



Hubbard Brook Experimental Forest, 2015 (Photo by: Mariel Carr) Attribution: Science History Institute [CC BY-SA 3.0 (<https://creativecommons.org/licenses/by-sa/3.0/>)], via Wikimedia Commons.

## 2018 Scientific Symposium and Fall Meeting

*40 Years of Monitoring Atmospheric Deposition:  
Historical Legacy and Looking Ahead to the Future*

November 5 – 9, 2018  
Albany, NY



National Atmospheric  
Deposition Program



*NADP Proceedings 2018-2019*

**NADP 2018  
Technical Committee Meeting**

November 5 – 9, 2018  
Albany, New York

**Scientific Symposium Chair**  
Dr. Doug Burns  
U.S. Geological Survey

**PROCEEDINGS**

## Conference Schedule

### ***Monday, November 5, 2018***

Registration	9:00 AM – 5:00 PM
TDEP Subcommittee meeting	1:00 PM – 5:00 PM
AMSC (Aeroallergen Monitoring Science Committee)	1:00 PM – 3:00 PM
Break	3:00 PM
CLAD Working Group	3:00 PM – 5:00 PM

### ***Tuesday, November 6, 2018***

Registration	7:30 AM – 6:00 PM
Continental Breakfast	7:30 AM – 8:30 AM
Joint Subcommittee Meeting	8:30 AM – 10:00 AM
Break	10:00 AM
NOS/CLAD/EROS Subcommittee Meetings	10:00 AM – 12:00 PM
Lunch (on your own)	12:00 PM – 1:30 PM
Joint Subcommittee Meeting	1:30 PM – 2:30 PM
Break	2:30 PM – 3:00 PM
Executive Committee Meeting	3:00 PM – 6:00 PM

### ***Wednesday, November 7, 2018***

Registration	7:30 AM – 5:15 PM
Continental Breakfast	7:30 AM – 8:00 AM
Welcome, Introductions and Overview	8:00 AM – 8:30 AM
Annual State of the NADP Report	8:30 AM – 9:00 AM
Keynote Address – Gene Likens, PhD	9:00 AM – 10:00 AM
Break	10:00 AM – 10:20 AM
<b>Session #1 (6 speakers) Atmospheric Deposition – Spatial and Temporal Patterns</b>	10:20 AM – 12:20 PM
Lunch (on your own)	12:20 PM – 1:35 PM
<b>Session #2 (5 speakers) Urban Deposition and Critical Loads</b>	1:35 PM – 3:15 PM
Break	3:15 PM – 3:35 PM
<b>Session #3 (5 speakers) Atmospheric Mercury Deposition</b>	3:35 PM – 5:15 PM
Break	5:15 PM – 6:30 PM
Poster Reception (Hudson Ballroom)	6:30 PM – 8:30 PM

### ***Thursday, November 8, 2018***

Registration	7:30 AM – 4:30 PM
Continental Breakfast	7:30 AM – 8:00 AM
Opening Remarks, Announcements and Overview	8:00 AM – 8:10 AM
<b>Session #4 (5 speakers) Mercury in Ecosystems</b>	8:10 AM – 9:50 AM
Break	9:50 AM – 10:10 AM
<b>Session #5 – Part 1 (6 speakers) Ecosystem Effects, Recovery and the Future</b>	10:10 AM – 12:10 PM
Lunch (on your own)	12:10 PM – 1:30 PM
<b>Session #5 – Part 2 (2 speakers) Ecosystem Effects, Recovery and the Future</b>	1:30 PM – 3:10 PM
<b>Session #6 – Part 1 (3 speakers) Atmospheric Deposition – Total and Reduced Nitrogen</b>	3:10 PM – 3:30 PM
Break	3:30 PM – 4:30 PM
<b>Session #6 – Part 2 (3 speakers) Atmospheric Deposition – Total and Reduced Nitrogen</b>	3:30 PM – 4:30 PM
Meeting Adjourn	4:30 PM

### ***Friday, Nov 9, 2018***

Optional Field Trip - Mohonk Lake and Surrounding Area	8:00 AM – 4:00 PM
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## Acknowledgements

The NADP Program Office would like to thank the following people and sponsors for their additional support of the 2018 Scientific Symposium and Fall Meeting:

- Dr. Doug Burns, Symposium Chair
- NADP Executive Committee
- New York State Energy Research & Development Authority (NYSERDA)
- Lisa Volk
- Dr. David Gay

In addition, we thank everyone who submitted abstracts for sharing their research. The use of NADP data by researchers and policymakers is what has made NADP successful for the past 40 years and will continue to do so for many years to come.

# Agenda

## NADP Scientific Symposium and Fall Meeting Hilton Hotel, Albany, NY November 5 - 9, 2018

11/5

### Monday, November 5, 2018

### Room Location

9:00 AM – 5:00 PM	Registration	East Gallery C
1:00 PM – 5:00 PM	TDEP	Governor C
1:00 PM – 3:00 PM	AMSC	Anteroom
3:00 PM	Break	
3:00 PM – 5:00 PM	CLAD	Hudson Ballroom

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### Tuesday, November 6, 2018

7:30 AM – 6:00 PM	Registration	East Gallery C
7:30 AM – 8:30 AM	Continental Breakfast	
8:30 AM – 10:00 AM	Joint Subcommittee Meeting	Hudson Ballroom
10:00 AM	Break	
10:00 AM – 12:00 PM	Subcommittee Meetings Network Operations Ecological Response and Outreach Critical Loads	Governor C Capital AB Governor D
12:00 PM – 1:30 PM	Lunch on your own	
1:30 PM – 2:30 PM	Joint Subcommittee Meeting	Hudson Ballroom
2:30 PM – 3:00 PM	Break	
3:00 PM – 6:00 PM	Executive Committee Meeting	Governor C

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**Wednesday, November 7, 2018**

**Room Location**

7:30 AM – 5:15 PM	Registration	East Gallery C
7:30 AM – 8:00 AM	Continental Breakfast	
8:00 AM – 8:30 AM	<b>Welcome, Introductions, Overview of Meeting Agenda</b> Doug Burns – NADP Vice Chair, Symposium Chair U.S. Geological Survey Tamara Blett – NADP Chair National Park Service	Governor A
8:30 AM – 9:00 AM	<b>Annual State of the NADP Report</b> Jamie Schauer – Wisconsin State Laboratory of Hygiene Director and NADP Principal Investigator Michael Olson – NADP Program Coordinator	
9:00 AM – 10:00 AM	<b>Keynote Address:</b> <b>Long-term Monitoring: Environmental Insights from NADP and Hubbard Brook Pertaining to Acid Rain</b> Gene Likens, PhD (see abstract and biography, page 10) Founder and President Emeritus, Cary Institute of Ecosystem Studies, Millbrook, NY Distinguished Research Professor and Special Advisor to the President on Environmental Affairs, University of Connecticut	
10:00 AM – 10:20 AM	Break	
<b>Technical Session 1:</b>	<b>Atmospheric Deposition – Spatial and Temporal Patterns</b> Session Chair: John Walker, U.S. Environmental Protection Agency	
10:20 AM – 10:40 AM	<b>Linking Improvements in Sulfur Dioxide Emissions to Decreasing Sulfate Deposition by Combining Satellite and Surface Observations with Trajectory Analysis</b> Fedkin Nikita, University of Maryland-College Park	
10:40 AM – 11:00 AM	<b>Quantifying Inter-Regional Atmospheric Nitrogen Deposition to U.S. Hydrologic Regions</b> Kristina Wagstrom, University of Connecticut	
11:00 AM – 11:20 AM	<b>Spatial and Temporal Patterns of Atmospheric Deposition in USA</b> Habibollah Fakhraei, Syracuse University	
11:20 AM – 11:40 AM	<b>Background of Atmospheric Deposition in Mexico Studies and Actual Challenges</b> Rodolfo Sosa Echeverría, Universidad Nacional Autonoma de México (UNAM)	

