

**Directory  
of  
Acid Rain  
and  
Air Quality Materials  
for Interpreters and Educators**

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## **WHY THIS DIRECTORY WAS DEVELOPED**

In response to many questions about where to start in communicating the issue of acidic deposition, or acid rain as it is referred to here, the authors surveyed existing materials that were developed by agencies, industries and institutions to translate the findings of science into language and formats easily understood by the public. The rationale, of course, is not to replicate materials that already exist, but to identify gaps in the existing base of materials, to assess the need for additional development, and to make potential users aware of the range and value of material that is already available.

Directories are never complete. As more materials are reviewed, more are discovered. It is hoped that readers will contribute single copies of materials that do not appear here. Every attempt will be made to incorporate the new information into future editions of the Directory.

The Directory is the work of educators and interpreters who reviewed the materials as users. We have felt a responsibility to report our assessments of the quality of the entries for education and interpretation. Both the author and the editors have also been trained to exercise the objectivity required for providing public information on natural resource issues. Nevertheless, the reviewers' ideas and opinions about the materials may differ from those of others. We welcome input that may assist in improving the future volumes.

## **HOW THE MATERIALS WERE IDENTIFIED**

Initial requests for air quality/acid rain educational and informational materials were sent by the author to several organizations, based on information received from the Acid Rain Information Clearinghouse and from the National Wildlife Federation Conservation Directory. Other inquiries were sent to producers listed in incoming materials. Three types of materials were received: curriculum supplements, audio-visual aids, and informational resources.

Materials were reviewed and evaluated according to format, production date, intended audience, geographic focus, advocacy (pro-environmental, pro-industry, or neutral), overall quality, ability of the item to attract and hold the attention of the reviewer ("interest factor"), quality of graphics and artwork, and the amount of documentation. Evaluations are recorded in Tables 1, 2, and 3 of the sections on Curriculum, Audio-visual, and Informational Materials, respectively.

## **HOW TO USE THIS DIRECTORY**

Under the three categories of Curriculum Supplements, Audiovisual Aids, and Informational Materials, entries are listed in alphabetical order by source. A fourth category entitled NPS Air Quality Reference Materials lists items available from the NPS Air Quality Division in Lakewood, Colorado. Complete addresses of all sources are listed in a final section. Prices reflect 1987 price listings and may have changed.

# I

## Curriculum Supplements

### **The Acid Rain Foundation, Inc.**

The Acid Rain Foundation, Inc., offers several materials, including packets for grades 7-12, a curriculum for grades 4-8, and audio-visual materials. These materials were not available for review at the time of this writing, but a brief description is given. The Acid Rain Foundation, Inc., is well-known and respected in the area of acid rain education materials and is the supplier of materials produced by the Acid Precipitation Awareness Project.

The Acid Rain Educational Materials consist of six packets designed for science and social studies classes in grades 7-12. Each includes classroom activities, overhead transparencies, pre-/post-tests, and a bibliography. A sample activity was printed in the April 1983 issue of *The American Biology Teacher*. It included an investigation of the pH of common substances and the determination of survival rates of freshwater crustaceans in water of differing pH levels. (\$10/set, \$55/all six)

Twelve interdisciplinary curriculum supplements are also available for grades 4-8. These include lesson plans and student pages in the subjects of mathematics, social studies, science, art, and language arts. A poster and pH test paper are also included. Activity titles are: Air Pollution Collage, Aquatic Organisms, Cartoons, Fossil Fuels, Futures Wheel, Letter Writing, Logarithmic pH Values, Measuring pH of Rain, Measuring pH of Snow, Neutralizing, pH Scale, and Sources of Acid Rain. (\$35)

The Student Information Packet contains brochures, articles, descriptions of legislation, and posters. The materials were collected from many organizations to explain acid rain, causes, effects and possible remedies; many of the informational materials listed in this report are included in this packet. A different packet is available for both elementary and secondary levels. (\$5 each)

### **Carolina Biological Supply**

"Carolina Tips, Acid Rain: The Bitter Experience," a 5-page flier, explains background information on sources, transport of pollutants, the pH scale, effects on lakes and forests, and potential solutions to the acid rain problem. This "Carolina Tips" issue was produced in 1980 and contains some outdated information. Advertisements for other CBS pollution-related materials are included. (#47-2845, \$9.50/pack of 30)

An "Acid Rain BioKit" is also available from CBS for a class of 30. The kit contains marigold seeds and growth cones, marble and granite chips, pH test paper and test cups, buffers (pH 3 and 7), glass marking pencil, hydrochloric acid, sodium sulfite and sodium bicarbonate, self-sealing plastic bag, Petri dishes, filter paper, methyl red, "Carolina Tips" flier: Acid Rain, 30 student guides, and a teachers manual. The kit was not available for review. The materials listed could be found in most high school chemistry labs, though not in most NPS visitor center program preparation facilities. Such a kit could be useful for demonstrations on pH and the effects of acid rain. (#65-3085, \$52.95)

### **Colorado Department of Education, Conservation Education Service**

This comprehensive "Colorado Model for Conservation Education" program from 1979 utilizes four concepts throughout grades K-12, with "Air" being one of five content areas under each concept. Basic principles are emphasized and some air pollution activities are included under "Human Beings Are Now the

Most Influential of Earth's Organisms." Applicable topics range from the awareness of air pollution to discussions of air quality laws to student action projects. Most activities are taken from other sources, such as "Project Learning Tree." A very general introduction to air quality issues is provided through this curriculum and most of the activities are those commonly used in teaching about air pollution. (no price given)

## **Diversified Education Enterprises (DEE)**

DEE offers an Apple computer software package for students in grades 9-12. It is described by DEE as follows: "ACID RAIN is a tutorial and interactive quiz that explores the relationship between the generation of electric power and deterioration of an aquatic environment. A user's guide provides extensive background information, suggestions for classroom use, and worksheet activities." In actual use the program is little more than an electronic page-turner. (#001-107, \$49.95)

## **Education Materials and Equipment, Co.**

"Air Pollution" is an interactive computer activity with color graphics for Apple or TRS-80 III or IV computers. Participants may change various factors related to automobile traffic flow in order to increase or decrease the amount of carbon monoxide produced. High school students and older would find this challenging. Carbon monoxide is the only pollutant with which this program deals. (no price given)

## **Electric Power Research Institute (EPRI)**

"Energy Reporter, Acidic Precipitation: Collecting the Clues" is a four-page flier containing a summary of the phenomenon of acid rain, environmental effects, and related EPRI research, plus questions and a vocabulary list. The included Teacher's Guide lists suggestions for activities: 1. testing rain water for acidity, 2. adding vinegar to baking soda to demonstrate neutralization reaction, 3. holding a debate on changing the standards to lower the amount of discharged pollutants from industries. It also lists questions (and answers) for students, and suggested readings. An EPRI video tape, "Lake Acidification," is available for loan to teachers. The materials are well-done. (free)

## **Energy Source Education Program**

In the high school edition of these curriculum supplements on "Energy Choices and Challenges," current issues and sources of energy are discussed in the student book. One of the eight student investigations in the "Energy Issues of the 80's" chapter introduces students to two sides of the acid rain conflict. A *Field and Stream* magazine article ("The Rain of Terror," 1982) represents the act-now-to-stop-acid-rain point of view, while "Acid Rain" ("Two Energy Futures," 1982, American Petroleum Institute) promotes more research before costly actions are taken. After reading these short articles, students are asked to respond to agree/disagree questions and situations. Additional readings are provided. This is a valuable exercise, but is the only air quality-related activity in the series. (Teacher Pack — \$28, Student Pack, with books for 35 - \$84, Student Pack, without books - \$9)

## **Environment Canada**

"Environmental Education Kit: Acid Rain" is one of the most complete sets of materials available. As with other materials from EC, this kit is extremely well done and appealing. The kit includes: a concept list, "Stop Acid Rain" sticker, photo of a 3-dimensional acid rain display, the pamphlet: "Acid Rain, LRTAP, and Your Health," the booklet "Acid Rain," the article "Acid Rain—The Forecast for Western

Canada," a "Rain Can Be Clean Again" poster, "The Silent Peril" and "Still Waters" reprints, reading activities on "The Silent Peril" and "Economic Aspects," suggested activities by concept, an acid rain quiz with answers, and a very complete resource list. For use with grades 8-12. (free)

## Federation of Ontario Naturalists

The Federation of Ontario Naturalists, which is a private, non-profit conservation organization, have produced several useful teaching aids dealing with acid precipitation.

