Conductivity Meter - Serial # 77675

pH Meter - Serial # 0090398

Rain Gauge - Serial (Mfg's) # 9270

Site: ORGAN PIPE CACTUS N.M. 030620

By: MAX LOGAN

Date: 6-30-80
(Name)

2-Way Memo

Subject: Photos, Site Documentation
Organ Pipe

From: Dr. J. H. Gibson
Coordinator, NADP Program
Nat. Res. Ecol. Lab.
Colo. State Univ.
Fort Collins, Colo. 80523

DATE OF MESSAGE
4-24-80
DATE OF REPLY

INSTRUCTIONS
Use routing symbols whenever possible.
SENDER:
Forward original and one copy.
Conserve space.
RECEIVER:
Reply below the message, keep one copy, return one copy.

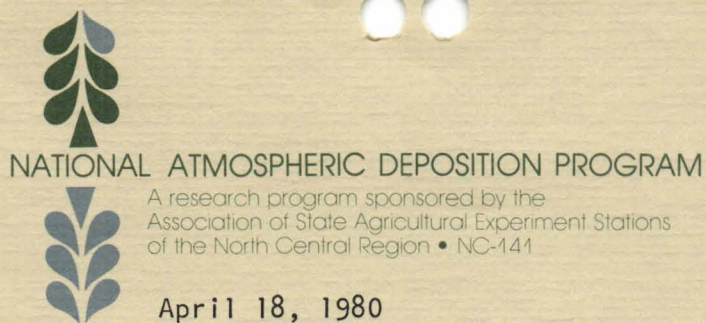
Enclosed find the 8 Photographs of the Organ Pipe NADP site. Photos are labeled on reverse.

We are anxious to find out what the problem was with the probe for the pH meter. We have received no rain, however, so nothing was lost as a result of the problem.

Best Regards

Terry
Peters

To: James T. Peters
Resources Management Spec.
Rt. 1 Box 100



April 18, 1980

Mr. Terry Peters
Superintendent's Office
Organ Pipe Cactus National Monument
Route 1, Box 100
Ajo, AZ 85321

Dear Terry:

The electrode was faulty and I am enclosing a replacement. This should be soaked overnight in the pH 4 or 7 buffer before attempting to set up the meter. If you have any questions give Dave Bigelow or me a call at 303 491-5571. I am sorry that this happened and that we could not complete the testing.

We enjoyed our trip to Organ Pipe and our sightseeing on Saturday. Everyone got back home on time. Look forward to seeing you in the future.

Sincerely,

A handwritten signature in dark ink, appearing to read "J. H. Gibson". The signature is written in a cursive, flowing style.

J. H. Gibson
Program Development Coordinator

JHG/lb

P.S. The clamp which you are also missing will be forwarded to you by Dave Bigelow in a few days.

Enclosure

N3615?

ORGAN PIPE CACTUS NATIONAL MONUMENT
ROUTE 1, BOX 100, AJO, AZ 85321

March 27, 1980

Dr. J. H. Gibson
Program Development Coordinator
National Atmospheric Deposition Program
Natural Resource Ecology Laboratory
Colorado State University
Fort Collins, Colorado 80523

Dear Mr. Gibson:

Enclosed find the NADP site questionnaire information for
the site proposed at Organ Pipe Cactus National Monument.

The photographs requested will be mailed at a later date.

Sincerely,

William F. Wallace
Superintendent

NC-1 SITE DESCRIPTION QUESTIONNAIRE

National Park Service, Organ Pipe Cactus Nat. Mon.
Agency, Organization or Institution

A. SITE IDENTIFICATION

1. Station _____ 2. County Pima 3. State Arizona
4. Latitude 31° 57' 5. Longitude 112° 47' 6. Elevation 510 (m)
7. ^{title} ~~Name~~ of Supervisory Official Superintendent, attn: Resource mgmt. spec.
Alternate _____
8. Mailing Address Rt. 1 Box 100 AJO Ariz. 85321
(number -- street) (city -- state) (zip code)
9. Phone 602/ 387-6849 1 N/A
(commercial) (FTS)

B. LOGISTICS

NOT generally limited by vehicle
1. Is road access to proposed site in summer: X Good, _____ Fair, _____ Poor?
winter: X Good, _____ Fair, _____ Poor?
2. Type of road surface? unsurfaced
3. How far from the road will collector be sited? est. 30 (m)
4. How close can a vehicle approach the collector? est. 30m. normally (m)
5. What electrical power is available on site? 110 (Volts) 30 (Amps)
If none, how soon will it be provided? _____ (date)
6. Is there adequate security against vandalism, etc? X (Yes) _____ (No)
7. Are there any special logistical problems? Please describe: Site is an area selected to be restored by controlling vehicular traffic. Access would normally be by foot, but could be reached by vehicle for special limited purposes.

