

Reports

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**Environmental education resources directory : a guide to environmental information and educational resources in Virginia**

Department of Environmental Quality, Commonwealth of Virginia

Virginia Institute of Marine Science

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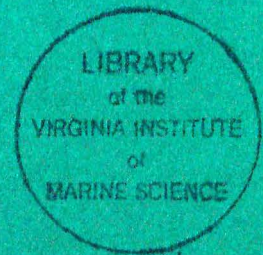
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# Environmental Education Resources Directory



# Environmental Education Resources Directory

A Guide to Environmental Information and Educational Resources in Virginia

*Produced by:*

**Department of Environmental Quality**  
Commonwealth of Virginia

**Virginia Institute of Marine Science**  
School of Marine Science  
College of William and Mary

Jan Hodges and Ann Regn, *Editors*

*With Financial Assistance from:*

**Virginia Environmental Endowment**  
**Virginia Resource-Use Education Council**  
**Virginia Sea Grant Marine Advisory Program**  
**Chesapeake Bay National Estuarine Research Reserve in Virginia**

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**Virginia Department of Education**

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**Bill Portlock**

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October 1994

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## Introduction

It is with great pleasure that the Department of Environmental Quality presents the *Environmental Education Resources Directory: A Guide to Environmental Information and Educational Resources in Virginia*.

We have cataloged a considerable amount of information on materials and services available to help you learn or teach about Virginia's environment. You will find nearly 300 educational resources listed in an easy-to-use format. An electronic version of the directory can be found on VA PEN, the Virginia Department of Education's electronic network for teachers. While this directory is designed to be used by educators, we hope it will be useful to the general public as well.

A variety of organizations were asked to contribute information on materials and programs available to Virginians about the Commonwealth's resources. These entries reflect their responses but do not represent all the environmental education resources that are available; many more references exist on national and international issues from various other groups.

Because this material comes from a broad range of sources, the value of the information must be left to the judgment of individual users. We hope readers will explore the diversity of references and approaches, and as they discover new resources, send them to us for inclusion in the directory, which will be updated periodically.

The directory was a collaborative project involving a number of state agencies and institutions who provided funding and other support: Virginia Institute of Marine Science/ College of William and Mary, the Chesapeake Bay National Estuarine Research Reserve in Virginia, the Virginia Sea Grant College Program, the Department of Education, and the Department of Conservation and Recreation. In addition, the Virginia Environmental Endowment and the Virginia Resource-Use Education Council provided major funding.

We also thank all the agencies, organizations and individuals who submitted information and reviewed the directory. Without their help this project would not have been possible.

Today in Virginia and across the country, we face challenges in managing natural resources for the health and welfare of our citizens. These challenges can be met if public and private decision-making is informed by a full and reasoned understanding of the nature of resources, range of choices, and actual risks involved in addressing specific concerns, and by the application of the principles of science, including the science of economics. Success will depend on providing a healthy governmental and economic environment to foster and empower individual responsibility, private initiative and innovation. With this directory we hope to encourage the critical inquiry which must form the basis of stewardship efforts in the Commonwealth.

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*This directory is a listing of some of the many environmental education resources available and is not an endorsement of any particular item. These materials may not reflect the opinions or policies of the Department of Environmental Quality. Educators should review **all** materials carefully to determine if appropriate for their audience.*

# Helpful Hints When Using This Directory...

## ***How is the directory organized?***

Entries are categorized by topic (e.g. air, water, waste), and are arranged alphabetically by type of product or service (e.g. awards, brochures, conference, etc.).

## ***How is the information listed in each entry?***

### **Sample entry**

#### ***Conserving Soil (Title of material)***

##### *Available from:*

John Marshall Soil and Water  
Conservation District

This materials packet contains a...

(Describes the material, including the author and/or producer, date, length, and the audience\* for which the material is intended.)

##### *Ordering instructions:*

Available only to Fauquier County  
residents; call JMSWCD.