### 1. Acid Deposition Education Kit

This education kit is a comprehensive, ready-to-use resource on acid deposition. It contains well researched lesson plans, numerous hands-on activities and experiments, and follow-ups for participant evaluation.

Here is a more thorough breakdown of the units contained in the kit.

#### **Unit 1 What is Acid Deposition?**

Introduction  
Measuring acidity  
Main ingredients of acid deposition  
Long range transport of airborne pollutants  
The role of "superstacks" in acid deposition  
Tracking airborne pollution  
Acid sensitivity  
Acidification

The impact of acid deposition on soils  
Acid deposition and agriculture  
Social and economic impacts

#### **Unit 4 Sources/Distribution of Acid Deposition**

Introduction to the sources and distribution of acid-forming emission in North America  
Fossil-fuel fired power plants  
Non-ferrous smelters  
Transportation

#### **Unit 2 Acid Deposition and Aquatic Ecosystems**

A healthy lake ecosystem  
Disruption of a lake ecosystem due to acidification  
The effect of acid deposition of fish  
Acid shock  
Teaching of metals

#### **Unit 5 What Are The Solutions**

Recognizing the problem  
Liming  
Legislation  
Public participation

#### **Unit 3 Acid Deposition and Terrestrial Ecosystems**

A healthy forest ecosystem  
The impact of acid deposition and other air pollutants on forest ecosystems

#### **Unit 6 Teacher's Guide**

## Great Smoky Mountains National Park

Man and the Biosphere Education Project produced a set of education modules on air quality topics through a cooperative effort of the Pi Beta Phi Elementary School in Gatlinburg, Tennessee, the Uplands Field Research Lab of the Great Smoky Mountains National Park, and The Ohio State University. Activity topics include "We can help clean up our air," "Let's sock car exhaust," "Pollution sense search," "Air quality in the Smokies" (with activities on ozone, visibility, and the Clean Air Acts). A variety of lessons on these topics are included for grades K-8. (contact the Park for cost and availability)

## Michigan Department of Natural Resources

"The Acid Rain Game" is a small board game suitable for use in junior and senior high school. Players land on squares indicating "good" or "bad" environmental situations related to acid rain, such as:

"Smokestacks—what goes up, must come down. Lose your next turn." This is easily reproduced, though is not of exceptional quality or depth. (free)

### **Minnesota Sea Grant Extension: Lacustrine Lessons**

A demonstration of the effect of sulfur dioxide on the pH of water is described. It would be useful as a demonstration by interpreters. Directions are also given for the development of an acid rain version of "Trivial Pursuit," where students (7-12) make up the questions and then play the game. (free)

### **National Institute for Urban Wildlife**

One of several newly released curriculum supplements on various wildlife topics, the Urban Areas Activity #2: "Pollution Meters" provides teachers and students (grades 4-7) with several investigations on the effects of pollution on wildlife and people: (1) collect air-borne particulates on coated glass slides; (2) collect run off rain water from trees and test for pH; (3) monitor noise levels along a street; (4) collect particulates from auto exhaust with a sock over the tail pipe; and (5) search for oil spots on the road. Optional observations, resources, questions, data sheet and other activities on the urban environment are included in this packet. The air pollution activities are typical of the activities found in other sources and would be useful as demonstrations for visitors or activities for groups. (\$5 + \$3 for postage and handling)

### **National Wildlife Federation (NWF)**

In "The Acid Rain Kit" the Teacher's Guide provides background information on acid rain. Eleven activities are divided into three study areas: what causes acid rain, problems created by acid rain, and how students can combat acid rain. Investigations in the first category introduce students to acidity and pH (grades 7-12), the water cycle (4-6), sources of pollution and writing to environmental agencies (7-12), and collecting samples of particulates from automobiles (4-9). The effects of acid rain are studied through studying aquatic invertebrates in acidified water (7-12), growing plants using water of varying pH levels (4-6), collecting and measuring the acidity of local rainwater (6-9), analyzing the buffering capacity of differing local soil types (6-9), and interviewing residents on public perception of long term effects of acid rain in their community (6-12). Student involvement activities are to inform elected officials of the student's views on strengthening the Clean Air Act through letter writing (6-12) and to communicate the acid rain problem to others through a variety of media, including public forum, debate, exhibits, posters, newspaper articles, and television and radio messages (6-12). Also included are a crossword puzzle, glossary, bibliography, and resources list for teacher and student. This was one of the most often suggested or sent activity sets from organizations other than the NWF. (\$1)

The National Wildlife Federation developed additional activities on air quality for the 1987 National Wildlife Week. For the topic "We Care About Clean Air," NWF made available at no cost to teachers a packet including a sheet of stickers, pages of puzzles, word search and map exercises, a 22 x 34" color poster, USEPA informational handout and activity page from October 1986, educators' guide with information and activities for grades K-12, and a listing of other NWF materials on a variety of subjects.

In preparation for that Week, "Ranger Rick Magazine" sponsored a t-shirt contest among its readers on the topic of clean air. This was announced in the October 1986 issue, which included an article, "Ranger Rick's Adventures," where Rick and his friends in the western Upper Peninsula of Michigan learned about acid rain's effects on lakes firsthand. A "Ranger Rick acid rain test kit" is available consisting of hydron paper (pH range — 3.0 to 5.5), a bumper sticker, instruction/information sheet, and data reply card. (\$3)

## **New Jersey Department of Environmental Protection**

The Acid Precipitation Awareness and Activity Package is a set of cards with suggested activities and games (e.g., crossword puzzles) to be used as supplements in upper elementary through high school classes. Such materials could be included in an NPS take-home activity book or in park newspapers. (free)

## **New York State Sea Grant Institute**

One of a set of nine aquatic activities for grades K-6 deals specifically with the effect of acid rain on statues. In "Monumental Problems," students make Plaster of Paris statues, subject them to simulated acid rain, and monitor its effect. With a few modifications, this would make an interesting demonstration for NPS visitors, especially at battlefield and other historical marker sites. (no price given)

## **Province of British Columbia**

The information sheet, "Air Pollution," is designed for upper elementary students. Information on air pollution, its effects, solutions, and student action possibilities are given on this one-page handout. (free)

## **PUCE, Inc.**

This computer software company cooperated with the Ministry of the Environment, Province of Quebec, to produce "Acid Rain" (Les Precipitations Acides) for IBM-PC. In addition to being the only available software on the subject for IBM as of 1/88, the program itself is very well done. Students in grades 6-9 investigate the causes of acid rain by talking to its victims, keeping a database of responses, and sorting data. Then they conduct a "Conference" by computer to discuss how to deal with the problem, and in it they encounter the various interest groups that are vocal on the subject. An open-ended portion of the software allows students or teacher to develop new conferences on any issue. Both French and English versions are available. (Estimated cost \$75 U.S.)

## **Science Activities (Periodical)**

Directions are given in this article (Rakow and Glenn, 1982) for making "The Acid Rain Game" board game, which is designed to help students explore the relationships among the production of power, the making of profit, and the death of fish. The scope of the environmental effects is quite limited. This game is for use with grades 4-6.

## **Science Teacher (Periodical)**

"The Acid Rain Debate," an article in the April 1984 issue, describes a role-playing activity for junior/senior high school students. Students become members of public concern groups on various sides of the acid rain problem and give "testimonies" at a mock government hearing run by other students. Roles of participants are provided.

## **Simulation and Games (Periodical)**

The article, "A Gaming Approach to the Acid Rain Problem" (September, 1984) by Baba, describes a computer modeling "game" of economic and political impacts of solving the acid rain problem in Europe.

This software is available only from the authors in Japan, is designed for use on a computer not available in the United States, and is appropriate for college students.