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Wednesday, November 7, 2018

Room Location  
Governor A

11:40 AM – 12:00 PM	<b>Atmospheric Deposition of Reactive Nitrogen and Trace Species in South Asia</b> Umesh Kulshrestha, Jawaharlal Nehru University
12:00 PM – 12:20 PM	<b>A Reassessment of Bromide Levels in NADP/NTN Precipitation Samples</b> Martin Shafer, University of Wisconsin-Madison/Wisconsin State Laboratory of Hygiene
12:20 PM – 1:35 PM	Lunch on your own
<b>Technical Session 2:</b>	<b>Urban Deposition and Critical Loads</b> Session Chair: Chris Clark, U.S. Environmental Protection Agency
1:35 PM – 1:55 PM	<b>Patterns and Controls on Atmospheric Nitrogen, Phosphorus, and Carbon Deposition in Urban Environments</b> Pamela Templer, Boston University
1:55 PM – 2:15 PM	<b>Enhancing Wet-Deposition Maps with Urban Data: Preliminary Results from the Network for Urban Atmospheric Nitrogen Chemistry</b> Gregory Wetherbee, U.S. Geological Survey
2:15 PM – 2:35 PM	<b>History of Critical Loads in North America</b> Tamara Blett, National Park Service
2:35 PM – 2:55 PM	<b>Exceedance of Lichen-based Critical Loads of Atmospheric Deposition: Why Would a Manager Care?</b> Linda Geiser, USDA-Forest Service
2:55 PM – 3:15 PM	<b>Past, Present and Future of Critical Loads – European Perspective</b> Maximilian Posch, International Institute for Applied Systems Analysis (IIASA)
3:15 PM – 3:35 PM	Break
<b>Technical Session 3:</b>	<b>Atmospheric Mercury Deposition</b> Session Chair: Karen Murray, U.S. Geological Survey
3:35 PM – 3:55 PM	<b>Gaseous Deposition of Atmospheric Elemental Mercury in Ecosystems - What We Know and What is Missing</b> Daniel Obrist, University of Massachusetts, Lowell
3:55 PM – 4:15 PM	<b>Investigation of Atmospheric Chemistry of Gaseous Oxidized Mercury at a Coastal Site in Atlantic Canada</b> Irene Cheng, Environment and Climate Change Canada



11/7

Wednesday, November 7, 2018

Room Location  
Governor A

4:15 PM – 4:35 PM

Mercury Wet Deposition Differences by Precipitation Type at One Remote Island Site in Northwest Pacific and Two Sites in Northern Taiwan in 2010-2015

Guey-Rong Sheu, National Central University

4:35 PM – 4:55 PM

Is it Possible to Accurately Measure Ambient Air Mercury at the Low Parts Per Quadrillion Level Using Passive Samplers?

Eric Prestbo, Tekran Instruments

4:55 PM - 5:15 PM

Wet and Dry Deposition of Total Mercury and Methylmercury at an Unpolluted Site in Puerto Rico

James Shanley, U.S. Geological Survey

6:30 PM – 8:30 PM

Poster Session and Reception

Hudson Ballroom

*Atmospheric Deposition of Metals and Polycyclic Aromatic Hydrocarbons (PAH) in the Canadian Oil Sands Region*

M.A. Bari, W.B. Kindzierski

*Synthesizing and Communicating Ecosystem Responses to Air Pollution for Federal Resource Management*

Michael Bell, Linda Pardo, Chris Clark, Linda Geiser, Jason Lynch and Bill Jackson

*Temporal and Spatial Trends of Atmospheric Deposition in Maryland and Comparison to Observations of Atmospheric Pollutants in the Chesapeake Bay Watershed*

Sarah Benish, Phil Stratton, Allison Ring, Gina Mazzuca and Xinrong Ren

*Total Sulphur Deposition Downwind of an Aluminum Smelter in the Kitimat Valley, British Columbia*

Dane Blanchard and Julian Aherne

*Long Term Atmospheric Monitoring in New York State: From Mountaintop to New York City*

Richard Brandt, James Schwab, Brian Crandall, Matt Ninneman, Hesham Hassan, Paul Casson, Dirk Felton and Oliver Rattigan

*Spatial Assessment of Total Mercury Concentrations on Baffin Island, Nunavut*

Rachel Brown, Tanner Liang, Phaedra Cowden, Julian Aherne and Holger Hintelmann

*A Review of 2008 - 2017: Data in the Adirondacks with Recommendations for Future Monitoring Options*

Amanda Carpenter, Oliver Rattigan and Dirk Felton

*An Intercomparison of Several Collocated Rain Gauges at Whiteface Mountain Field Station*

Paul Casson, Scott McKim, Rich Brandt, Jim Schwab, Brian Frei and Justin Minder

*Measurements and Modelling of Atmospheric Deposition in Canada: Acidifying Pollutants, Base Cations and Polycyclic Aromatic Compounds*

Irene Cheng, Leiming Zhang, Deyong Wen, Zhiyong Wu, Xin Qiu, Fuquan Yang and Tom Harner

***A Specific Ultraviolet Absorbance Pilot Project in Adirondack Mountain Lakes and Streams***

Kevin Civerolo, Karen Roy, Philip Snyder and Gregory Lawrence

***AMoN Readiness Verification Plan Ammonia Field Inter-comparison***

Camille Danielson, Martin Shafer, Jesse Wouters and Chris Worley

***The Anthropogenic Impact on Precipitation Quality***

Courtney Davis, Charles Driscoll, Mario Montesdeoca and Dimitar Todorov

***Brook Trout Restoration and Monitoring of the Adirondack Ecosystem: Bringing Additional Value to the NYSDEC Stocking and Liming Program***

James Dukett, Phil Snyder, Matt Kelting and Sue Capone

***Ethanol Concentrations in Wet Deposition Collected at the Atmospheric Integrated Research Monitoring Network Sites***

J. David Felix and Bipin Sharma

***Investigating Gaseous Atmospheric Mercury Exchange in a Forest Ecosystem with a Gradient-based Micrometeorology Approach***

Dean Howard, Timothy Richards, J. William Munger and Daniel Obrist

***A New Online Continuous Relaxed Eddy Accumulation Flux System Coupled with Ion Chromatographs***

Amy Hrdina, Alexander Moravek, Elizabeth Patte and Jennifer G. Murphy

***Wet Atmospheric Deposition and Stream Water Chemistry at the Glacier Lakes Ecosystem Experiments Site (GLEES), Southeastern Wyoming, USA, 1989-2018***

John Korfmacher and Kathleen A. Dwire

***Monitoring Cloud Water Chemistry (including Organics) at Whiteface Mountain***

Christopher Lawrence, Paul Casson, Richard Brandt, Elizabeth Yerger, Hunter Favreau, Dan Kelting, James Schwab and Sara Lance

***Transitioning a Major National Monitoring Program: Transition Strategy, Current Status and Future Plans***

Amy Mager, Camille Danielson, Chris Worley and Martin Shafer

***Isotopic Investigation of Redox Effects on Nitrate Partitioning in a Forest Soil***

Ariel Mollhagen

***A Decadal Change in Mercury in Upland Irish Lakes***

Sarah Nelson, Julian Aherne and Holger Hintelmann

***Variations of Wet Deposition of Mercury Across Eastern North America***

Raheem Outlaw, Ronnie Blakeney, Nallah Muhammad, Precious Hairston, Jacorey Patterson and Godfrey Uzochukwu

***Total Reduced Nitrogen (NH<sub>x</sub>) Measurement Methods for Implementation in Long-Term Monitoring Networks***

Melissa Puchalski, John T. Walker, Xi Chen, Christopher Rogers, Ralph Baumgardner, Kevin Mishoe, Gregory Beachley, Joann Rice, Bret Schichtel and Katherine Barry