(Lists the source by acronym and ordering instructions including cost, if any.\*\* Acronyms are listed in the first section of the directory.)

\* Please note that many entries include materials more appropriate for adults than for K-12 students, but may be listed because a K-12 educator could learn from the materials and convey the information to students. Also, some resources listed as appropriate for adults would work as references for high school students.

\*\* Some materials are from local and regional organizations serving a particular geographic area. However, most of these organizations have counterparts around the state (e.g. Soil and Water Conservation Districts, Litter Control Councils, etc.). Try contacting your local group for similar materials or services. And if there isn't a local counterpart for the organization or service you're looking for, why not start a group yourself?

## ***What if I can't find what I'm looking for?***

If you can't find what you're looking for, either check the index or a related

topic. For example, you might check marine and aquatic resources as well as water resources.

Also there are several collections of materials listed as single entries — what you want may be contained in one of them.

Finally, check the general Environmental Education or general Chesapeake Bay topics. There are a lot of resources listed under these broad topics because they cover a wide range of subjects and could not readily be categorized by any one topic.

## ***How do I obtain materials of interest?***

Look up the acronym for the source in the list of agencies, institutions and organizations, then call or write that group for more information. Remember, they might have other materials of interest not catalogued in this directory.

## ***Might there be more than one source for materials?***

Yes, there may be another source for some materials. Some resources were submitted for entry by their producer, and the producer is listed as the source, but another source (such as the Chesapeake Bay Lending Library) may have copies of what you are looking for. So when you call and a resource is out of stock or out on loan, ask if there's another source for the material. Some items identify the producer in the description and you can always contact the original producer directly.

## ***What if I'm interested in a particular product or service?***

The index provides an alphabetical list of products and services, with the title and topic section noted.

## ***How can I submit additional entries?***

Send a copy of the material you would like listed in the directory or a complete description of the service you provide to the Department of Environment Quality, Division of Public Affairs, PO Box 10009, Richmond, VA 23240-0009.

The directory will be updated periodically. Corrections, additions, and deletions will be made routinely and posted on VA PEN, the Department of Education's electronic network for educators. If you have access to VA PEN, please consult that file for the latest, most accurate version. Any suggestions are welcome.