C. EQUIPMENT ON HAND

1. Raingage: None _____ Recording _____ Non-Recording X
 Weighing _____ Tipping Bucket _____ Other _____
 Opening 20.32 (cm) Manufacturer U.S. VENT Model U.S. L.R. 1355
 Distance _____ (m)
2. Wind: None _____ Speed X Direction X Distance 36K(m)
 Recording _____ Non-Recording X Manufacturer _____
 Model _____ Height above ground 2.1 (m)
3. pH Meter: None X Manufacturer Beckman Model 3500
4. Conductivity Meter: None X Manufacturer Beckman
 Model BC-16C
5. Available Lab Space: None _____ Good _____ Fair X Poor _____
 Distance 536 (km)
6. Other related equipment (please list): NONE

D. BACKGROUND DATA

1. Precipitation at the site:
 Yes X Years 40 Annual Precipitation 2210.9 CM
 No _____ Nearest gage 536 (km) Years 40
 Annual rain 2210.9 mm Annual snow 0.00 (cm)
2. Wind at site: Yes X No _____ Years 40 Distance to
 nearest measurement 536 (km)
 (Please attach wind rose if available.) NOT AVAILABLE
3. If air quality or precipitation chemistry data available at or near the site,
 please describe:
AERO VIROMENT SFS-500 ON SITE SINCE
2/26/79
H1 VOLUME AIR SAMPLER 1 KM
FROM SITE GENERAL METAL WORKS
MODEL GMU2000 SINCE 1960

E. TOPOGRAPHY

1. Ground slope at site: Direction from sampler _____ Amount $\pm$ 7.3 %

2. Soil type: within 10 m of site Gravel, within 1 km Gravel

% Cultivated 0, % Orchard 0, % Lawn 0

% Pasture 0, % Forest 0, % Other 100% DEBRIS

within 1/4 section containing site.

(Please attach standard soil analysis if available.)

3. Tall objects in area:

A. Trees Acacia Species _____ Max. Height 6 (m)

Distance 50 (m) Direction W

B. Buildings None Type _____ Height _____ (m)

Use: _____ Distance _____ Direction _____

C. Other (eg overhead wires, masts, etc.)

(1) Object Overhead wires, Height 12.0 (m)

Direction W, Distance 50 (m)

(2) Object —, Height — (m)

Direction —, Distance — (m)

(3) Object —, Height — (m)

Direction —, Distance — (m)

F. CIVILIZATION

1. Large highways (expressways): Distance _____ (km, m) Route # N/A
Direction from sampler _____.
2. Other paved roads: Distance 1 (km, m) Direction from sampler east and west
traffic: Heavy _____, Medium _____, Light X.
3. Unpaved road: Distance N/A (km, m) Direction from sampler _____
traffic: Heavy _____, Medium _____, Light _____.
4. Parking lot: Distance 0.35 (km, m) Direction from sampler Heavy
Unpaved _____ Surface material Gravel Use: continuous X
intermittent _____ car volume Low large truck volume NONE
5. Lake/river or rail traffic: Distance 12.87 (km, m) Direction from sampler S
barge NONE, lake steamer _____, ocean vessels _____, rail 40.23 km NW
traffic: Heavy _____, Medium _____, Light X.
6. Airport(s): Distance 8.046 (km, m) Direction from sampler S
traffic: Heavy _____, Medium _____, Light X.
7. Stationary sources:
Power plant(s): Distance _____ (km) Direction from sampler _____ Fuel _____
Electrical capacity _____ (KW_e, MW_e)
Light industry: Distance 1 km (km) Direction from sampler _____ Product _____
Heavy industry: Distance NONE (km) Direction from sampler _____ Product STAINLESS
8. Other sources: Significant agricultural operations: Distance 8.046 (km, m)
Direction from sampler S Other (please describe) COPPER MINE,
MILL and Smelter
Distance 40.23 (km, m) Direction from sampler NW.

G. OTHER

It would be very useful for the Site Selection and Certification Subcommittee to have one or more of the following submitted with the questionnaire.

1. Topographic map, 1:24,000, revision year _____ not available ✓
2. Topographic map, 1:250,000, revision year _____ not available 1:62,000 only
3. Aerial photograph, 1:1200, year _____ not available ✓
4. Photos of the site in the 8 directions.