## **U.S. Fish and Wildlife Service**

"Whirligigs: #6 Testing the Waters," consists of two laboratory activities suitable for upper elementary and junior high school students: (1) the determination of the pH of common substances and (2) the effect of increased acidity on freshwater animals (*Daphnia*). Suggested extension activities and data sheet are provided. (no price given)

## **Wisconsin Department of Natural Resources**

Background information accompanies the activities described for grades 4-12 in the flier entitled "Acid Rain Study Guide." "Acids Unveiled" introduces students to pH through testing common substances for acidity levels (4-12). In "Spinning a Web," the concepts of food webs and the effect of acid rain through that interdependence are taught, as students become linked with string and are then "tugged" upon by acid rain (4-6 — and perhaps younger). The "Acids in Your Hometown" activity has students reading local newspapers for articles on acid rain (5-12); in "A Burning Issue," students share their knowledge of acid rain with other students and with adults through a variety of media (4-12). Understanding the legislative process and the existence of air pollution and acid rain policies is the goal of "Acid Policies" (7-12). This is a very concise and complete curriculum supplement with an extensive resource list. (free)

Table 1. Summary of Curriculum Supplements

Material Source	Type	Date	Intended Audience	Geographic Region	Advocacy	Qual. *	Inter. *	Graph *	Doc. **
Carolina Biological Supply: -Tips	flier	1980	9-12	US/Canada	neutral	3	2	3	few
Colorado Model for Conservation Education: curriculum		1979	K-12	US/Colo.	pro-env	3	3	2	-
Diversified Education Enterprises software			9-12	all	neutral	3	2	2	few
Education Materials and Equipment: computer		?	7-12	city	neutral	4	4	4	-
EPRI	flier/acts.	1983	9-12	US	pro-ind	3	3	3	few
Energy Source Education Program: curriculum		1984	9-12	US	both sides	3	3	-	X
Environment Canada: Environmental Education Kit curr. activities		?	8-12	Canada/US	(pro-env)	5	5	5	few
Great Smoky Mountains National Park: AR activities		1983	6-8	US/Smokies	neutral	4	3	2	X
MAB activities		1986-7	K-8	Smokies/US	neutral	-	-	-	X
Michigan DNR: Boardgame		?	7-12	US/Mich.	neutral	4	4	3	-
Minnesota Sea Grant Education: demonstration		?	7-12	(US)	neutral	3	3	-	-
game		?	7-12	(US)	neutral	3	3	-	-
National Institute for Urban Wildlife: activities		1985	7-12	city/US	neutral	4	4	4	X
National Wildlife Federation: AR Kit/activities		1985	4-12	(US)	neut/pro-env	5	5	4	X
Ranger Rick Kit		1986-7	elem	US	pro-env	5	5	4	-
New Jersey Department of Environmental Protection: activity cards		?	4-12	US	neutral	3	4	2	X
New York Sea Grant: activity		?	4-6	all	neutral	4	4	4	-
Province of British Columbia: information sheet		?	elem	US	neutral	4	3	3	-
PUCE	software	1987	5-8	US/Canada	both sides	5	5	4	X
Science Activities: game instructions		1982	4-6	US	pro-env	3	2	-	-
Science Teacher: mock debate		1985	7-12	internat'l	both sides	5	4	n/a	-
Simulation and Games: computer model		1984	college	Europe	neutral	-	-	-	-
US Fish and Wildlife Service: activity		?	7-12	all	neutral	3	4	3	-
Wisconsin DNR: curr. supplements		?	4-12	US/Wis	neutral	5	5	4	X

\* Number values for Quality (Qual.), Interest (Inter.) and Graphics and Artwork (Graph) are: Excellent = 5, Good = 4, Fair = 3, Poor = 2 and Very Poor = 1.

\*\* Documentation (Doc.) levels are denoted by "X" for "Well documented," "few" for "Somewhat well documented," and "-" for "Little or No Documentation."

## II

# Audio-Visual Materials

### **The Acid Rain Foundation, Inc.**

The Foundation offers several films, filmstrips, slide tape presentations, and video tapes (3/4" or 1/2").

### **The American Chemical Society News Service**

An audio tape, "Acid Rain Update: Man and Molecules" (1982), is produced by the American Chemical Society. This was not available for review at the time of this writing. (no price given)

### **Canadian Nature Federation**

The Canadian Nature Federation offers a free red on white 22" by 17" poster. Pictured are emissions from industry and automobiles changing to acid rain, which falls to earth on a lake yielding a fish skeleton. The written message encourages readers to support CNF and to ask representatives for tougher air quality standards. This poster is directed at a predominantly Canadian audience, with part of its purpose being to gain new CNF members. (free)

### **Edison Electric Institute**

#### **"Acid Rain: No Simple Solutions"**

Researchers provide much of the narrative for this video tape which favors the idea that many acidified lakes have naturally low pH levels. The adverse effects of cleaning industrial stack effluents are highlighted and the impacts of acid precipitation are minimized. An audience of high school aged individuals and adults is appropriate for this video tape. (free loan)

#### **"To Catch A Cloud: A Thoughtful Look at Acid Rain"**

Attractive graphics illustrate the water cycle and introduce viewers to the acid rain topic. Research efforts are discussed, as are natural sources of acidic soils and lakes. Considering both environmental and economic concerns in developing a remedy for acid rain is encouraged. High school-aged audiences are suggested. (free loan)

### **Electric Power Research Institute (EPRI)**

A videotape entitled "Lake Acidification" is available from this group. No further information was available. (free loan to teachers)

### **Environment Canada**

"Acid Rain" is a 17" x 22" black and white cartoon poster showing the sources and effects of acid rain, with a written explanation. The poster is very well done. (free)

A set of six full-color posters (18" x 24") describe different facets of the acid rain story: "Acid Rain" (advocates action now), "Death of a Lake," "What is Acid Rain?" (describes sulfur and nitrogen

oxides), "Effects of Acid Rain," "Where Does Acid Rain Come From?," and "There Are Solutions." A brief text on each describes the topic of the poster. These are very well-done and are produced by both the National Wildlife Federation and the Canadian Embassy. (free)

## **Federation of Ontario Naturalists**

"Acid Deposition: A Legacy of Ignorance."

The Federation of Ontario Naturalists produced a 30 minute video in VHS or Beta which provides excellent accompaniment to their Acid Deposition Education Kit. Prominent members of the Canadian political, industrial and scientific communities discuss and illustrate acid precipitation problems and solutions.

## **Films, Inc.**

This 57-minute video tape or film, "What Price Clean Air?," includes interviews with administration, industry, and environmental spokespersons, showing the price Americans would pay in terms of poor health and environmental damage as existing standards of the Clean Air Act are relaxed, especially in human health and destruction of property. This presentation is from 1982 and is appropriate for audiences of junior high school and above. (rental cost not available)

## **International Tele-Film**

Two slide/tape presentations are offered by ITF, but were not available for review at the time of this writing. These presentations are: "Acid Rain: Just a Drop of Water" (15 minutes) and "Acid Rain: Barriers to a Solution" (15 minutes). (free loan)

## **Media Associates, Inc.**

"Acid Rain: The Choice is Ours," 1980, is a well-done overview of acid rain, including forms of deposition, pH scale, sources, geographical areas of sensitivity, effects, and possible solutions. The narrative focuses geographically on northeastern North America, but briefly describes the problem in Scandinavia and Germany. Questions for discussion, a glossary, and a selected bibliography are included. Good photography and graphics. Produced for Friends of Boundary Waters Wilderness. This is available on synchronized slide/tape (\$86.50 + \$3.50 shipping) and on filmstrip (\$42.50 + 2.50 shipping). [Also available from Carolina Biological Supply, #52-3442 (slide/tape) or #48-1360 (filmstrip)]

Media Associates also offers 12 overhead transparencies with teacher's guide, discussion questions, and bibliography. These are especially helpful for conveying the concepts of the acid rain phenomenon in personal presentation modes. They use some of the excellent graphics from the tape described above. (\$29.50 + \$1.50 shipping) [Carolina Biological Supply, #50-1130 \$29.50]

## **Michigan Department of Natural Resources**

"Acid Rain Slide Presentation"

This 54-slide presentation from 1985 describes acidity and the pH scale, causes of acid rain, Michigan's contribution and controls, the varying sensitivity of areas to acid rain, the effects of acid rain on aquatic systems, the mobility of metals, the deterioration of statues and buildings, terrestrial ecosystems, and acid rain research and potential solutions. Because of its Michigan/Great Lakes emphasis, this would be most appropriate for use in that area. (no price given)

## **National Public Radio (NPR)**

An audio tape, 29 minutes in length, entitled "Scientists Look at Acid Rain" is available from NPR. This was not available at the time of writing for review. (\$9.95 + \$2.00 shipping)