***Atmospheric Deposition of Microfibers***

Brett Roblin and Julian Aherne

***The Clean Air Status and Trends Network (CASTNET): A Versatile Platform for Evolving Deposition Science and Other Air Quality Monitoring Research***

Christopher Rogers, Melissa Puchalski, Selma Isil and Marcus Stewart

***Evaluation and Intercomparison of Modeled Atmospheric Deposition over North America and Europe - An Overview of Phase 4 of the Air Quality Model Evaluation International Initiative***

Donna Schwede, Johannes Bieser, Olivia Clifton, Jason Ducker, Lisa Emberson, Johannes Flemming, Stefano Galmarini, Christian Hogrefe, Christopher Holmes, Paul Makar, Martijn Schaap and Sam Silva

***Broader Proficiencies of the WSLH: Enhancing and Building NADP Network Capabilities and Collaborations***

Martin Shafer, Mike Olson, Mark Olson, Chris Worley and James Schauer

***Tekran 2537 A, B, X Intercomparison Study***

Timothy Sharac, Mark Olson, David Grande, Mark Rhodes, Sandy Steffen, Rob Tordon and Eric Prestbo

***Long-term Changes in Soil and Stream Chemistry across an Acid Deposition Gradient in the Northeastern United States***

Jason Siemion, Michael R. McHale, Gregory B. Lawrence, Douglas A. Burns and Michael R. Antidormi

***Advancements in NADP Field Equipment and Site Liaison Support***

Richard Tanabe, Mark Olson and Robert Larson

***A National Survey of Total Gaseous Mercury Stable Isotope Composition***

Michael Tate, Ryan Lepak, Sarah Janssen, David Krabbenhoft, Martin Risch, David Gay, John DeWild and Jacob Ogorek

***Atmospheric Depositions Introduce Anomalies in Modeled Estimates of Dissolved Organic Carbon Export from Terrestrial to Aquatic Ecosystems in the United States from 1981-2010***

Xinyuan Wei and Daniel J. Hayes

***Comparison of Accuracy, Variability and Relative Bias for Two Central Analytical Laboratories for the National Atmospheric Deposition Program***

Gregory Wetherbee, Camille Danielson, Martin Shafer, Sybil Anderson, Nina Gartman, Chris Worley and Amy Mager

***It's Raining Plastic***

Gregory Wetherbee, Austin Baldwin and James Ranville

***NADP Sample Processing at the WSLH: Conventional Strategies and New Approaches***

Kirsten Widmayer, Amy Mager and Chris Worley

***Investigating Different Strategies to Reduce Costs, Enhance Sampler Integrity, and Improve the Extraction Process, in the Ammonia Monitoring Network (AMoN)***

Jesse Wouters, Chris Worley, Camille Danielson and Martin Shafer

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**Thursday, November 8, 2018**

**Room Location**

7:30 AM – 4:30 PM	Registration	East Gallery C
7:30 AM – 8:00 AM	Continental Breakfast	
8:00 AM – 8:10 AM	<b>Opening Remarks, Announcements, and Overview of Day 2</b> Doug Burns – NADP Vice Chair, Symposium Chair U.S. Geological Survey	Governor A
<b>Technical Session 4:</b>	<b>Mercury in Ecosystems</b> Session Chair: Eric Prestbo, Tekran Instruments	
8:10 AM – 8:30 AM	<b>Factors Influencing Mercury Concentrations in Fish from Streams in the Northeastern United States</b> Karen Riva-Murray, U.S. Geological Survey	
8:30 AM – 8:50 AM	<b>Chemical and Physical Controls on Mercury Source Signatures in Stream Fish from the Northeastern United States</b> Sarah Janssen, U.S. Geological Survey	
8:50 AM – 9:10 AM	<b>Mercury in Fish from National Parks - Concentrations, Sources, and Ecological Risk</b> Colleen Flanagan Pritz, National Park Service-Air Resources Division	
9:10 AM – 9:30 AM	<b>Increase in Lake Champlain Fish Mercury Linked to Elevated Sediment Loading from Hurricane Irene</b> Mark Swinton, Rensselaer Polytechnic Institute	
9:30 AM – 9:50 AM	<b>The Dragonfly Mercury Project: Biosentinel Mercury Concentrations and Landscape Drivers across U.S. National Parks</b> Megan Hess, Program in Ecology and Environmental Sciences, University of Maine	
9:50 AM – 10:10 AM	Break	
<b>Technical Session 5:</b>	<b>Ecosystem Effects, Recovery, and the Future</b> Session Chair: Linda Geiser, USDA-Forest Service	
10:10 AM – 10:30 AM	<b>25 Years of Whole-Watershed Experimental N Additions in a Forested Maine Watershed</b> Ivan Fernandez, University of Maine	
10:30 AM – 10:50 AM	<b>Differential Vulnerability of 348 Herbaceous Species to Atmospheric Deposition of Nitrogen and Sulfur across the Contiguous U.S.</b> Christopher Clark, U.S. Environmental Protection Agency	



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Thursday, November 8, 2018

Room Location  
Governor A

- 10:50 AM – 11:10 AM      **Assessing Risk to Forest Ecosystems from Nitrogen and Sulfur Deposition across the Continental U.S.**  
Linda Pardo, USDA-Forest Service
- 11:10 AM – 11:30 AM      **A Clean Air Act Success: Indicators of Recovery in Fish Assemblages and Water Quality from Acidified Streams of the Catskill and Adirondack Mountains, New York**  
Barry Baldigo, U.S. Geological Survey
- 11:30 AM – 11:50 AM      **Do Watershed and In-Stream Liming Accelerate Recovery of Macroinvertebrate Communities in Acidified Tributaries to an Adirondack Lake?**  
Scott George, U.S. Geological Survey
- 11:50 AM – 12:10 PM      **Soil-Calcium Depletion Extends Increasing Trends of Dissolved Organic Carbon in Adirondack Streams**  
Gregory Lawrence, U.S. Geological Survey
- 12:10 PM – 1:30 PM      Lunch on your own
- 1:30 PM – 1:50 PM      **Recent and Potential Future Changes in the Chemistry of Surface Waters of the Adirondack Region of New York in Response to Decreases in Atmospheric Deposition**  
Charles Driscoll, Syracuse University
- 1:50 PM – 2:10 PM      **The Responses of Stream Ecosystems to Future Scenarios of Atmospheric Deposition Derived from Changing Land Use-related Emission and Projected Future Meteorological Conditions**  
Shuai Shao, Syracuse University
- Technical Session 6:**      **Atmospheric Deposition - Total and Reduced Nitrogen**  
Session Chair: Donna Schwede, U.S. Environmental Protection Agency
- 2:10 PM – 2:30 PM      **Measuring Surface-Atmosphere Exchange of Ammonia over a Corn Field Using the Eddy Covariance Method**  
Saumya Singh, Department of Chemistry, University of Toronto
- 2:30 PM – 2:50 PM      **Measurements of Ammonia Emission and Deposition in Adjacent Natural Ecosystems**  
Mark Zondlo, Princeton University

11/8

**Thursday, November 8, 2018**

**Room Location**  
Governor A

- |                   |   |
|-------------------|---|
| 2:50 PM – 3:10 PM | <b>Potential Contribution of the Satellite Observations for Improving Atmospheric Deposition Estimates</b><br>Mark Shephard, Environment and Climate Change Canada              |
| 3:10 PM – 3:30 PM | Break   |
| 3:30 PM – 3:50 PM | <b>Loch Vale, CO Wet Reactive Nitrogen Deposition Long Term Trends and Uncertainty</b><br>Bret Schichtel, National Park Service-Air Resources Division                          |
| 3:50 PM – 4:10 PM | <b>Assessing Uncertainty in Total Reactive Nitrogen Deposition Estimates for North American Critical Load Applications</b><br>John Walker, U.S. Environmental Protection Agency |
| 4:10 PM – 4:30 PM | <b>Trends in Reactive Nitrogen at Rocky Mountain National Park by Transport Direction</b><br>Kristi Gebhart, National Park Service  |



11/9

**Friday, November 9, 2018**

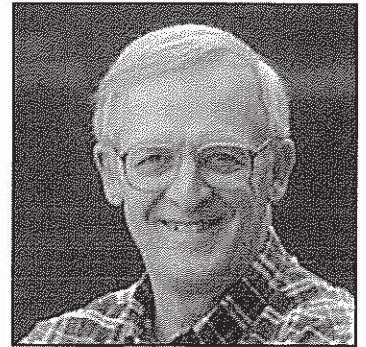
- 8:00 AM – 4:00 PM **Optional Field Trip - Mohonk Lake and Surrounding Landscape**  
(Departs from hotel at 8:00 AM and returns to hotel at 4:00 PM)

During the field trip you will see Mohonk Lake and hear the history of acid rain effects on the glacial lakes of the Shawangunk Mountains. We will visit the NOAA weather station near the lake that began measurements in 1896. The group will also visit the Dan Smiley Research Center and see the precipitation collector he developed in the 1970s that is still in operation today. Later, time will be available to hike some of the nearby trails and to observe this unique and stunning landscape.