The site and items noted in Section F should be indicated on the figures.

Included —

	Average Maximum		Average Minimum		Avg. Days 38° C (100° F) & Over	Avg. Days 47° C (115° F) & Over	Average Rainfall in. cm.	51 best Temp. Recorded	100 best Temp. Recorded		
JANUARY	57	19	38	2	0	7	.66 1.67	89	32	14	-10*
FEBRUARY	71	23	40	4	0	1	.44 1.21	90	36	7	-5
MARCH	75	24	40	4	0	1	.54 1.43	90	37	15	-1
APRIL	83	25	49	9	0	4	.27 .50	103	39	32	2
MAY	91	33	53	12	0	7	.13 .32	116	47	37	-1
JUNE	100	37	54	16	1	7	.13 .26	116	46	37	1
JULY	103	39	74	23	25	7	1.29 2.25	116	47**	50	11
AUGUST	101	35	72	22	21	4	1.50 3.91	114	46	38	7
SEPTEMBER	99	37	66	19	12	7	1.29 3.40	111	45	46	0
OCTOBER	89	32	56	13	2	6	.85 2.13	105	41	34	1
NOVEMBER	77	25	45	7	0	1	.73 1.95	93	34	25	-4
DECEMBER	65	21	36	3	0	5	1.07 2.71	92	33	18	-9

* Lowest Temperature was recorded in 1962.

** Highest Temperature was recorded in 1958.

Greatest 24 hour snowfall: 2.54 cm. (1 in) on December 8, 1960.

Average yearly rainfall: 22.09 cm (8.70").

" " Snowfall: 0

80
39.
41

SINCE 39

RECORDED 22.77



United States Department of the Interior

NATIONAL PARK SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:

N3615 (492)

NOV 26 1979

*Janet
NLS
start new
file for
NADP
Program*

RECEIVED	
Organ Pipe Cactus, N. M.	
NOV 29 1979	
1	SUPERINTEND
2	ADMINISTRATION
3	CH. RANGER
4	CH. MAINTENANCE
	CH. INTERPRE
	RESOURCE
	PARK TECH
	PARK TECH
	SUPT. SECRETARY

Memorandum

To: All Regional Chief Scientists

From: Chief, Air and Water Resources Division

Subject: National Atmospheric Deposition Program (NADP)

This memo will update our progress, follow-up on your requests, on our discussions, and on Dr. Sudia's memo of May 18, 1979. We were successful in developing an agreement (copy enclosed) with the National Atmospheric Deposition Program for installation during 1980 of 12 wet fall-dry monitors in National Park Service biosphere reserve areas as a part of the national network. This program will support local initiatives and be a pilot study for implementation of the long term atmospheric monitoring program to support NPS management of park resources.

The NADP agreement provides a focus to our efforts and provides the suggested vehicle for developing long term atmospheric monitoring as a resources management tool. Present efforts by this office are aimed at assisting those areas that have a high priority need for addition to the network in FY 80-81. Your assistance is required.

The long term benefits of the NADP-NPS cooperative effort do not need to be restated. If I can further assist your participation in this program give me a call.

Enclosure

bcc:

Everglades Nat'l Park - Superintendent John M. Good
Peter Rosendahl

Big Bend Nat'l Park - Superintendent Robert Haraden
Mike Warren

Glacier Nat'l Park - Superintendent Phillip Iversen
Cliff Martinka

Great Smoky Mount.
Nat'l Park - Superintendent Boyd Evison
Gary Larson

Olympic Nat'l Park - Superintendent James Coleman
Bruce Moorehead

Organ Pipe Nat'l Mon. - Superintendent Ray Martinez
Terry Peters

Mount McKinley Nat'l
Park - Superintendent Frank Betts
John Dollywolly

Virgin Islands Nat'l
Park - Supt. Joe Miller
Jim Riddle

Yellowstone Nat'l Park Supt. John A. Townsley
Margaret M. Megher

* Sequoia & Kings
Canyon Nat'l Park - Supt. David D. Thompson, Jr.
Larry Bancroft

Jim Larson - Alaska Area Office

Phil Wondra)
Don Henderson) Air Quality Team, Denver Service Center
Jim Littlejohn)

Larry May - Env. Investigations, Denver Service Center

Keith Yarborough - Southwest Regional Office

Dave Stevens - Rocky Mountain Region

Bob Spottlemeyer - Michigan Tech. Univ.