# Agencies, Institutions & Organizations

ACB

**Alliance for the Chesapeake Bay**

P. O. Box 1981  
Richmond VA 23216  
(804) 775-0951

ANS

**Audubon Naturalist Society**

8940 Jones Mill Road  
Chevy Chase MD 20815  
(301) 652-9188

APPCO

**Appalachian Power Company**

P.O. Box 2021  
Roanoke VA 24019  
(703) 985-2353

AWWA

**American Water Works Association**

3629 George Washington Highway  
Yorktown VA 23693  
(804) 867-9171

BPFS

**Bill Portlock Field Studies**

Rt. 1 Box 107  
Bowling Green VA 22427  
(804) 633-7249

BREN

**Blue Ridge Environmental Network**

P. O. Box 1623  
Roanoke VA 24008  
(703) 985-0808

BRPT

**Blue Ridge Public Television**

P. O. Box 13246  
Roanoke VA 24032  
(703) 344-0991

BRWS

**The Blue Ridge Wildflower Society**

P. O. Box 20385  
Roanoke VA 24018

CBF

**Chesapeake Bay Foundation**

1001 E. Main Street, Suite 815  
Richmond VA 23219  
(804) 780-1392

CBNERR

**Chesapeake Bay National Estuarine  
Research Reserve in Virginia**

P. O. Box 1346  
Gloucester Point VA 23062  
(804) 642-7144

CBYCC

**Chesapeake Bay Youth Conservation  
Corps**

301 Albemarle Drive  
Chesapeake VA 23320  
(804) 436-8185

CEC

**Citizens Environmental Council**

522 Mountain Avenue  
Roanoke VA 24016  
(703) 343-8172

CFLC

**Caroline Furnace Lutheran Camp  
and Retreat Center**

HC 60 Box 3865  
Fort Valley VA 22652  
(703) 933-6266

CG

**Commonwealth Gas**

P.O. Box 35800  
Richmond VA 23235  
(804) 323-5450

CHAS

**Cape Henry Audubon Society**

P. O. Box 1533  
Norfolk VA 23501  
(804) 622-0372

CSWCD

**Colonial Soil and Water  
Conservation District**

3302 Craggy Oak Court  
Williamsburg VA 23188-1080  
(804) 564-1870

CTFNFM

**Citizens Task Force on National  
Forest Management**

2753 Tanglewood Drive  
Roanoke VA 24018  
(703) 774-6690

CVC

**Clean Valley Council**

P. O. Box 3320  
Roanoke VA 24015  
(703) 345-5523

DACS

**Department of Agriculture and  
Consumer Services**

P. O. Box 1163  
Richmond VA 23219  
(804) 786-2373

DCR

**Department of Conservation and  
Recreation**

203 Governor Street  
Richmond VA 23219  
(804) 371-7535

DEQ  
**Department of Environmental  
Quality**  
P.O. Box 10009  
Richmond VA 23240-0009  
(804) 762-4570

DGIF  
**Department of Game and Inland  
Fisheries**  
4010 West Broad Street  
Richmond VA 23230  
(804) 367-1000

DMME  
**Department of Mines, Minerals, and  
Energy**  
2201 West Broad Street  
Richmond VA 23220  
(800) 552-3831

DOF  
**Department of Forestry**  
P.O. Box 3758  
Charlottesville VA 22903  
(804) 977-6555

EC  
**Environmental Concern, Inc.**  
P.O. Box P  
St. Michaels MD 21663

ENV  
**Education Network of Virginia**  
3421 Surrey Lane  
Falls Church VA 22042  
(703) 698-0487

EPA  
**US Environmental Protection Agency  
Region III-Office of External Affairs**  
841 Chestnut Building  
Philadelphia PA 19107  
(215) 597-9076

FAS  
**Fairfax Audubon Society**  
P. O. Box 82  
Vienna VA 22183  
(703) 256-6895

FEE  
**Friendship Environmental Education**  
P. O. Box 145  
Palmyra VA 22963  
(804) 589-8950

FOL  
**Fauquier Outdoor Lab**  
705 Waterloo Road  
Warrenton VA 22186  
(703) 347-2788

FR  
**Friends of the Rappahannock**  
P. O. Box 7254  
Fredericksburg VA 22404  
(703) 373-3448

FRO  
**Friends of the Roanoke**  
P. O. Box 1750  
Roanoke VA 24008  
(703) 343-3696

FSN  
**Friends of the North Fork  
(Shenandoah River)**  
P. O. Box 746  
Woodstock VA 22664

FSS  
**Friends of the Shenandoah River  
(South Fork)**  
P. O. Box 410  
Front Royal VA 22630  
(703) 636-4948

GEMS  
**Great Explorations in Math and  
Science**  
Lawrence Hall of Science  
University of California  
Berkeley CA 94720  
(510) 642-7771

ICBS  
**Institute for Chesapeake Bay Studies**  
Rt. 1 Box 107  
Bowling Green VA 22427  
(804) 633-7249

JMSWCD  
**John Marshall Soil and Water  
Conservation District**  
98 Alexandria Pike, Suite 31  
Warrenton VA 22186  
(703) 347-3120

MF  
**Maymont Foundation**  
1700 Hampton Street  
Richmond VA 23220  
(804) 358-7166

MM  
**Mariners' Museum**  
100 Museum Drive  
Newport News VA 23606  
(804) 595-0368

MMZP  
**Mill Mountain Zoological Park**  
P. O. Box 13484  
Roanoke VA 24034  
(703) 343-3241