## Keynote Speaker – Dr. Gene E. Likens

Dr. Gene Likens received a Ph.D. in zoology from the University of Wisconsin in 1962. He served on the faculty of Dartmouth College from 1963-69 and at Cornell University from 1969-83.



Dr. Likens is founder and President Emeritus of the Cary Institute of Ecosystem Studies, Millbrook, NY. Currently, he serves as Distinguished Research Professor and Special Advisor to the President on Environmental Affairs at the University of Connecticut.

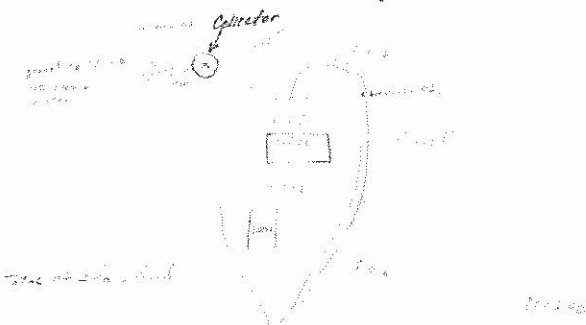
Dr. Likens' research focuses on the ecology and biogeochemistry of forest and aquatic ecosystems, primarily through long-term studies at the Hubbard Brook Experimental Forest in New Hampshire. He co-founded the Hubbard Brook Ecosystem Study in 1963, which has informed understanding of the links between ecosystem function and land-use practices. He and his colleagues were the first scientists to discover and document acid rain in North America and its links to fossil fuel combustion. His findings have influenced politicians and policy makers, motivated scientific studies, and increased public awareness of human-accelerated environmental change. He has received many awards and honors including election to the National Academy of Science in 1981, and the 2001 National Medal of Science.

Dr. Likens has authored more than 600 papers, reports, and books that include studies of limnology, acid rain and its ecological effects, human influence on water quality, and the ecological effects of forest management, among others. He has been a long-time proponent of the value of environmental monitoring, including the activities of NADP.

### **Keynote Talk Title: Long-term Monitoring: Environmental Insights from NADP and Hubbard Brook pertaining to Acid Rain**

**Abstract:** High quality, long-term scientific data offer unique insights into how atmospheric chemistry affects human-accelerated environmental change. Data from Hubbard Brook and NADP provide two special examples regarding long-term changes in atmospheric deposition. Acid rain was discovered in North America at Hubbard Brook in 1963. Chemical records at Hubbard Brook now have been hindcasted to 1900 to provide context for the 55-year measurement period. The NADP, celebrating 40 years of successful operations, provided critical temporal, and especially, spatial data for the acid rain debates in the 1980s. Long-term data from these programs were important in passing the 1990 Clean Air Act Amendments.

*NC-144 Precip Collector at Hubbard Brook Experimental Forest, N.H.*



**Original drawing for NADP site application.  
Included in NADP archival site files.**

## 2018 NADP Site Operator Awards

### 35 Year Award

NADP 測站 維護 得獎 名單

Site Code	Operator Name	Site Name	Funding Agency	Wet Start
MD13 - NTN	Michael Newell	Wye	University of Maryland-State Agricultural Experiment Station	3/8/1983

### 30 Year Awards

Site Code	Operator Name	Site Name	Funding Agency	Wet Start
MT07 - NTN	Kent Dodge	Clancy	U.S. Geological Survey	1/24/1984
TX16 - NTN	Robert Moen	Sonora	U.S. Geological Survey	6/26/1984

### 25 Year Awards

Site Code	Operator Name	Site Name	Funding Agency	Wet Start
PA15 - AIRMoN	Robert Ziegler	Penn State	National Oceanic and Atmospheric Administration - Air Resources Laboratory	10/6/1992
PA15 - NTN	Robert Ziegler	Penn State	National Oceanic and Atmospheric Administration - Air Resources Laboratory and Pennsylvania Game Commission	6/7/1983
PA42 - NTN	Kevin Horner	Leading Ridge	Pennsylvania State University-State Agricultural Experiment Station	4/25/1979

### 20 Year Awards

Site Code	Operator Name	Site Name	Funding Agency	Wet Start
NC36 - NTN	Paul Anderson	Jordan Creek	U.S. Geological Survey	10/18/1983
NM08 - NTN	Linda Madron	Mayhill	U.S. Geological Survey	1/24/1984



## 15 Year Awards

Site Code	Operator Name	Site Name	Funding Agency	Wet Start
MI51 - NTN	Denise Dickson	Unionville	U.S. Environmental Protection Agency - Clean Air Markets	1/26/1999
MS19 - NTN	Grace Norman	Newton	National Oceanic and Atmospheric Administration - Air Resources Laboratory	11/11/1986
NY20 - MDN	Charlotte Demers	Huntington Wildlife	New York State Energy Research & Development Authority and U.S. Environmental Protection Agency	12/10/1999
TX56 - NTN	Dale Burks	L.B.J. National Grasslands	U.S. Geological Survey	9/20/1983
WI31 - MDN	Alexander Nyhus	Devil's Lake	Wisconsin Department of Natural Resources	1/11/2001
WY00 - NTN	John Korfmacher	Snowy Range	U.S. Forest Service	4/22/1986
WY95 - NTN	John Korfmacher	Brooklyn Lake	U.S. Forest Service	9/22/1992

## 10 Year Awards

Site Code	Operator Name	Site Name	Funding Agency	Wet Start
AZ99 - NTN	Janice Goodman	Oliver Knoll	U.S. Geological Survey	8/25/1981
KS24 - MDN	Lisa Silby	Glen Elder State Park	Kansas Department of Health and Environment	5/27/2008
KS32 - MDN	Curt Sauer	Lake Scott State Park	Kansas Department of Health and Environment	6/10/2008
MD08 - AMNet	Mark Castro	Piney Reservoir	State of Maryland	1/1/2008
MI48 - NTN	Jim Patton	Seney National Wildlife Refuge-Headquarters	U.S. Fish and Wildlife Service-Air Quality Branch	11/28/2000
MI96 - AMoN	Matt Nowak	Detroit	U.S. Environmental Protection Agency - Clean Air Markets	10/29/2007
MN27 - MDN	Lee Klossner	Lamberton	Minnesota Pollution Control Agency	7/2/1996
ND08 - NTN	Janna Robinson	Icelandic State Park	U.S. Geological Survey	10/25/1983
NM98 - AMoN	Joe Cotie	Navajo Lake	U.S. Environmental Protection Agency - Clean Air Markets	1/11/2008
NM99 - AMoN	Joe Cotie	Farmington	U.S. Environmental Protection Agency - Clean Air Markets	1/9/2008
NY06 - MDN	Sergio Fleishaker	Bronx	New York State Department of Environmental Conservation	1/9/2008