CONTRACT NO. CX-0001-9-0034

CONTRACT BETWEEN
THE NATIONAL PARK SERVICE
AND
COLORADO STATE UNIVERSITY

THIS CONTRACT entered into this 14th day of September 1979, by the United States of America, hereinafter called the "Government", acting by and through the Contract Specialist, General Services Division, National Park Service, Washington, D.C. 20240, hereinafter called the "Contracting Officer", party of the first part, and Colorado State University, Fort Collins, Colorado 80523, hereinafter called the "Contractor", party of the second part. Be it herewith understood that this Contract shall be binding and effective when signed by all parties.

Dr. Raymond Herrmann, Chief, Air & Water Resources Division, National Park Service, Washington, D.C. 20240, is designated as the Contracting Officer's Technical Representative (COTR) for this Contract.

WITNESSETH: That the parties hereto do mutually agree as follows:

ARTICLE I - SCOPE OF WORK

For the consideration to be paid by the Government as hereinafter set forth, the Contractor shall establish, through the National Atmospheric Deposition Program, an atmospheric deposition monitoring network in 12 Biosphere Reserve sites administered by the National Park Service. All work under this Contract shall be in accordance with the general guidance provided by Appendices A and B hereto. In order to establish this network, the Contractor shall:

- A. Work closely with National Park Service personnel to select suitable sites for the monitoring stations. Final decision on suitable sites shall rest with the Contracting Officer's Technical Representative.
- B. Develop site descriptions for each site.
- C. Provide the sampler equipment and installation of such equipment at each site.

- D. Provide the necessary laboratory equipment and supplies required at each site.
- E. Train National Park Service personnel to collect the samples and to carry out the required on-site analyses.
- F. Provide chemical analysis for no more than 30 samples from 12 sites.

ARTICLE II - EQUIPMENT

At the termination of this Contract, title to all equipment acquired for specific use under this Contract shall revert to the National Park Service. A detailed equipment list, including descriptions, identifying serial numbers, etc., acquisition cost, estimated useful life, location, etc., shall be maintained by the Contractor and turned over to the National Park Service at the termination of this Contract.

ARTICLE III - THE GOVERNMENT AGREES

To pay a fixed price of \$95,992.00 for work under the provisions of this Contract. Partial payments may be made as follows:

A. On or about December 14, 1979	\$23,998.00
B. On or about March 14, 1980	23,998.00
C. On or about June 14, 1980	23,998.00
D. On or about September 14, 1980	<u>23,998.00</u>
Total	<u>\$95,992.00</u>

Invoices shall be submitted in quadruplicate to the Contracting Officer's Representative, who will certify that the work has been received and payment is justified. Upon certification the invoices will be forwarded to the Contracting Officer for further processing.

ARTICLE IV - TERM OF CONTRACT

This Contract shall be in force and effect from September 14, 1979, through September 13, 1980.

ARTICLE V - SPECIAL AND GENERAL PROVISIONS

It is mutually understood and agreed that this Contract is subject to the Special and General Provisions attached hereto and incorporated herein by this reference and made a part hereof.

IN WITNESS THEREOF, the Government and Contractor have caused this Contract to be signed, intending to be legally bound thereby.

COLORADO STATE UNIVERSITY

BY: Bl James F. Brown

TITLE: Assistant Vice President
for Research

UNITED STATES OF AMERICA

(Sgd) Michael J. Sullivan

Michael J. Sullivan
Contract Specialist
(Contracting Officer)
National Park Service

THE CHANGING CHEMISTRY OF ATMOSPHERIC DEPOSITION AND ITS
EFFECTS ON AGRICULTURAL AND FOREST LANDS AND SURFACE WATERS IN
THE UNITED STATES

Ellis B. Cowling
Chairman of Technical Committee

James H. Gibson
Program Development Coordinator

Background

The nutrient status, growth, and development of terrestrial and aquatic plants are influenced by the abundance of beneficial nutrient elements and injurious substances dispersed into the atmosphere and subsequently deposited on the land and in the surface waters. Similarly, the health and reproductive capacity of wildlife and fish are influenced by the transfer of substances from the atmosphere to the biosphere of the earth. These influences may be by direct exposure or through the food chain.