## **National Wildlife Federation and the Canadian Embassy**

A set of six full-color posters (18" x 24") describe different facets of the acid rain story: "Acid Rain" (advocates action now), "Death of a Lake," "What is Acid Rain?" (describes sulfur and nitrogen oxides), "Effects of Acid Rain," "Where Does Acid Rain Come From?," and "There Are Solutions." A brief text on each describes the topic of the poster. These are very well-done and are produced by both the National Wildlife Federation and the Canadian Embassy. (free)

## **Ontario Ministry of Environment**

"Case Against the Rain," is available on 3/4" and 1/2" videotape cassettes, but was not available for review. (free loan)

## **Sigurd Olson Environmental Institute**

The slide/tape presentation, "Stop the Rain" (1985), contains 140 slides and runs approximately 30 minutes. Pollutants, sources, pH scale, seasonal fluctuations, and the effects of acid rain are discussed, with special emphasis on the northern Wisconsin, Minnesota, and Michigan. Lake liming and scrubbers are among the remedies discussed. The musical theme song "Who'll stop the rain?" is repeated throughout. As with other regionally-oriented materials, this would be especially useful in the upper Great Lakes area. This presentation is appropriate for junior high students through adults. (\$7.50/rental or \$85/purchased)

## **Time-Life Video**

The NOVA production, "Acid Rain: New Bad News" (1984), emphasizes the "new bad news" that not only lakes, but also the world's forests are affected by acid rain. Scientists from the United States, Germany, and Scandinavia discuss their work. The "facts" are presented in an interesting and attention-holding fashion. This was the most interesting, complete, and informative production reviewed of all the video tapes and films. "New Bad News" is suitable for junior high school and older audiences. (no price given)

## **Umbrella Films**

"Cooperation Across Boundaries: The Acid Rain Dilemma" is a case study of policy-making procedures for the environmental issue of acid rain and is available on video tape or 16mm film. Representatives of the U.S. and Canadian governments, power companies, industry, coal mining families, environmental groups, citizens groups, and New England residents provide their side of the problems in working toward a solution to acid rain. Congressmen discuss the development of legislation which attempts an evenly distributed burden for cleanup. The usual effects-sources-pH scale format is not used as this presentation is concerned with the policy-making process. Specific target audiences are designated by the producers: college students, environmental groups, and public action organizations. (film: \$495; video: \$395; rental: \$57)

## Wisconsin Educational Radio and Television Networks

The video tape presentation, "Acid Rain," gives equal emphasis to the detrimental effects of acid rain on the natural and cultural environment across the United States. "SOX" and "NOX" are the terms used throughout for sulfur and nitrogen oxides. Graphics are appropriately used to clearly describe the deterioration of marble, and in other discussions. The efforts of the Wisconsin Department of Natural Resources to lower NOX and SOX emissions are described, as well as the problems encountered in solving the acid rain dilemma, including the transport of pollutants across state lines. The roles of science, technology, and society are discussed in this well-done, interest-holding, 30-minute production from 1986. This is one of the better video tapes available on the subject and would be suitable for audiences of junior high school age and older. (no rental price given) An accompanying software package is in production at this time.

Table 2. Summary of Audio-visual Materials

<u>Material Source</u>	<u>Type</u>	<u>Date</u>	<u>Intended Audience</u>	<u>Geographic Region</u>	<u>Advocacy</u>	<u>Qual. *</u>	<u>Inter. *</u>	<u>Graph *</u>	<u>Doc. **</u>
American Chemical Society:	audio tape	1982	gen.pub.	-	-	-	-	-	-
Canadian Nature Federation:	poster	?	Canadian	Canada	pro-env	4	3	3	-
Edison Electric Institute:	-Ar:Soln video	?	HS+	US	pro-ind	3	3	3	-
	-Cloud video	?	HS+	US/Canada	pro-ind	3	3	4	-
Environment Canada:	poster	?	all	all	pro-env	4	4	4	-
Films, Inc.	video	1982	JrHi +	city/US	pro-env	3	3	3	-
International Tele-Film:	-Drop slide/tape	?	-	-	-	-	-	-	-
	-Barriers s/t	?	-	-	-	-	-	-	-
Media Associates:	-OH trans.	?	students	US	neutral	-	-	-	-
	-Choice s/t	1980	JrHi +	N.America	neutral	4	4	4	3
Michigan DNR:	slide program	1985	all	Mi/US	neutral	3	3	-	-
National Film Board:	-Heaven film	1981	elem +	Canada	pro-env	3	4	2	-
	-Requiem film	1982	HS+	Can/US/int'l	pro-env	4	3	3	-
National Public Radio:	audio tape	1982	all	-	-	-	-	-	-
National Wildlife Federation/Canadian Embassy:	posters	?	all	US/Canada	pro-env	-	-	-	-
Ontario Ministry of Environment:	video	?	-	-	-	-	-	-	-
Sigurd Olson Environmental Institute:	s/t	1985	all	north.Gr.Lakes	pro-env	4	4	3	-
Time-Life Videos:	video	1984	all	int'l	neutral	5	5	5	X
Umbrella Films:	video	1986	college	US/Canada	neutral	4	3	2	-
Wisconsin Educational Radio and Television Network:	video	1986	all	int'l	neutral	5	4	5	X

\* Number values for Quality (Qual.), Interest (Inter.) and Graphics and Artwork (Graph) are: Excellent = 5, Good = 4, Fair = 3, Poor = 2 and Very Poor = 1.

\*\* Documentation (Doc.) levels are denoted by "X" for "Well documented," "few" for "Somewhat well documented," and "-" for "Little or No Documentation."

### III

## Informational Materials

NOTE: N/A indicates those items which were not available for review.

### The Acid Rain Foundation

- Acid Rain, by Kathlyn Gay. 1984. Book. N/A ("Causes, effects, what can be done.") \$11.00.
- Acid Rain and International Law, by Irene H. vanLier. 1981. Book. N/A ("Scientific background, economics and international law, from 1909 to MOI and ECE Convention, 700 footnotes and references.") \$20.00.
- Acid Rain in Minnesota. (Also available from the Minnesota Department of Education). 1984. An overview of the acid precipitation situation of Minnesota, including definitions, sources, transport, buffering/sensitivity, the Great Lakes and Scandinavian problems, effects (on tourism, structures, health, agriculture, and forestry), research and actions. 20-page booklet. \$3.00 — single copy; \$35.00 — thirty copies.
- Acid Rain in North Carolina. (no date) Brochure. N/A. Free.
- Acidification. 1982. N/A ("Condensed color version (40 pages) of the Swedish essay listed below.") \$5.00. Acidification Today and Tomorrow. 1982. Book. N/A ("Color, illustrated, 231 page Swedish study prepared for the 1982 Stockholm Conference.") \$12.00.
- Air Pollutants: Effects on Forest Ecosystems. 1985. N/A (Symposium proceedings.) \$45.00.
- Bibliography—Acid Rain. (no date). N/A ("Listing of scientific papers, symposia, books, conference proceedings, and pamphlets on the topic of acid deposition. Useful for student research and libraries.") \$8.00
- Bibliography—Air Pollutants/Forests. (no date). Book. N/A ("Listing of scientific papers, symposia, books, conference proceedings, and pamphlets on the topic of air pollutants/forests. Useful resource for student research and libraries.") \$8.00.

### Acid Rain Information Clearinghouse

"Acid Precipitation Digest" (Annual subscription rates for 1987). Subscription rates: 1 year (12 issues), U.S. & Canada—corporate/government \$150; nonprofit (including public and academic libraries, personal) \$50. Foreign—corporate/government \$165; nonprofit \$65. Back issues available, inquire.

#### Bibliographic Series

- "Suggested Background Readings on Acid Precipitation." Contains over 70 items from a variety of sources.
- "Liming of Acid Waters." An extensive, up-to-date bibliography, containing more than 150 citations.
- "Economic Assessment of Acid Rain." Over 180 citations taken from the literature dealing with economics, business and management, policy and public administration.
- "Liming Acidic Waters: Environmental and Policy Concerns." The edited papers and remarks of 22 presenters at a conference held in Albany, New York in October 1985. 82 pages.
- "Acid Rain: Economic Assessment," Paulette Mandelbaum, Editor. Published by Plenum Publishing Corporation. Volume 33 in the series Environmental Science Research. The proceedings of a conference sponsored by ARIC in Washington, D.C. in December 1984. 302 pages. Available from publisher, 233 Spring Street, New York, NY 10013.
- "Acid Rain: A New York State Agenda." Published by the Adirondack Mountain Club. Proceedings of a conference sponsored by ARIC in Albany, New York in April 1984. Contains a postscript on legislation which summarizes New York's acid deposition control act of 1984. 59 pages.