## 10 Year Awards

Site Code	Operator Name	Site Name	Funding Agency	Wet Start
NY43 - MDN	Tom Everts	Rochester	New York State Energy Research & Development Authority	1/8/2008
NY67 - AMoN	Tom Butler	Ithaca	U.S. Environmental Protection Agency - Clean Air Markets	10/30/2007
OH02 - AMoN	Gary Conley	Athens Super Site	U.S. Environmental Protection Agency - Clean Air Markets	10/30/2007
OK99 - AMNet	Larry Scrapper	Stillwell	Cherokee Nation	10/20/2008
SD08 - NTN	David Gay	Cottonwood	U.S. Geological Survey	10/11/1983
WI10 - NTN	Joe Cebe	Potawatomi	Forest County Potawatomi Community	6/7/2005
WY06 - NTN	Ted Porwoll	Pinedale	U.S. Bureau of Land Management	1/26/1982
WY08 - NTN	John Klapotosky	Yellowstone National Park-Tower Falls	Wyoming Department of Environmental Quality	6/5/1980

## 5 Year Awards

Site Code	Operator Name	Site Name	Funding Agency	Wet Start
AK98 - MDN	Stephen Bodnar	Kodiak	State of Alaska Department of Environmental Conservation	9/18/2007
BC22 - NTN	Jim Young	Haul Road Station	Rio Tinto	9/19/2012
BC23 - NTN	Jim Young	Lakelse Lake	Rio Tinto	3/20/2013
CO21 - NTN	Steven Alton	Manitou	U.S. Forest Service	10/17/1978
CO96 - MDN	Bob Brantlinger	Molas Pass	U.S. Bureau of Land Management	6/30/2009
CO96 - NTN	Bob Brantlinger	Molas Pass	U.S. Forest Service	7/29/1986
ID03 - NTN	Douglass Owen	Craters of the Moon National Monument	National Park Service-Air Resources Division	8/22/1980
MD08 - MDN	Ben Brown	Piney Reservoir	Maryland Department of Natural Resources and University of Maryland - Appalachian Laboratory	6/29/2004
ME94 - NTN	Martin Dana	Indian Township	Passamaquoddy Tribe and U.S. Environmental Protection Agency	10/3/2013
ME96 - MDN	Liza Woodward	Casco Bay-Wolfe's Neck Farm	Maine Department of Environmental Protection and U.S. Environmental Protection Agency	1/6/1998



## 5 Year Awards

Site Code	Operator Name	Site Name	Funding Agency	Wet Start
ME96 - NTN	Liza Woodward	Casco Bay-Wolfe's Neck Farm	Maine Department of Environmental Protection and U.S. Environmental Protection Agency	1/6/1998
MN18 - AMoN	James B. Anderson	Fernberg	U.S. Environmental Protection Agency - Clean Air Markets	10/30/2007
MN18 - MDN	James B. Anderson	Fernberg	Minnesota Pollution Control Agency	3/5/1996
MN18 - NTN	James B. Anderson	Fernberg	U.S. Environmental Protection Agency - Clean Air Markets	11/18/1980
MN32 - NTN	Bryce Olson	Voyageurs National Park-Sullivan Bay	National Park Service-Air Resources Division	5/30/2000
MS12 - AMNet	Ronald Cole	Grand Bay NERR	National Oceanic and Atmospheric Administration	9/29/2006
NC45 - NTN	Alexander Dreyer	Mt. Mitchell	North Carolina State University and U.S. Environmental Protection Agency - Clean Air Markets	11/26/1985
NS01 - AMoN	Margo DeLong	Kejimikujik National Park	Environment Canada	10/8/2013
NY06 - NTN	Sergio Fleishaker	Bronx	New York State Department of Environmental Conservation	1/22/2013
NY28 - NTN	Erik Cortright	Piseco Lake	New York State Energy Research & Development Authority	12/31/2012
NY43 - NTN	Tom Everts	Rochester	New York State Energy Research & Development Authority	4/30/2013
NY92 - NTN	Jim Wolfe	Amherst	New York State Energy Research & Development Authority	10/29/2013
NY94 - AMoN	Ken Eckhardt	Nick's Lake	U.S. Environmental Protection Agency - Clean Air Markets	11/20/2012
NY96 - MDN	Andrew Seal	Cedar Beach-Southold	New York State Energy Research & Development Authority	9/24/2013
NY98 - AMoN	Paul Casson	Whiteface Mountain	U.S. Environmental Protection Agency - Clean Air Markets	11/20/2012
OH02 - AMNet	Alex Burke	Athens Super Site	Ohio EPA	1/1/2007
OK00 - NTN	Robert Kildow	Salt Plains National Wildlife Refuge	U.S. Geological Survey	12/13/1983
PA18 - MDN	Kevin Horner	Young Woman's Creek	Pennsylvania State University	10/22/2013
TX04 - NTN	Jeff Bennett	Big Bend National Park - K-Bar	National Park Service-Air Resources Division	4/10/1980
TX43 - AMoN	Brent Auvermann	Cañonceta	U.S. Environmental Protection Agency - Clean Air Markets	10/30/2007

## 5 Year Awards

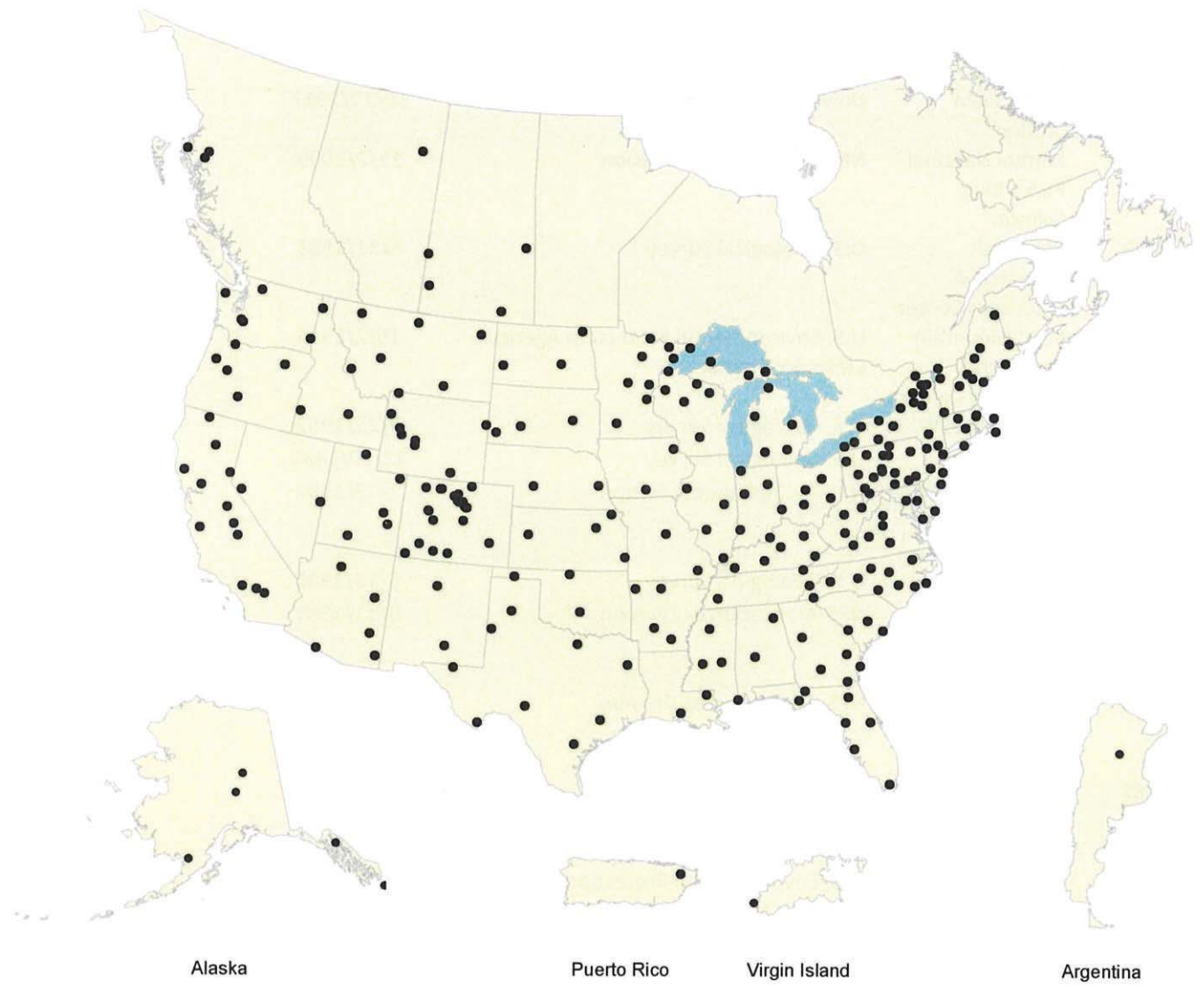
Site Code	Operator Name	Site Name	Funding Agency	Wet Start
VA24 - AMoN	Gene Brooks	Prince Edward	U.S. Environmental Protection Agency - Clean Air Markets	3/1/2011
VT99 - AMoN	Miriam Pendleton	Underhill	U.S. Environmental Protection Agency - Clean Air Markets	11/20/2012
WY26 - MDN	Steve Renner	Roundtop Mountain	Wyoming Department of Environmental Quality	12/20/2011
WY97 - NTN	Steve Renner	South Pass City	Bridger-Teton National Forest	4/30/1985