Earlier, it was believed that most nutrient elements essential for the growth of plants were obtained after release from decomposing organic matter, weathering of soil minerals, or addition as fertilizers. Now it is recognized that substances deposited as precipitation, dry particulate matter, aerosols, and gases significantly augment the supply of both beneficial elements and injurious substances. Natural sources of airborne matter include biogenic particles such as spores and pollen; salt spray from oceans and large lakes; dust particles resulting from wind erosion of soil, volcanic eruptions, and cosmic sources; and nitrogenous and sulfurous gases from decomposing organic matter.

In recent decades human activities have greatly increased both the abundance of substances dispersed in the atmosphere and their impact on the biosphere of the earth. These changes have resulted mainly from increases in 1) combustion of fossil fuels in power production, space heating, and transportation; 2) emissions of dusts, aerosols, and gases from industrial and land-management activities; 3) use of fertilizers and other chemicals in intensive agriculture and forestry; and 4) decomposition and combustion of industrial, urban, and agricultural wastes.

Previously it was believed that most of these substances were removed from the atmosphere near the site of emission. Now we know that atmospheric processes can lead to extensive mixing accompanied by chemical and physical interactions leading to transformations of atmospheric particles, aerosols, and gases. Furthermore, these substances and their reaction products are dispersed by meteorological processes and finally are deposited in fields of deposition that extend hundreds and even thousands of kilometers from the source of emission. Thus, the chemical composition of atmospheric deposition within a given state or region is a function of all the airborne substances which are dispersed, mixed, transformed, and transported through atmospheric processes and deposited on the agricultural and forest land and surface waters within that region. Projected increases in the use of coal as a primary source of energy in the United States will add still further to the total atmospheric burden in many states.

Knowledge as to the ultimate short term and long term consequences of the large quantities of substances introduced into the atmosphere by the burning of fossil fuels is extremely limited. Studies in the U.S. and Europe, particularly Sweden have demonstrated the significant degradation of aquatic ecosystems as a result of the increased acidity of rainfall. As a response to the critical need to understand the impact of atmospheric deposition, the North Central region of the State Agricultural Experiment Stations established a program (NC-141) to conduct research on the effects on agricultural and forest lands and surface waters. The specific objectives of this project include the following:

- 1) Establishing a national atmospheric deposition network to determine spatial and temporal trends in the supply of beneficial nutrient elements and injurious substances in precipitation and dry particulate matter in various regions of the United States;
- 2) Determining the relative importance and contribution of precipitation, dry particulate matter, aerosols, and gases to the total atmospheric deposition in various states and regions; and
- 3) Coordinating research on the effects of changes in atmospheric deposition on: a) the productivity of agricultural crops, forests, range lands, wet lands, and surface waters; b) the health and productivity of domestic food animals, wildlife and fish; and c) corrosion of metals, painted surfaces, masonry, and materials in machinery or structures.

National Atmospheric Deposition Program

This program known as the National Atmospheric Deposition Program (NADP) consists of an interdisciplinary team of about 100 research scientists and an initial planned network of 75-100 collection sites throughout the U.S. The attached map indicates presently operating sites (numbered plots) and sites planned to be operational in 1979 (X). The participating institutions and agencies include 21 State Agricultural Experiment Stations (SAES), 4 U.S. Forest Service Experiment Stations, The Illinois State Water Survey and 7 other state or private research organizations and universities in the United States and Canada. In addition, the following agencies are contributing personnel and/or financial support to the Project: the Agricultural Research (SEA/AR), the U.S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), the Department of Energy (DOE), the Environmental Protection Agency (EPA), the Tennessee Valley Authority (TVA), the National Aeronautics and Space Administration (NASA), the Canadian Atmospheric Environment Service (CASES), the Sulfate Regional Experiment (SURE) of the Electric Power Research Institute (EPRI), and the Multistate Atmospheric Power Production Pollution Study (MAP3S) of DOE. The Cooperative State Research Service of the USDA is coordinating the development of interagency relationships and resources for research in the field of atmospheric deposition.

Monitoring Network

The map shows the states and regions in which collection sites were established as of April 1, 1979 to implement objective 1). All collection sites have been selected to give accurate and representative information

concerning spatial and temporal variations in the chemistry of precipitation and dry particulate matter within the major physiographic regions of each participating state and region.

Each site is equipped with an identical collector of the wet/dry deposition type (Aerochem Metrics Model 301, Miami, Florida) a recording rain gauge, and pH and conductivity meters. Samples of precipitation and dry particulate matter are collected at each site on a regular weekly basis and shipped to the Central Analytical Laboratory for analysis.