## **Ad Hoc Committee on Acid Rain: Science and Policy**

(Available from Acid Rain Foundation, Inc.)

"Is There Scientific Consensus on Acid Rain?" October, 1985. Excerpts from six governmental reports in areas where consensus occurs in seven areas: atmosphere, aquatic ecosystems, terrestrial ecosystems, structural changes, visibility, health, action. 13-page booklet. No price given.

## **Air Pollution Control Association**

"Report on the APCA International Seminar Series: Acid Rain Options." March, 1985. Seminar presentations on the topics, air monitoring, economics, policy (U. S. and Canada), and legislation. 29 pages. Free.

## **Air Science Company**

Acid Rain and the Environment 1984-1988. (A Bibliography) N/A. \$55.00. Acid Rain and the Environment 1980-1984. (A Bibliography) N/A. \$33.75. (Add \$2 post/handling)

## **American Chemical Society**

Acid Rain Information Pamphlet. 1985. 8-page flier. Summarizes pH, causes, atmospheric processes, assessment techniques, modeling and policy. Attractive, with schematics. Free.

## **American Forests**

"Acid Rain' and Forests: An Attempt to Clear the Air," by Adela Backiel and Frances A. Hunt. February, 1986. 7-page reprint. The effects of air pollution on forests (especially in the eastern United States) are discussed in lay terms. Free.

"A Walk in the Black Forest," by Jim Conrad. January, 1986. 92(1):38-43. The condition of the German Black Forest due to acid rain is discussed. Parallels are drawn with Scandinavian and Appalachian forests. Free.

## **American Lung Association**

"Acid Air and Your Health." November, 1985. Brochure. Three potential "acid air" health problems are discussed (airborne pollutants, acid precipitation, and secondary effects) as well as research and citizen action options. Free.

## **The Atlantic Center for the Environment**

"Acid Rain: A Comparative Survey of Anglers' Knowledge and Attitudes," by Tara Gallagher and Joyce Stone. May, 1985. Flier. Anglers in Maine and New Brunswick were interviewed for knowledge and attitudes toward acid rain. Of those interviewed, over 90 percent cited acid rain as a problem requiring political action, but only 60 percent felt their governments were taking adequate actions to alleviate the problem. Free.

## **Bass Anglers for Clean Water, Inc.**

"The Only Fish That Thrives in Acid Rain: Red Herring; Myths and Facts About Acid Rain." (no date) Brochure. Five myths about acid rain are refuted, though no evidence for either claim is presented. (Also distributed by The Izaak Walton League of America.) Free.

## **British Columbia Ministry of Environment**

Fact Sheet: Acid Rain in the West. (no date) 4-page flier. Reasons why acid rain is not a problem in western Canada and suggestions for keeping it that way. Free.

"Western Canadian Low-Sulphur Coal: Its Expanded Use in Ontario." June, 1986. 20-page booklet report. The pros and cons of using western Canada's low-sulfur coal in Ontario. Report of a Federal/Provincial Task Force. Free.

"Western and Northern Canada Acid Deposition/LRTAP Activities: Annual Report 1985." 1985. 26-pages. "Report of monitoring and research studies related to acid rain and long-range transport of atmospheric pollutants in Western and Northern Canada." Free.

## **The Canadian Acid Precipitation Foundation**

"Is Acid Rain Hurting BC Today?" (no date) Pamphlet. The potential for a serious acid rain problem in western Canada, specifically British Columbia, in fishing, forests, agriculture, and health is outlined. Sources of acid rain and opportunities for individual actions are also presented.

## **Carolina Biological Supply**

"Acid Rain: A Critical Perspective," by Joshua J. Schneck. 1981. 58-page report. N/A ("Covers all aspects of acid rain, including history of the problem and possible solutions. Includes glossary and illustrations. For 8th to 12th-grade levels. Soft cover.") #45-3282, \$5.45.

"For Crying Out Cloud: A Study of Acid Rain," by Marla Coyne and Nancy Smith. 1981. 64 pages. N/A ("Presents the complex problems of acid rain in a clear and sensitive way for the 4th- to 7th-grade levels. Includes glossary and illustrations. Soft cover.") #45-3281, \$4.45.

"Acid Rain: The Devastating Impact on North America," by Ross Howard and Michael Perley. 1982. 208 pages. N/A ("Accurate, vivid documentation of the most severe environmental problem in North America. Illustrated in black and white. Soft cover.") #45-3280, \$6.95.

"A Killing Rain: The Global Threat of Acid Precipitation," by Thomas Pawlick. 1984. 206 pages. N/A ("An investigative report on the causes and effects of acid rain. The author stresses the loss to people and considers what, if anything, is being done to correct the environmental crisis. Hard cover.") #45-3283, \$15.95.

## **Concern, Inc.**

"Acid Rain: The Invisible Pollutant." May, 1982. Brochure. Affected areas; effects on ecosystems, monuments, health; legislation, opportunities for individual action are also discussed. Free.

Bulletin: "Acid Rain Update." Winter, 1986. 4-page newsletter. Recent and pending state and federal legislative actions relating to acid rain are outlined. Readers are encouraged to write Congressional representatives. Free.

## **The Conservation Foundation**

- "Will Congress Swallow an Anti-Acid Bill?" January, 1983. 8-page newsletter. The 1983 political climate regarding acid rain legislation is discussed. Also included is a list of the top 50 coal fired power plants (rated by the amount of sulfur dioxide emissions produced) provided by Ontario Ministry of Environment. Free.
- "Acid Rain—A Major Threat to The Ecosystem." December, 1982. 8-page newsletter. Background information on acid rain, with emphasis on the lack of United States government action. Free.

## **Edison Electric Institute**

- "Acid Rain: The Creation of an Issue," by William H. Megonnell. 1984. 8-page pamphlet; transcribed speech. A sarcastic response to the pro-environmental view of the acid rain problem.
- "Acid Rain: Answers to Your Questions." 1985. 40-page pamphlet. Answers to questions on acid rain are excerpts from over 60 scientific papers. Free.
- "Understanding Acid Rain," by Alan W. Katzenstein. 1983. 50-page booklet. An overview of acid rain, its effects on the natural and built environments, present actions, and possible solutions. Free.
- "Acid Rain: The Debate Continues" 1985. 16-page booklet. An attractive summary of information on acid rain: pH, causes, effects, utility control technologies, and the need for research organizations. Excellent artwork; resources. Free.

## **Electric Power Research Institute (EPRI)**

- "Energy Researcher: Acid Rain." November, 1984. 4-page flier. A summary of the efforts of government and industry's research on the effects of acid rain, while stressing the need for more research. Free.

## **Environment Canada**

- "The Acid Rain Story." 1984. 16-page booklet, excellent photography and four-color artwork. An extremely attractive, four-color presentation of acid rain causes, effects, and actions by Canada and the United States. Excellent photography and graphics. Free.
- "Fact Sheet on Acid Rain." March, 1985. 8-page booklet. Answers to questions on acid rain are provided, along with excellent map work on loading and sensitive areas, though not to the extent of the 1984 "Acid Rain Story" (above). Free.
- "Downwind: The Acid Rain Story." 1982. 20-page booklet. Background information on pH, transport, sources, effects, and potential solutions. Additional readings are provided. Maps of eastern North America on areas of acidic sensitivity, loading, major wind paths, and pollutant emissions sources are included. Free.
- "Acid Rain: What it is and what it does (The Canadian Control Program)." (no date) 6-page flier. An outline of the Canadian acid rain problem, present regulations, and the strategy behind the Canadian Control Program. Free.
- "The Statistics (Acid Rain)." (no date) 6-page fold-out flier. Statistics and excellent graphs on emissions from various types of sources; projected impacts and sensitivity/wind pattern maps. One of the Canadian Control Program publications. Free.
- "Moving ahead on acid rain." (no date) 1-page fact sheet. Eight sentence statements on intended actions of the Canadian Control Program. Free.
- "Facts on Acid Rain: Aquatic Effects" (no date) 2-page factsheet. Answers to questions on acid rain, its impacts, and range. Free.