# National Atmospheric Deposition Program

## National Trends Network (NTN)

國家趨勢監測網 (264個測站)



NTN 測站及開始監測日期

## NTN

Site ID	Site Name	Site Sponsor	Start Date
AB32	Fort Mackay	Wood Buffalo Environmental Association	9/13/2016
AK01	Poker Creek	U.S. Forest Service	12/29/1992
AK02	Juneau	U.S. Forest Service	6/22/2004
AK03	Denali National Park-Mt. McKinley	NPS-Air Resources Division	6/17/1980
AK96	Toolik Field Station	University of Alaska Fairbanks	10/12/2017
AK97	Katmai National Park - King Salmon	NPS-Air Resources Division	11/2/2009
AL10	Black Belt Research & Extension Center	U.S. Geological Survey	8/31/1983
AL99	Sand Mountain Research & Extension Center	U.S. Environmental Protection Agency - Clean Air Markets	10/2/1984
AR02	Warren 2WSW	U.S. Geological Survey	5/25/1982
AR03	Caddo Valley	U.S. Geological Survey	12/30/1983
AR16	Buffalo National River-Buffalo Point	NPS-Air Resources Division	7/13/1982
AR27	Fayetteville	U.S. Geological Survey	5/13/1980
AZ03	Grand Canyon National Park- Hopi Point	NPS-Air Resources Division	8/11/1981
AZ06	Organ Pipe Cactus National Monument	NPS-Air Resources Division	4/15/1980
AZ97	Petrified Forest National Park- Rainbow Forest	NPS-Air Resources Division	12/3/2002
AZ98	Chiricahua	U.S. Environmental Protection Agency - Clean Air Markets	2/23/1999
AZ99	Oliver Knoll	U.S. Geological Survey	8/25/1981
BC22	Haul Road Station	Rio Tinto	9/19/2012
BC23	Lakelse Lake	Rio Tinto	3/20/2013
BC24	Port Edward	Prince Rupert Port Authority	1/15/2014
CA28	Kings River Experimental Watershed	USFS - Pacific Southwest Research Station	4/24/2007
CA42	Tanbark Flat	U.S. Forest Service	1/12/1982
CA45	Hopland	U.S. Geological Survey	10/3/1979
CA50	Sagehen Creek	U.S. Geological Survey	11/6/2001



**NTN**

<b>Site ID</b>	<b>Site Name</b>	<b>Site Sponsor</b>	<b>Start Date</b>
CA66	Pinnacles National Monument-Bear Valley	NPS-Air Resources Division	11/2/1999
CA67	Joshua Tree National Park-Black Rock	NPS-Air Resources Division	9/19/2000
CA75	Sequoia National Park-Giant Forest	NPS-Air Resources Division	7/8/1980
CA76	Montague	U.S. Geological Survey	6/25/1985
CA88	Davis	U.S. Geological Survey	9/4/1978
CA94	Converse Flats	U.S. Forest Service	5/9/2006
CA96	Lassen Volcanic National Park-Manzanita Lake	NPS-Air Resources Division	6/13/2000
CA99	Yosemite National Park-Hodgdon Meadow	NPS-Air Resources Division	12/8/1981
CAN5	Frelighsburg	U.S. Geological Survey	10/2/2001
CO00	Alamosa	U.S. Geological Survey	4/22/1980
CO01	Las Animas Fish Hatchery	U.S. Geological Survey	10/4/1983
CO02	Niwot Saddle	INSTAAR-University of Colorado/ National Science Foundation	6/5/1984
CO06	CAMP	City and County of Denver	1/10/2017
CO08	Four Mile Park	U.S. Environmental Protection Agency - Clean Air Markets	12/29/1987
CO09	Kawuneechee Meadow	U.S. Bureau of Land Management	7/10/2012
CO10	Gothic	U.S. Environmental Protection Agency - Clean Air Markets	2/2/1999
CO11	Arvada Gardens	U.S. Geological Survey	12/5/2016
CO15	Sand Spring	U.S. Bureau of Land Management	3/20/1979
CO19	Rocky Mountain National Park-Beaver Meadows	NPS-Air Resources Division	5/29/1980
CO21	Manitou	U.S. Forest Service	10/17/1978
CO22	Pawnee	Colorado Department of Public Health & Environment	5/22/1979
CO84	Betasso	U.S. Geological Survey	5/2/2017
CO85	Boulder	Colorado Department of Public Health & Environment	1/3/2017
CO86	Rocky Flats NWR	U.S. Fish and Wildlife Service	1/3/2017
CO87	National Jewish Hospital	Colorado Department of Public Health & Environment	1/10/2017
CO90	Niwot Ridge-Southeast	INSTAAR-University of Colorado	1/24/2006

**NTN**

<b>Site ID</b>	<b>Site Name</b>	<b>Site Sponsor</b>	<b>Start Date</b>
<b>CO90</b>	Niwot Ridge-Southeast	National Science Foundation	1/24/2006
<b>CO91</b>	Wolf Creek Pass	U.S. Forest Service	5/26/1992
<b>CO92</b>	Sunlight Peak	U.S. Environmental Protection Agency - Clean Air Markets	1/13/1988
<b>CO93</b>	Buffalo Pass - Dry Lake	U.S. Forest Service	10/14/1986
<b>CO94</b>	Sugarloaf	U.S. Environmental Protection Agency - Clean Air Markets	11/4/1986
<b>CO96</b>	Molas Pass	U.S. Forest Service	7/29/1986
<b>CO97</b>	Buffalo Pass - Summit Lake	U.S. Forest Service	2/7/1984
<b>CO98</b>	Rocky Mountain National Park-Loch Vale	U.S. Geological Survey - Biological Resources Division/ Colorado State University	8/16/1983
<b>CO99</b>	Mesa Verde National Park-Chapin Mesa	U.S. Geological Survey	4/28/1981
<b>CT15</b>	Abington	U.S. Environmental Protection Agency - Clean Air Markets	1/26/1999
<b>FL03</b>	Bradford Forest	U.S. Environmental Protection Agency - Clean Air Markets	10/10/1978
<b>FL05</b>	Chassahowitzka National Wildlife Refuge	USFWS-Air Quality Branch	8/27/1996
<b>FL11</b>	Everglades National Park-Research Center	NPS-Air Resources Division	6/17/1980
<b>FL14</b>	Quincy	U.S. Geological Survey	3/13/1984
<b>FL23</b>	Sumatra	U.S. Environmental Protection Agency - Clean Air Markets	1/26/1999
<b>FL41</b>	Verna Well Field	U.S. Geological Survey	8/25/1983
<b>GA09</b>	Okefenokee National Wildlife Refuge	USFWS-Air Quality Branch	6/3/1997
<b>GA20</b>	Bellville	U.S. Environmental Protection Agency - Clean Air Markets	4/26/1983
<b>GA41</b>	Georgia Station	University of Georgia-State Agricultural Experiment Station	10/3/1978
<b>GA99</b>	Chula	U.S. Geological Survey	2/10/1994
<b>IA08</b>	Big Springs Fish Hatchery	U.S. Geological Survey	8/14/1984
<b>IA23</b>	McNay Research Center	U.S. Geological Survey	9/11/1984
<b>ID02</b>	Priest River Experimental Forest	U.S. Forest Service	12/31/2002