Analyses and Analytical Services

During the first phase of Network operation, analyses will be made for the following elements, ions, or other properties of each sample: SO_4^{2-} , NO_3^- , PO_4^{3-} , Cl^- , NH_4^+ , K^+ , Na^+ , Ca^{++} , Mg^{++} , pH, total and free acidity or alkalinity, and electrical conductivity. Later certain additional elements will be added including F, Br, Mn, Zn, Cu, Fe, Mo, B, Pb, Hg, I, Ni, Cd, V, and other elements, various pesticides, asbestiform fibers, and radioactive materials.

To insure that the network data are of such high quality that they provide maximum credibility for a wide variety of fundamental research and mission oriented purposes, a Quality Assurance Committee of impartial experts is critically overseeing the selection and operation of each collection site, as well as the operation of the Central Analytical Laboratory (Illinois State Water Survey). The U.S. Geological Survey (USGS) with the cooperation of the Environmental Protection Agency (EPA) and the Department of Energy (DOE) laboratories has agreed to conduct an extensive quality assurance program to meet criteria established by the Quality Assurance Committee.

Availability of Data

Data obtained by the Network is provided to all participating agencies. Any portion or all of the data will be provided upon request for any purpose of analysis and interpretation by personnel of any agency, public or private, which may wish to use the data. A highly flexible computerized print-out system will provide the data in maximally useful forms. This will be achieved by providing various types of sums, averages, correlations, time-course plots and spatial variation plots. A hard-copy of trends in the amount of each element of ion deposited at each collection site will be produced at least every 3 months. Tabular data should be available early 1979 and the data management systems should be functional in mid to late 1979. A proposal has been received from EPA to develop and support a data system to serve NADP and other atmospheric monitoring programs.

Financial Support

Funds for the coordination of the Project as a whole have been provided by the North Central Regional Association of Directors, the Cooperative State Research Service, the U.S. Geological Survey, the U.S. Forest Service, and the Agricultural Research. The costs of establishment and operation of each collection site and analyses of precipitation and dry particulate matter are borne by each Experiment Station or institution participating in the Project. (See following Budget estimate).

The cost of research on the effects of atmospheric deposition on plants, soils, wildlife and fish are borne by various granting agencies and the Experiment Stations and other agencies affiliated with the Project.

Organization

The Regional Project is governed by a Technical Committee including representatives from each participating institution or agency. The project is operated by an Executive Committee under the authority of the Technical Committee. Five subcommittees have been organized to provide technical direction for each of the programs major phases. Program organization and a listing of Sub-Committee Chairman and Executive Committee membership is attached.

Any person or agency wishing to participate in this Regional Project should contact the Project Development Coordinator (J. H. Gibson) or any member of the Executive Committee.

BUDGET FOR ESTABLISHING AND OPERATING MONITORING SITE

A frequently asked question is the cost for establishing and operating a monitoring site. Exact figures for a given site depend on location, available personnel and available equipment. The following figures are presented to help in estimating the initial and recurring expenses that may be incurred. It is assumed that the available site has 110 volt power, personnel to collect samples weekly, and no unusual problems in locating the sampler. The cost of certain items may vary depending on the manufacture selected.

Initial Costs

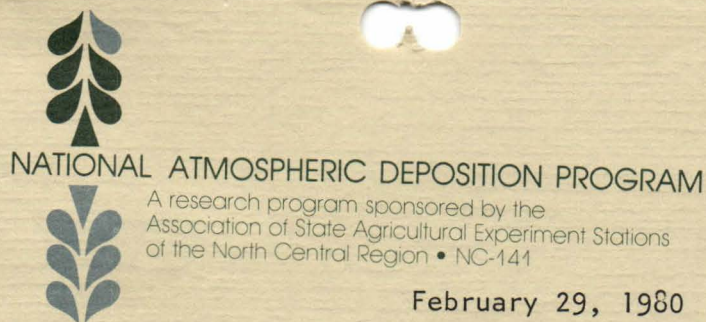
*Aerochem Metrics Model 301 Collector (including estimated postage)	\$1,500
Belfort recording rain gauge	\$ 500
pH meter	\$300-400
Conductivity meter	\$300-400

Recurring Costs

Chemical analysis (58 samples x \$58.50) ^{**}	\$ 3,400
Postage (estimate)	\$ 240

*Required manufacture and model

**Cost for period of July 1, 1978 to June 30, 1979



RECEIVED	
Organ Pipe Cactus, N. M.	
MAR 12 1980	
1	SUPERINTENDENT
	ADMINISTRATION
	CH. RANGER
	CH. MAINTENANCE
	CH. INTERPRETER
	RESOURCE MANAGEMENT
	PARK TECH
	PARK TECH
	SUPT. SECRETARY
	FILE