- "Fact Sheet: Acid Rain [in] British Columbia and Yukon." (no date) 3-page flier. Information on the potential problem in British Columbia and Yukon Territory with acid rain, including sensitive areas, sources, legislation, and forecasted problems. A list of additional readings is provided. Free.
- "Acid Rain Milestones." March, 1984. 4-page flier. Governmental steps toward alleviating the acid rain problem, from 1978 to 1984, for both Canada and the United States. Free.
- "Acid Rain." (no date) 4-page flier. Received from The Canadian Forestry Association of British Columbia. Background information on acid rain is provided with special emphasis on transport, pollutants, buffering, and research. Free.
- "Acid Rain: The Forecast for Western Canada." 1981. 4-page flier. Received from The Canadian Forestry Association of British Columbia. Background information on acid rain with emphasis on definition, situation in western Canada, effects of weather, research, and action. Free.
- "Long Range Transport of Airborne Pollutants [LRTAP]: Ecosystem Classification and Acid Rain." 1985. 6-page fold-out flier; green. Using representative watersheds in Canada, scientists are labeling effects of acid rain on specific ecosystem types. The methods used at the Turkey Lakes Watershed are outlined. Free.
- "Long Range Transport of Airborne Pollutants: Target Loading For Aquatic Ecosystems." 1985. 3-page flier; blue. Overview of acid rain effects on aquatic systems, controlling air quality pollution, and models of target loading. Free.
- "Long Range Transport of Airborne Pollutants: Acid Rain and Wildlife." 1985. 6-page fold-out flier; pink. Studies of the effects on amphibians and terrestrial wildlife are discussed as well as the effects of acid rain on the total food web. Free.

## **Environmental Protection Agency**

- "Acid Rain." July, 1980. 37-page booklet; EPA-600/9-79-036. Definition of acid rain problem; discussion of pH and a temporal and geographical look at acid precipitation. The importance of climate, geology, biota, and human activities to the effects of acid rain are described. Specific effects on aquatic and soil systems, vegetation, human created objects, and humans, as well as sources and control methods, are described. The roles of the EPA, research, states, and industry are discussed. Additional reading materials are listed. Very readable and well illustrated. No price given.
- "Three perspectives on acid rain (Canadian, industry, environmentalists)." From the Environmental Protection Agency Journal, June/July 1986, these articles give a good idea of the range of viewpoints that are likely to be encountered among park visitors.

## **Greenpeace**

- "Stop Acid Rain." (no date) Brochure. Designed to solicit contributions. Basic background information on acid rain is provided: definition, effects, results of research, Canada's role and that of the United States. Free.

## **Inform**

- "Acid Rain and Energy: A Challenge for New Jersey," by James S. Cannon. 1984. 38-page booklet. Summarizes a report on the re-instituting of coal-fired power plants in New Jersey, and the decrease in both consumer rates and air quality. \$3.50.

## The Izaak Walton League of America

- "The Only Fish That Thrives in Acid Rain: Red Herring; Myths and Facts About Acid Rain." (no date) Brochure. Five myths about acid rain are refuted, though no evidence for either claim is presented. (Also distributed by Bass Anglers for Clean Water, Inc.) Free.
- "IWLA Acid Rain Campaign: Acid Rain Fact Sheet." (no date) 2-page factsheet. Basic acid rain problems are outlined. Free.
- "Questions and Answers." (no date) 2-page Q/A sheet. Various acid rain questions and answers are presented. Free.

## Media Associates, Inc.

- "Acid Rain: A Critical Perspective," by Joshua J. Schneck. 1981. 64-pages. N/A ("Covers all aspects of acid rain, including history of the problem and possible solutions. Includes glossary and illustrations. For 8th to 12th-grade levels." Paperback.) \$5.45 + \$1.50 shipping.
- "For Crying Out Cloud: A Study of Acid Rain," by Marla Coyne and Nancy Smith. 1981. 64 pages. N/A ("Presents the complex problems of acid rain in a clear and sensitive way for the 4th- to 7th-grade levels. Includes glossary and illustrations." Paperback.) \$4.45 + \$1.50 shipping.
- "Acid From Heaven," by Susan West. (no date) Article reprint from Science News. N/A ("...good background information for teachers or supplemental reading assignments for students.") \$.50 each; \$1.00 shipping for up to 10 sets.
- "Acid Solutions," by Susan West. (no date) Article reprint from Science News. N/A ("...good background information for teachers or supplemental reading assignments for students.") \$.50 each; \$1.00 shipping for up to 10 sets. "Rain, Rain Go Away." (no date) 24-page coloring book for ages 4-9. \$1.95 + \$1.00 shipping.

## Michigan Department of Natural Resources

- "The Great Lakes Atmospheric Deposition Program in Michigan," by Laura J. Terkeurst. March, 1986. 16-page report. A description of the GLAD program in Michigan (a part of NADP) to measure acid precipitation in that state. As of 1985, the average pH state-wide was 4.2. Free.
- "Report and Recommendations of the Interagency Task Force on Acid Rain to Governor James J. Blanchard." Revised February, 1984. 50-page report. ". . . a summary of findings, introductory information about the acid rain issue, a summary and economic analysis of current legislative proposals, followed by discussion of various approaches and the Task Force's recommendations" on the direction pending acid rain legislation (1984) should take to be advantageous to Michigan. Free.
- "1985 Air Quality Report." 1985. 98-page report. Summary of air quality monitoring and results in Michigan for 1985. Free.

## Minnesota Department of Education

- "Acid Rain in Minnesota." 1984. 20-page booklet. (Also available from Acid Precipitation Awareness, Minnesota Pollution Control Agency, and The Acid Rain Foundation, Inc.) An overview of the acid precipitation situation of Minnesota, including definitions, sources, transport, buffering/sensitivity, the Great Lakes and Scandinavian problems, effects (on tourism, structures, health, agriculture, and forestry), research and actions. Additional resources. (Also available: "Acid Rain in Minnesota: A Resource Guide for Educators.") Free.

## **National Acid Precipitation Assessment**

"NAPAP Annual Report, Vol. IV, to the President and Congress." The National Acid Precipitation Assessment Program's annual report deals with many aspects of air quality research, including emissions and controls, atmospheric chemistry, air quality monitoring, terrestrial effects on forest and crops, aquatic effects, and effects on materials and cultural resources.

## **National Audubon Society**

"Conservation Notebook—Acid Rain: Traveling Pollution." (no date) 2-page factsheet. Brief summary of acid rain problem with emphasis on individual action. Free. (The National Audubon Society is presently undertaking a "Stop Acid Rain Campaign.")

## **National Clean Air Coalition**

"The Case For Acid Rain Control: Conclusions of the Study Panels, 1981-1986." 1986. 4-page factsheet. Summary of United States and Canadian governmental actions, scientific reports, international conferences on acid rain.

## **National Geographic Society**

"Air: An Atmosphere of Uncertainty," by Noel Grove. 1987, April. Discusses different aspects of air quality.

## **National Parks and Conservation Association**

"Acid Rain Invades Our National Parks," by Susan Buffone and Carolyn Fulco. 1987. 48 pages. This report provides an overview about air quality in National Park Service units.

## **National Wildlife Federation**

"Acid Rain: What It Is—How You Can Help!" Revised, 1984. 12-page booklet. Sources, pH, sensitivity, effects on natural and man-made environments, legislative action, economic threats and plea for citizen action. Especially appropriate for student use. References. Price not available.

"Save Sport Fishing, Stop Acid Rain." Brochure. Summary of acid rain problem (with emphasis on fishing/fish), with suggested individual actions. (Also distributed by The Izaak Walton League, Trout Unlimited, and The Canadian Wildlife Federation.) Free.

## **Ontario Ministry of the Environment**

"Countdown Acid Rain: Ontario's Acid Gas Control Program for 1986-1994." 1986. 11-page booklet. Description of program to reduce sulfur dioxide and nitrogen oxide emissions in Ontario through 1994. Free.

"Countdown Acid Rain." (no date) 4-page flier. Brief outline of the above plan. Free.