**NTN**

<b>Site ID</b>	<b>Site Name</b>	<b>Site Sponsor</b>	<b>Start Date</b>
<b>ID03</b>	Craters of the Moon National Monument	NPS-Air Resources Division	8/22/1980
<b>ID11</b>	Reynolds Creek	U.S. Geological Survey	11/22/1983
<b>IL11</b>	Bondville	U.S. Environmental Protection Agency - Clean Air Markets	2/27/1979
<b>IL46</b>	Alhambra	U.S. Environmental Protection Agency - Clean Air Markets	1/26/1999
<b>IL78</b>	Monmouth	U.S. Geological Survey	1/8/1985
<b>IN20</b>	Roush Lake	U.S. Geological Survey	8/22/1983
<b>IN22</b>	Southwest Purdue Agriculture Center	U.S. Geological Survey	9/25/1984
<b>IN34</b>	Indiana Dunes National Lakeshore	NPS-Air Resources Division	7/15/1980
<b>IN41</b>	Agronomy Center for Research and Extension	Purdue University-State Agricultural Experiment Station	7/13/1982
<b>KS07</b>	Farlington Fish Hatchery	U.S. Geological Survey	3/27/1984
<b>KS31</b>	Konza Prairie	Kansas State University-State Agricultural Experiment Station	8/17/1982
<b>KS32</b>	Lake Scott State Park	U.S. Geological Survey	3/27/1984
<b>KS97</b>	Kickapoo Tribe - Powhattan	Kickapoo Tribe	10/13/2015
<b>KY03</b>	Mackville	U.S. Geological Survey	11/29/1983
<b>KY10</b>	Mammoth Cave National Park-Houchin Meadow	NPS-Air Resources Division	8/27/2002
<b>KY19</b>	Cannons Lane	U.S. Geological Survey	10/7/2003
<b>KY22</b>	Lilley Cornett Woods	U.S. Geological Survey	9/6/1983
<b>KY35</b>	Clark State Fish Hatchery	U.S. Geological Survey	8/30/1983
<b>KY99</b>	Mulberry Flat	Murray State University/ U.S. Forest Service	12/27/1994
<b>LA12</b>	Iberia Research Station	U.S. Geological Survey	11/16/1982
<b>LA30</b>	Southeast Research Station	U.S. Geological Survey	1/18/1983
<b>MA01</b>	North Atlantic Coastal Lab	NPS-Air Resources Division	12/15/1981
<b>MA08</b>	Quabbin Reservoir	Northeast States for Coordinated Air Use Management	3/5/1982
<b>MA14</b>	Nantucket	Nantucket Land Council, Inc.	3/4/2014

NTN

Site ID	Site Name	Site Sponsor	Start Date
MA22	Boston University	Boston University	6/16/2015
MA98	Arnold Arboretum	Boston University	2/9/2016
MD08	Piney Reservoir	Maryland Department of Natural Resources	6/29/2004
MD13	Wye	University of Maryland-State Agricultural Experiment Station	3/8/1983
MD15	Smith Island	National Oceanic and Atmospheric Administration - Air Resources Laboratory	6/1/2004
MD18	Assateague Island National Seashore-Woodcock	Maryland Department of Natural Resources	9/5/2000
MD99	Beltsville	Maryland Department of Natural Resources	6/1/2004
ME00	Caribou	U.S. Environmental Protection Agency/ Maine Department of Environmental Protection	4/14/1980
ME02	Bridgton	U.S. Environmental Protection Agency/ Maine Department of Environmental Protection	9/30/1980
ME04	Carrabassett Valley	U.S. Environmental Protection Agency - Clean Air Markets	3/12/2002
ME08	Gilead	U.S. Geological Survey	9/28/1999
ME09	Greenville Station	Maine Department of Environmental Protection/ Maine Department of Environmental Protection	11/20/1979
ME94	Indian Township	Passamaquoddy Tribe/ U.S. Environmental Protection Agency/	10/3/2013
ME96	Casco Bay-Wolfe's Neck Farm	Maine Department of Environmental Protection/ U.S. Environmental Protection Agency	1/6/1998
ME98	Acadia National Park-McFarland Hill	NPS-Air Resources Division	11/10/1981
MI09	Douglas Lake	Michigan State University-State Agricultural Experiment Station	7/3/1979
MI26	Kellogg Biological Station	Michigan State University-State Agricultural Experiment Station	6/26/1979
MI48	Seney National Wildlife Refuge-Headquarters	USFWS-Air Quality Branch	11/28/2000
MI51	Unionville	U.S. Environmental Protection Agency - Clean Air Markets	1/26/1999
MI52	Ann Arbor	U.S. Environmental Protection Agency - Clean Air Markets	1/26/1999
MI53	Wellston	U.S. Forest Service	10/10/1978
MI99	Chassell	U.S. Forest Service	2/15/1983
MN01	Cedar Creek	Minnesota Pollution Control Agency	12/31/1996



**NTN**

<b>Site ID</b>	<b>Site Name</b>	<b>Site Sponsor</b>	<b>Start Date</b>
<b>MN08</b>	Hovland	Minnesota Pollution Control Agency	12/31/1996
<b>MN16</b>	Marcell Experimental Forest	U.S. Forest Service	7/6/1978
<b>MN18</b>	Fernberg	U.S. Environmental Protection Agency - Clean Air Markets	11/18/1980
<b>MN23</b>	Camp Ripley	U.S. Geological Survey	10/18/1983
<b>MN27</b>	Lamberton	Minnesota Pollution Control Agency	1/2/1979
<b>MN28</b>	Grindstone Lake	Minnesota Pollution Control Agency	12/31/1996
<b>MN32</b>	Voyageurs National Park- Sullivan Bay	NPS-Air Resources Division	5/30/2000
<b>MN99</b>	Wolf Ridge	Minnesota Pollution Control Agency	12/31/1996
<b>MO03</b>	Ashland Wildlife Area	U.S. Geological Survey	10/20/1981
<b>MO05</b>	University Forest	U.S. Geological Survey	10/27/1981
<b>MS10</b>	Clinton	U.S. Geological Survey	7/10/1984
<b>MS12</b>	Grand Bay NERR	National Oceanic and Atmospheric Administration - Air Resources Laboratory	3/9/2010
<b>MS19</b>	Newton	National Oceanic and Atmospheric Administration - Air Resources Laboratory	11/11/1986
<b>MS30</b>	Coffeeville	U.S. Forest Service	7/17/1984
<b>MT00</b>	Little Bighorn Battlefield National Monument	U.S. Geological Survey	7/13/1984
<b>MT05</b>	Glacier National Park-Fire Weather Station	NPS-Air Resources Division	6/3/1980
<b>MT07</b>	Clancy	U.S. Geological Survey	1/24/1984
<b>MT96</b>	Poplar River	Fort Peck Assiniboine & Sioux Tribes	12/21/1999
<b>MT97</b>	Lost Trail Pass	U.S. Forest Service	9/25/1990
<b>MT98</b>	Havre - Northern Agricultural Research Center	U.S. Geological Survey	7/30/1985
<b>NC03</b>	Lewiston	North Carolina State University	10/31/1978
<b>NC06</b>	Beaufort	U.S. Environmental Protection Agency - Clean Air Markets	1/26/1999
<b>NC17</b>	University Research Farm	U.S. Department of Energy	1/30/2015
<b>NC25</b>	Coweeta	U.S. Forest Service	7/5/1978
<b>NC29</b>	Hofmann Forest	North Carolina State University	7/2/2002
<b>NC34</b>	Piedmont Research Station	North Carolina State University	10/17/1978
<b>NC35</b>	Clinton Crops Research Station	North Carolina State University	10/24/1978
<b>NC36</b>	Jordan Creek	U.S. Geological Survey	10/18/1983