Terry Peters
Organ Pipe Cactus National Monument
Route 1, Box 100
Ajo, AZ 85321

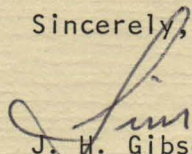
Dear Terry:

As we discussed earlier, I am planning to install the sampling station in Big Bend National Park and also Organ Pipe Cactus National Monument in early April. It is my understanding that the delivery date for the samplers is firm. Actually, the two samplers to be delivered as of the 1st of March have arrived. Therefore, I would like to suggest the following plan. There would be four individuals visiting both Big Bend and Organ Pipe Cactus National Monument. These would be Van Bowersox from the Illinois State Water Survey, Rick Linthurst from North Carolina State University, Dave Bigelow from Colorado State University and myself. As I believe I discussed with you earlier, we wish to have the four of us involved in the establishment of these first sites in order to enable us to exchange ideas on how to proceed with other sites in the future. This will provide us with expertise on the east coast, the midwest and the west, which, in the future, can be also used for trouble shooting at sites other than the National Park Service. In addition, these individuals will be responsible for the installation in the other National Park sites.

It is our plan to arrive at Big Bend National Park on Monday, the 7th of April. We would plan to spend two days installing the equipment and training site personnel. We would then plan to arrive in Organ Pipe Cactus National Monument Friday the 11th, and spend two days at that site. At the time we arrive you should have already received the sampler. I will plan to drive from Fort Collins and bring the other equipment with me. If there are any problems with this schedule, please let me know as soon as possible. I will be out of town for the next several weeks, but you can leave word by calling my secretary, Linda Bandhauer. If there are any questions, she will have me get in touch with you.

I look forward to seeing you next month.

Sincerely,


J. H. Gibson
Program Coordinator

JHG/1b

xc Dave Bigelow
Van Bowersox
Rick Linthurst
Ray Herrmann



NATIONAL ATMOSPHERIC DEPOSITION PROGRAM

A research program sponsored by the
Association of State Agricultural Experiment Stations
of the North Central Region • NC-141

RECEIVED	
Organ Pipe Cactus, N. M.	
JAN 30 1980	
1	SUPERINTENDENT
	ADMINISTRATION
	CH. RANGER
	CH. MAINTENANCE
	CH. INTERPRETATION
2	RESOURCE MANAGEMENT
	PARK TECH
	PARK TECH
	SUPT. SECRETARY
	FILE

MEMORANDUM

TO: ROCKY MOUNTAIN NATIONAL PARK - DAVE STEVENS
EVERGLADES NATIONAL PARK - PETER ROSENDAHL
BIG BEND NATIONAL PARK - MIKE WARREN
ORGAN PIPE CACTUS NATIONAL MONUMENT - TERRY PETERS
GREAT SMOKY MOUNTAIN NATIONAL PARK - GARY LARSON
OLYMPIC NATIONAL PARK - BRUCE MOOREHEAD
SEQUOIA KING'S CANYON NATIONAL PARK - LARRY BANCROFT
ISLE ROYALE NATIONAL PARK - ROBERT STOTTEMEYER
GLACIER NATIONAL PARK - ROBERT HALL

FROM: J. H. GIBSON, PROGRAM DEVELOPMENT COORDINATOR

DATE: JANUARY 18, 1980

RE: ESTABLISHMENT OF NADP MONITORING SITES

This memo is a followup to a recent phone conversation in which we discussed the schedule for establishment of an NADP monitoring network site at your National Park or Monument. I have enclosed a package of information describing the National Atmospheric Deposition Program. You may have received some or all of this material previously from Ray Herrmann. However, some may be updated and more recent. I have also attached a copy of a recent shipment schedule which I sent to Mr. Wallace Weber of Aerochem Metrics. If you find any mistakes in the address to which your sampler is to be sent, please notify me immediately, and I will have it corrected. You will also note the shipping date which I have requested. I would hope to be able to schedule the installation of the equipment at your site within approximately 2 weeks after this projected arrival date. If I receive information from Aerochem Metrics that they cannot ship the sampler in time to meet this date, I will be in touch with you. Otherwise, I will be contacting you about the time that you should be receiving the sampler to set up a schedule to visit your Park.