MPNV  
**Moving People of Northern Virginia**  
310 N. Royal Street  
Alexandria VA 22314  
(703) 836-0925

NABT  
**National Association of Biology  
Teachers**  
11250 Roger Bacon Drive, # 19  
Reston VA 22090  
(703) 471-1134

NAIB  
**National Aquarium in Baltimore**  
Pier 3, 501 E. Pratt Street  
Baltimore MD 21202-3194  
(410) 576-3887



NASA CORE  
**NASA Central Operation of  
Resources for Teachers**  
1581 Route 58 South  
Oberlin OH 44074  
(216) 774-1051

NSVAS  
**Northern Shenandoah Valley  
Audubon Society**  
P. O. Box 175  
Boyce VA 22620  
(703) 667-3184

RACV  
**Recycling Association of Central  
Virginia**  
P. O. Box 8476  
Richmond VA 23226  
(804) 649-RACV

SCETV  
**South Carolina Educational TV**  
Marketing Department  
Box 11000  
Columbia SC 29211  
1(800) 553-7752

NBG  
**Norfolk Botanical Garden**  
Azalea Garden Road  
Norfolk VA 23518  
(804) 441-5803

NWF  
**National Wildlife Federation**  
1400 Sixteenth Street, NW  
Washington DC 20036-2266  
(800) 245-5484

RAS  
**Richmond Audubon Society**  
P. O. Box 804  
Richmond VA 23207  
(804) 257-0813

SMWVA  
**Science Museum of Western Virginia**  
1 Market Square  
Roanoke VA 24011  
(703) 342-5710

NC  
**Nature Conservancy**  
1233-A Cedars Court  
Charlottesville VA 22903  
(804) 295-6106

NWI  
**National Wilderness Institute**  
P.O. Box 25766, Georgetown Station  
Washington DC 20007  
(703) 836-7404

RCPR  
**Roanoke County Parks and  
Recreation**  
1206 Kessler Mill Road  
Salem VA 24153  
(703) 387-6091

SRI  
**Steel Recycling Institute**  
5102 #2 W. Village Green Drive,  
Suite 107  
Midlothian VA 23112  
(804) 744-7408

NEED  
**National Energy Education  
Development Project**  
P. O. Box 2518  
Reston VA 22090  
(804) 860-5029

OE  
**Ocean Encounters**  
405 Pleasant Street  
Highland Springs VA 23075  
(804) 737-7505

RPS  
**Rappahannock Preservation Society**  
P.O. Box 66  
Topping VA 23169  
(804) 758-2569

TARF  
**The Acid Rain Foundation**  
1410 Varsity Drive  
Raleigh NC 27606  
(919) 828-9443

NFRC  
**National Fisheries Research Center**  
Box 700  
Kearneysville WV 25430  
(304) 715-8461

PAV  
**Preservation Alliance of Virginia**  
P. O. Box 1407  
Staunton VA 24402  
(703) 886-4362

RRPO  
**Roanoke Regional Preservation Office**  
1030 Penmar Avenue SW  
Roanoke VA 24013  
(703) 857-7585

TU  
**Trout Unlimited**  
800 Follin Lane, SE, Suite 250  
Vienna VA 22180  
(703) 281-1100

NGS  
**National Geographic Society**  
Educational Services  
Washington DC 20036  
1(800)368-2728

PWCLCC  
**Prince William County Litter Control  
Council**  
3460 Commission Court  
Prince William VA 22192  
(703) 792-6272

SAV  
**State Arboretum of Virginia**  
P. O. Box 175  
Boyce VA 22620  
(703) 837-1758

UC/PDCCC  
**Union Camp/Paul D. Camp  
Community College**  
100 N. College Drive  
Franklin VA 23851  
(804) 562-2171

UPV  
**University Press of Virginia**  
Box 3608 University Station  
Charlottesville VA 22903  
(804) 924-6064