NTN

Site ID	Site Name	Site Sponsor	Start Date
NC41	Finley Farm	North Carolina State University	10/3/1978
NC45	Mt. Mitchell	U.S. Environmental Protection Agency - Clean Air Markets / North Carolina State University	11/26/1985
ND00	Theodore Roosevelt National Park- Painted Canyon	NPS-Air Resources Division	1/30/2001
ND08	Icelandic State Park	U.S. Geological Survey	10/25/1983
ND11	Woodworth	U.S. Geological Survey	11/29/1983
NE15	Mead	University of Nebraska-State Agricultural Experiment Station	7/25/1978
NE99	North Platte Agricultural Experiment Station	U.S. Geological Survey	9/24/1985
NH02	Hubbard Brook	U.S. Forest Service	7/25/1978
NJ00	Edwin B. Forsythe National Wildlife Refuge	USFWS-Air Quality Branch	10/13/1998
NJ39	Cattus Island County Park	U.S. Environmental Protection Agency - Clean Air Markets	12/4/2012
NJ99	Washington Crossing	U.S. Environmental Protection Agency - Clean Air Markets	8/4/1981
NM07	Bandelier National Monument	NPS-Air Resources Division	6/22/1982
NM08	Mayhill	U.S. Geological Survey	1/24/1984
NV03	Smith Valley	U.S. Geological Survey	8/7/1985
NV05	Great Basin National Park- Lehman Caves	NPS-Air Resources Division	1/15/1985
NY01	Alfred	U.S. Geological Survey	8/17/2004
NY06	Bronx	New York State Energy Research & Development Authority	1/22/2013
NY08	Aurora Research Farm	Cornell University	4/17/1979
NY10	Chautauqua	U.S. Geological Survey	6/10/1980
NY20	Huntington Wildlife	New York State Energy Research & Development Authority	10/31/1978
NY22	Akwesasne Mohawk-Fort Covington	U.S. Environmental Protection Agency - Clean Air Markets	8/18/1999
NY28	Piseco Lake	New York State Energy Research & Development Authority	12/31/2012

**NTN**

<b>Site ID</b>	<b>Site Name</b>	<b>Site Sponsor</b>	<b>Start Date</b>
NY43	Rochester	New York State Energy Research & Development Authority	4/30/2013
NY52	Bennett Bridge	U.S. Environmental Protection Agency - Clean Air Markets	6/10/1980
NY59	Wanakena	New York State Energy Research & Development Authority	1/2/2013
NY67	Ithaca	National Oceanic and Atmospheric Administration - Air Resources Laboratory	1/2/2018
NY68	Biscuit Brook	U.S. Geological Survey	10/11/1983
NY92	Amherst	New York State Energy Research & Development Authority	10/29/2013
NY93	Paul Smith's	New York State Energy Research & Development Authority	1/1/2013
NY94	Nick's Lake	New York State Energy Research & Development Authority	11/3/2015
NY96	Cedar Beach-Southold	U.S. Environmental Protection Agency/County of Suffolk-Department of Health Services-Peconic Estuary Program	11/25/2003
NY98	Whiteface Mountain	U.S. Geological Survey	7/3/1984
NY99	West Point	U.S. Geological Survey	9/13/1983
OH09	Oxford	U.S. Geological Survey	8/14/1984
OH17	Delaware	U.S. Forest Service	10/3/1978
OH49	Caldwell	U.S. Geological Survey	9/26/1978
OH54	Deer Creek State Park	U.S. Environmental Protection Agency - Clean Air Markets	1/26/1999
OH71	Wooster	U.S. Geological Survey	9/26/1978
OK00	Salt Plains National Wildlife Refuge	U.S. Geological Survey	12/13/1983
OK17	Kessler Atmospheric and Ecological Field Station	National Oceanic and Atmospheric Administration - Air Resources Laboratory	3/29/1983
OK29	Goodwell Research Station	U.S. Geological Survey	1/8/1985
OR09	Silver Lake Ranger Station	U.S. Geological Survey	8/23/1983
OR10	H. J. Andrews Experimental Forest	U.S. Forest Service	5/13/1980
OR18	Starkey Experimental Forest	U.S. Geological Survey	3/6/1984
OR97	Hyslop Farm	U.S. Environmental Protection Agency - Clean Air Markets	4/26/1983
PA00	Arendtsville	U.S. Environmental Protection Agency - Clean Air Markets	1/26/1999



**NTN**

<b>Site ID</b>	<b>Site Name</b>	<b>Site Sponsor</b>	<b>Start Date</b>
<b>PA13</b>	Allegheny Portage Railroad National Historic Site	Pennsylvania Department of Environmental Protection/ Pennsylvania State University	7/26/2011
<b>PA15</b>	Penn State	National Oceanic and Atmospheric Administration - Air Resources Laboratory/ Pennsylvania Game Commission	6/7/1983
<b>PA18</b>	Young Woman's Creek	U.S. Geological Survey	4/20/1999
<b>PA29</b>	Kane Experimental Forest	U.S. Forest Service	7/18/1978
<b>PA30</b>	Erie	Pennsylvania State University/ Pennsylvania Department of Environmental Protection	7/27/2011
<b>PA42</b>	Leading Ridge	Pennsylvania State University-State Agricultural Experiment Station-	4/25/1979
<b>PA72</b>	Milford	U.S. Forest Service	12/27/1983
<b>PA90</b>	Hills Creek State Park	Pennsylvania Department of Environmental Protection/ Pennsylvania State University	7/26/2011
<b>PR20</b>	El Verde	U.S. Forest Service	2/12/1985
<b>SC05</b>	Cape Romain National Wildlife Refuge	USFWS-Air Quality Branch	11/21/2000
<b>SC06</b>	Santee National Wildlife Refuge	U.S. Geological Survey	7/19/1984
<b>SD04</b>	Wind Cave National Park-Elk Mountain	NPS-Air Resources Division	11/5/2002
<b>SD08</b>	Cottonwood	U.S. Geological Survey	10/11/1983
<b>SD99</b>	Huron Well Field	U.S. Geological Survey	11/29/1983
<b>SK20</b>	Cactus Lake	Saskatchewan Ministry of Environment	2/14/2012
<b>SK21</b>	Hudson Bay	Saskatchewan Ministry of Environment	4/30/2012
<b>SK30</b>	Weyburn	Saskatchewan Ministry of Environment	6/7/2016
<b>SK31</b>	Fox Valley	Saskatchewan Ministry of Environment	6/14/2016
<b>TN04</b>	Speedwell	U.S. Environmental Protection Agency - Clean Air Markets	1/26/1999
<b>TN11</b>	Great Smoky Mountains National Park-Elkmont	NPS-Air Resources Division	8/12/1980
<b>TN14</b>	Hatchie National Wildlife Refuge	U.S. Geological Survey	10/2/1984
<b>TX02</b>	Muleshoe National Wildlife Refuge	U.S. Geological Survey	6/18/1985
<b>TX03</b>	Beeville	U.S. Geological Survey	2/7/1984