I am planning that there will be three individuals to work with me in establishing these sites. These will be Dave Bigelow, Colorado State University; Van Bowersox, Illinois State Water Survey; and Rick Linthurst, North Carolina State University. We will plan to install the equipment at Big Bend and Organ Pipe Cactus National Monument sometime in early April. If our experience at these first two sites does not indicate any problems in the procedures that we are using, we will ~~schedule~~ schedule the installations at the rest of the parks as soon as possible.

Memorandum to cited National Parks and Monuments
January 18, 1980
Page 2

As I have indicated, we will supply all of the necessary equipment. This will include a sampler, a recording rain gauge, pH meter, a conductivity meter, and a balance with which to weigh each sample. The sampler will be sent directly to the site. The rest of the equipment will either be mailed to you or brought at the time that we visit the site. You should plan on having considered the following prior to our visit:

1. The Site Location. This should be in a relatively undisturbed area with respect to automotive traffic and visitors. 110V power should be available. Power could be temporarily furnished by the use of an outdoor-quality extension cord if a permanent power line is not installed at the time. You should plan to furnish such a cord if necessary. It would be helpful if you could fill in the information on the Site Selection Questionnaire and furnish us with a map of the area indicating your site location. If possible, I would appreciate receiving this information prior to our visit.
2. Space to Carry Out Laboratory Measurements. You will need an area with 5 or 6 feet of bench or table space to place the pH meter, balance and conductivity meters. It is preferable if this is adjacent to a sink where laboratory ware can be rinsed out and solutions disposed of.
3. Prior to the time that we will be visiting the site, I will have the Central Analytical Laboratory furnish you with extra sampling buckets and mailing containers. Unless you inform me otherwise, I will have these sent to the same address to which the samplers are being mailed. You will be receiving new buckets and mailing containers on a continuous basis as you return your samples to the Central Laboratory.

If you have any additional questions, or I can be of any help in your planning, please do not hesitate to contact me. We look forward to working with you in the near future.

JHG:1b

Enclosures

XC: Dave Bigelow
Van Bowersox
Rick Linthurst
Ray Herrmann
Wallace Weber
Gary Stensland
Keith Yarborough

ADDRESSES AND DATES OF ARRIVAL FOR
SAMPLERS ORDERED BY COLORADO STATE UNIVERSITY
OCTOBER 30, 1979, P.O. No. 42348

<u>SAMPLER NO.</u>	<u>REQUIRED ARRIVAL DATE</u>	<u>SHIPPING ADDRESS</u>
1	3/1/80	Colorado State University Central Receiving Fort Collins, CO 80523 Attention: J. H. Gibson (for Rocky Mountain National Park) ¹ Phone: 303 491 5571
2	3/1/80	U. S. National Park Service South Florida Research Center Everglades National Park Homestead, FL 33030 Attention: Peter Rosendahl Phone: 305 247 6211
3	3/17/80	Big Bend National Park Big Bend, TX 79834 Attention: Mike Warren, Superintendent's Office Phone: 915 477 2251
4	3/17/80	Superintendent's Office Organ Pipe Cactus National Monument Route 1, Box 100 Ajo, AZ 85321 Attention: Terry Peters Phone: 602 387 6849
5	3/17/80	Great Smoky Mountain National Park Warehouse Gatlinburg, TN 97738 Attention: Gary Larson Phone: 615 436 7120
6	4/14/80	Procurement Officer Olympic National Park 600 Park Avenue Port Angeles, WA 98362 Attention: Bruce Moorehead Phone: 206 452 8153

<u>SAMPLER NO.</u>	<u>REQUIRED ARRIVAL DATE</u>	<u>SHIPPING ADDRESS</u>
7	4/14/80	Resources Management Sequoia King's Canyon National Park Three Rivers, CA 93271 Attention: Larry Bancroft Phone: 209 565 3341
8	5/12/80	Isle Royale National Park Houghton, MI 49931 Attention: Robert Stottlemeyer Phone: 908 487 2478
9	5/12/80	Glacier National Park West Glacier, MT 59936 Attention: Robert Hall Phone: 406 888 5441
10	Will send date later ²	Mt. McKinley National Park (will send address later)
11	" " " " ²	Yellowstone National Park
12	" " " " ²	Virgin Islands National Park

¹Contact for Rocky Mountain National Park is - Dave Stevens
Headquarters
Rocky Mountain National Park
Estes Park, CO 80517
Phone: 303 586 2371

²Samplers 10, 11, and 12 will go to the indicated National Parks; however, arrangements for shipping and installation have not yet been made. Therefore, these samplers would not be required before May 1st. Shipping information will be sent to you as soon as it is available.