## **Sierra Club**

"Acid Rain: Congress Moves on Controls." May, 1986. 8-page newsletter. Description of 1986 Sikorski-Conte acid rain bill, history of air quality legislation, and listing of potential impacts of bill if passed on emissions by state. Free.

"Acid Rain: Are Clear Skies Ahead?" (no date) Brochure. Brief description of Sikorski-Conte bill with call for membership action. Free. Acid Rain response letter. 1986. Description of acid rain problem, with call for action. Bibliography and resources list. Free.

## **The Society of American Foresters**

"Acidic Deposition and Forests." 1984. 48-page booklet. Position statement, report of SAF task force, and description of effect of acid rain on soils, trees, and ecosystems. References. Free.

## **Soil Conservation Service of America**

"Acid Precipitation: A Position Statement." April, 1983. 8-page booklet. Description of acid rain problem; effects on aquatic environment, agriculture, forests, structures, and health; research; organizational and individual actions. Free.

## **U.S. Fish and Wildlife Service**

"Acid Rain: Effects on Fish and Wildlife," by Kathleen Stecher Mayer and R. Kent Schrieber. 1985. Fish and Wildlife Leaflet 1. 8-page booklet. Overview of acid rain problem: pH, sources, geography, sensitive areas, effects on fish and wildlife. Resources/references. Free.

## **Journal of Water Pollution Control Federation (Periodical)**

"The Acid Rain Debate: Is One Man's Power Another Man's Poison?" August, 1983. 8-page article reprint. Effects, sources, legislation, political environment, pH, international aspects. Free.

## **Worldwatch Institute**

"Worldwatch Paper 71 Altering the Earth's Chemistry: Assessing the Risks." July, 1986. 66 pages. A discussion of potential and present changes in world-wide climate and soils, resulting from air and water pollutants, such as carbon dioxide, sulfur dioxide, heavy metals, and synthetic chemicals. \$4.00/single copy; \$3.00/2-5 copies; \$2.00/6-20 copies; \$1.00/21 or more copies.

"Worldwatch Paper 58: Air Pollution, Acid Rain, and the Future of Forests." March, 1984. 54 pages. An international overview of air quality problems (including acid deposition, ozone, carbon dioxide) with respect to the forests of the world; sources; control technologies; and international politics. \$4.00/single copy; \$3.00/2-5 copies; \$2.00/6-20 copies; \$1.00/21 or more copies.

Table 3. Summary of Selected Informational Materials

Material Source	Type	Date	Intended Audience	Geographic Region	Advocacy	Qual.*	Inter.*	Graph*	Doc.**
Carolina Biological Supply (also from Media Assoc.):									
-Critic.	booklet	1981	8-12	-	-	-	-	-	-
-Cloud	booklet	1981	4-7	-	-	-	-	-	-
Edison Electric Institute:									
-Creat.	pamphlet	1984	all	US/Canada	pro-ind	2	2	-	-
-Debate	booklet	1985	students	US	neutral/p-i	5	4	5	few
EPRI	flier	1984	all	US	pro-res	4	3	3	X
Environment Canada:									
-AR Story	booklet	1984	all	Canada/US	pro-env	5	5	5	few
-Fact Sh.	booklet	1985	all	Canada/US	pro-env	5	5	5	few
US EPA:									
-AR	booklet	1980	all	US	neutral	4	4	3	X
-Toxic	booklet	1980	all	Great Lakes	neutral	3	3	3	X
The Izaak Walton League of America:									
-Herring	brochure	?	all	US/Canada	pro-env	3	4	3	-
Media Associates:									
-Critic.	booklet	1981	8-12	-	-	-	-	-	-
-Cloud	booklet	1981	4-7	-	-	-	-	-	-
-Heaven	reprint	?	7-12	-	-	-	-	-	-
-A.Sol'n	reprint	?	7-12	-	-	-	-	-	-
-Rain	color.book	?	ages 4-9	Canada	pro-env	4	4	3	-
Minnesota Department of Education:									
-AR in MN	booklet	1984	all	Minnesota	pro-env	4	3	3	X

\* Number values for Quality (Qual.), Interest (Inter.) and Graphics and Artwork (Graph) are: Excellent = 5, Good = 4, Fair = 3, Poor = 2 and Very Poor = 1.

\*\* Documentation (Doc.) levels are denoted by "X" for "Well documented," "few" for "Somewhat well documented," and "-" for "Little or No Documentation."

## IV

# NPS Air Quality Reference Materials

The following items are available upon request from the National Park Service, Air Quality Division. These materials are resources for the development of air quality interpretive activities or programs. If further assistance or other materials are needed in the development of air quality interpretive programs please contact:

Mr. Dee Morse  
National Park Service  
Air Quality Division  
P.O. Box 25287  
Lakewood, Colorado 80225  
Phone: (303) 969-2071, FTS 327-2071

### Information Material

#### **Air Resource Management Manual**

This manual explains the nature and value of air as a park resource, air resource relevance to other park resources and the visitor's experience, the National Park Service mission to manage the air resource in the parks, types of major air pollution and subsequent resource protection issues facing the National Park Service, and specific information on the kinds of assistance available within the National Park Service to aid personnel in air resource management activities. The manual is used by park personnel as a source of information for air resource management activities, air quality interpretive programs and to supplement training programs.

#### **"Air Quality in the National Parks"**

This report summarizes data collected from the National Park Service air quality research and monitoring program and includes information on, visibility monitoring, criteria pollutant monitoring, air pollution effects on visitor experiences, and air pollution effects on biological resources.

#### **"Atmospheric Haze" Its Sources and Effects on Visibility in Rural Areas of the Continental United States"**

This is a paper prepared by Dr. William Malm (NPS Air Quality Division). The paper explains how visibility is effected by air pollution. The paper serves as a good reference for historical and current visibility conditions in the U.S. There is information in the paper about visibility conditions for several park service units, servicewide.

#### **Introduction to Visibility**

This document explains the mechanics of how air pollution causes visibility reduction.

## **Impacts of Air Pollution on National Park Units, Hearings Before the Subcommittee on National Parks and Recreation of the Committee on Interior and Insular Affairs House of Representatives.**

This document includes testimony and research findings presented at the subcommittee hearings on May 20 and 21, 1985. The document includes information on air pollution effects on vegetation, visibility, cultural resources, and aquatic systems in National Park Service areas. Information on acid deposition is also presented in the document.

### **Air Quality Articles in Park Interpretive Newspapers**

These articles are a few examples of how air quality issues/concerns have been presented to the public in interpretive activity newspapers. The articles were drafted by the park staff and submitted to the Air Quality Division for review.

### **Air Quality Interpretive Pamphlets**

These pamphlets are examples of how air quality information on research and monitoring activities and issues/concerns has been presented to the public in a pamphlet format. The pamphlets were drafted by park personnel along with the technical assistance of the Air Quality Division.

### **Air Quality Primer, "Oh, Say, Can You See"**

This air quality primer addresses air pollutants, visibility impairment, acidic deposition, regulatory tools for addressing National Park service air quality issues, and air quality monitoring and research activities. The primer has been used by park personnel to supplement training and orientation sessions for new employees and seasonal employees.

### **Bryce Canyon Interpretive Prospectus**

The prospectus includes several air quality interpretive goals, themes, and objectives and sets the stage for the development of new air quality slide presentations, wayside exhibits and museum exhibit for the park. Harpers Ferry Center, Rocky Mountain Regional Office Interpretive Division, Air Quality Division, Bryce Canyon NP, and Bryce Canyon concessionaire personnel worked on the development of this interpretive prospectus.

### **Layout Designs for Air Quality Interpretive Displays**

These are layout designs for air quality interpretive portable posters and wayside exhibits. The poster displays are constructed by the National Park Service Denver Service Center and cost approximately \$200. The wayside exhibits were constructed by firms contracted through Harpers Ferry Center and cost approximately \$3,000. The Air Quality Division has limited funding available for these types of project.

- o Grand Canyon NP, Hopi Point, Air Quality Wayside Exhibit: This exhibit was developed by the Grand Canyon natural resources personnel and the Air Quality Division. The exhibit informs the public about visibility impairment and sources of anthropogenic air pollution at the Grand Canyon.

- ° Great Smoky Mountains NP, Newfound Gap Air Quality Wayside Exhibit: This exhibit informs the public about the air quality issues facing the National Park Service at Great Smoky Mountains and types of air pollutants at the park, where the pollutants come from and the effects the pollutants have on visibility and biological resources.
- ° Portable Visibility Poster Displays: These displays are constructed on light weight foam core backing and are approximately 30 inches by 40 inches. The displays are placed in visitor centers and are also used at training sessions. These posters are developed to inform people about the causes and effects of visibility impairment at a park. The posters are also developed to inform the public about other air quality issues facing the National Park Service.

The visibility exhibits/posters include photographs which show good to bad visibility conditions at the park unit. Park units that want to obtain photographs showing visibility impairment can do so by following established criteria for photographically documenting visibility impairment. Visual range can then be determined from the slides. The criteria for photographically documenting visibility impairment can be obtained upon request from the Air Quality Division.

## **Audio-visual Materials**

### **Air Quality Related Slide Base**

The slide base consist of 115 slides which show air pollution sources; air pollution effects on biological resources and visibility; air quality monitoring and research activities; and maps of class I clean air areas.

The slides have been distributed to park units for use in natural resource interpretive slide presentations and to supplement air quality training sessions.

### **National Park Service Standard Visual Range Spectrum Slide Sets**

The Air Quality Division has a set of slides for park units where visibility monitoring has been conducted. The slide sets consists of slides which show varying degrees of visibility impairment at National Park Service monitoring sites. Information accompanying the slides include visual range, and the date when the photograph was taken. The slide sets are used for management activities, policy formulation, and interpretive programs and are available upon request from the Air Quality Division.

### **Park Specific Air Quality Slide/Tape Scripts**

This material includes slides and scripts from air quality slide presentations. The presentations were produced by interpretive personnel from several park units.

## V

# Sources of Materials and Information

**Acid Rain Foundation, Inc., The**  
1630 Blackhawk Hills  
St. Paul, MN 55122

**Acid Rain Information Clearinghouse**  
33 South Washington Street  
Rochester, New York 14608

**Air Pollution Control Assoc.**  
P.O. Box 2861  
Pittsburgh, PA 15230

**Air Science Company**  
P.O. Box 143  
Corning, New York 14830

**American Chemical Society**  
Department of Government Relations  
and Science Policy  
1155 16th St., NW  
Washington, D.C. 20036

**American Chemical Society News Service, The**  
1155 16th St., NW  
Washington, D.C. 20036

**American Forests**  
The American Forestry Assoc.  
1319 18th St., NW  
Washington, D.C. 20036

**American Lung Association**  
1740 Broadway  
New York, NY 10019

**Atlantic Center for the  
Environment, The**  
39 S. Main St.  
Ipswich, MD 01938

**Bass Anglers for Clean Water, Inc.**  
No. 1 Bell Rd.  
Montgomery, AL 36119

**British Columbia Ministry of  
Environment**  
Information Services  
810 Blanshard St.  
Victoria, BC V8W 3E1  
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**Canadian Acid Precipitation Foundation, The**  
Canadian Coalition on Acid Rain  
112 St. Clair Ave., W.  
Suite 504  
Toronto, Ontario M4V 2Y3  
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**Canadian Embassy**  
Public Affairs Division  
1771 N St., NW  
Washington, D.C. 20036-3879

**Canadian Nature Federation**  
75 Albert St.  
Ottawa, Ontario K1P 6G1  
CANADA

**Carolina Biological Supply**  
2700 York Rd.  
Burlington, NC 27215

**Colorado Department of Education,  
Conservation Service**  
State Office Building  
201 E. Colfax Ave.  
Denver, CO 80203

**Concern, Inc.**  
1794 Columbia Rd., NW  
Washington, D.C. 20036

**Conservation Foundation, The**  
1717 Massachusetts Ave., NW  
Washington, D.C. 20036

**Diversified Education Enterprises**  
725 Main St.  
Lafayette, IN 47901

**Edison Electric Institute**  
1111 19th St., NW  
Washington, D.C. 20036

**Education Materials and Equipment**  
P.O. Box 17  
Pelham, NY 10803

**Electric Power Research Institute**  
3412 Hillview Ave.  
P.O. Box 10412  
Palo Alto, CA 94303

**Energy Source Education Program**  
Distribution Office  
5505 E. Carson St.  
Suite 259  
Lakewood, CA 90713

**Environment Canada**  
c/o Canadian Embassy  
Public Affairs Division  
Room 300  
1771 N St., NW  
Washington, D.C. 20036-2879

**Environmental Protection Agency**  
Publications Center of Environmental  
Research Information  
Cincinnati, OH 45268

**Federation of Ontario Naturalists**  
355 Lesmill Road  
Don Mills, Ontario M3B 2W8  
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**Films, Inc.**  
5547 N. Ravenswood Ave.  
Chicago, IL 60640

**Great Smoky Mountains National Park**  
Gatlinburg, TN 37738

**Greenpeace**  
2623 W. 4th St.  
Vancouver, BC V6K 1P8  
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**Inform**  
381 Park Ave., S.  
New York, NY 10016

**International Tele-Film**  
1200 W. Pender St.  
Suite 407  
Vancouver, BC V6E 2S9  
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**Izaak Walton League of America, The**  
1800 N. Kent St.  
Arlington, VA 22209

**Journal of Water Pollution Control Federation**  
c/o Water Pollution Control Federation  
2626 Pennsylvania Ave., NW  
Washington, D.C. 20037

**Media Associates, Inc.**  
5230 W. 73rd St.  
Minneapolis, MN 55435

**Michigan Department of Natural Resources**  
Air Quality Division  
Box 30028  
Lansing, MI 48909

**Minnesota Department of Education**  
Attn: Richard Clark  
642 Capital Square Building  
St. Paul, MN 55101

**Minnesota Sea Grant Extension:**  
Lacustrine Lessons  
208 Washburn Hall  
University of Minnesota-Duluth  
2400 Oakland Ave.  
Duluth, MN 55812

**National Acid Precipitation Assessment Program**  
722 Jackson Place N.W.  
Washington, D.C. 20503

**National Audubon Society**  
950 3rd Ave.  
New York, NY 10022

**National Clean Air Coalition**  
530 7th St., SE  
Washington, D.C. 20003

**National Film Board of Canada**  
Suite 313  
111 E. Wacker Dr.  
Chicago, IL 60601

**National Institute for Urban Wildlife**  
10921 Trotting Ridge Way  
Columbia, MD 21044

**National Park Service**  
Air Quality Division  
P.O. Box 25287  
Lakewood, CO 80225

**National Parks and Conservation  
Association**  
1015 31st Street, N.W.  
Washington, D.C. 20007

**National Public Radio**  
2025 M St., NW  
Washington, D.C. 20036

**National Wildlife Federation**  
1412 16th St., NW  
Washington, D.C. 20036

**New Jersey Department of Environmental  
Protection**  
Labor and Industry Building  
CN 402  
Trenton, NJ 08625

**New York State Sea Grant Institute**  
37 Elk St.  
New York, NY 12246

**Ontario Ministry of the Environment**  
Information Services  
135 St. Clair Ave., W.  
Toronto, Ontario M4V 1P5  
CANADA

**Province of British Columbia**  
Ministry of the Environment  
Parliament Buildings  
Victoria, BC V8V 1X4  
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**PUCE**  
342 Sherbrooke est.  
Montreal Quebec H2X 1E6  
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**Sierra Club**  
530 Bush St.  
San Francisco, CA 94108

**Sigurd Olson Environmental Institute**  
Northland College  
Ashland, WI 54806

**Society of American Foresters, The**  
5400 Grosvenor Lane  
Bethesda, MD 20814

**Soil Conservation Service of America**  
7515 NE Ankeny Rd.  
Ankeny, IA 50021-0764

**Time-Life Video**  
100 Eisenhower Dr.  
Paramus, NJ 07652

**U.S. Fish and Wildlife Service**  
Federal Building, Fort Snelling  
Twin Cities, MN 55111

**U.S. Fish and Wildlife Service**  
Publication Unit  
Washington, D.C. 20240

**Umbrella Films**  
60 Blake Rd.  
Brookline, MD 02146

**Wisconsin Department of Natural Resources**  
Bureau of Information and Education  
Box 7921  
Madison, WI 53707

**Wisconsin Educational Radio and Television  
Networks**  
3319 W. Beltline Highway  
Madison, WI 53713-2899

**Worldwatch Institute**  
1776 Massachusetts Ave., NW  
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