USFWS-CB  
**US Fish and Wildlife  
Service-Chesapeake Bay Field Office**  
177 Admiral Cochrane Drive  
Annapolis MD 21401  
(410) 224-2732

VATECH -- CEE  
**Virginia Tech -- Center for Economic  
Education**  
218 Hutcheson Hall  
Blacksburg VA 24061-0401  
(703) 231-7722

VATECH -- CFWR  
**Virginia Tech -- College of Forestry  
and Wildlife Resources**  
324 Cheatham Hall, VPI&SU  
Blacksburg VA 24060-0321  
(703) 231-7670

VCC  
**Valley Conservation Council**  
P. O. Box 2335  
Staunton VA 24402  
(703) 886-3541

VCE  
**Virginia Center for the Environment**  
(formerly Tandem Center for the Env)  
1706 Bent Tree Court  
Charlottesville VA 22902  
(804) 296-7165

VCES  
**Virginia Cooperative Extension  
Service**  
Box 9081, Virginia State University  
Petersburg VA 23806  
(804) 524-5964

VCU/OES  
**Office of Environmental Studies**  
**Virginia Commonwealth University**  
901 W. Franklin Street, Box 2527  
Richmond VA 23284  
(804) 367-7202

VEE  
**Virginia Environmental Endowment**  
1051 E. Cary Street, P. O. Box 790  
Richmond VA 23206-0709  
(804) 644-5000

VEN  
**Virginia Environmental Network**  
1001 E. Broad Street, # 435  
Richmond VA 23219  
(804) 644-0283

VEP  
**Virginia's Explore Park**  
Hofauser House  
3900 Rutrough Road  
Roanoke VA 24014  
(703) 344-3190

VFBF  
**Virginia Farm Bureau Federation**  
P.O. Box 27552  
Richmond VA 23261  
(804) 784-1374

VFHPP  
**Virginia Foundation for the  
Humanities and Public Policy**  
145 Ednam Drive  
Charlottesville VA 22903  
(804) 924-3296

VI  
**Versar, Inc.**  
6850 Versar Center  
Springfield VA 22151  
(800) 2-VERSAR

VIMS  
**Virginia Institute of Marine Science**  
**Virginia Sea Grant College Program**  
P. O. Box 1346  
Gloucester Point VA 23062  
(804) 642-7172  
Aquarium: 642-7176

VLM  
**Virginia Living Museum**  
524 J. Clyde Morris Blvd  
Newport News VA 23601  
(804) 595-1900

VMNH  
**Virginia Museum of Natural History**  
1001 Douglas Avenue  
Martinsville VA 24112  
(703) 666-8615

VMSM  
**Virginia Marine Science Museum**  
717 General Booth Boulevard  
Virginia Beach VA 23451  
(804) 437-4949

VNPS  
**Virginia Native Plant Society**  
P. O. Box 844  
Annandale VA 22003  
(703) 672-3814

VOICE  
**Virginia Organized Industries for a  
Clean Environment**  
P. O. Box 241  
Richmond VA 23202  
(804) 644-7884

VP  
**Virginia Power - Educational Services**  
P. O. Box 26666  
Richmond VA 23261

VPPSA  
**Virginia Peninsulas Public Service Authority**  
2 Eaton Street, Suite 502  
Hampton VA 23669  
(804) 728-2062

VRUEC  
**Virginia Resource-Use Education Council**  
c/o DEQ - Division of Public Affairs  
P.O. Box 10009  
Richmond VA 23240-0009  
(804) 762-4442

VWF  
**Virginia Wildlife Federation**  
4602 West Grove Court  
Virginia Beach VA 23455  
(804) 464-3136

VWRRC  
**Virginia Water Resources Research Center**  
617 N. Main Street  
Blacksburg VA 24060  
(703) 231-8036

VZS  
**Virginia Zoological Society**  
3500 Granby Street  
Norfolk VA 23504  
(804) 624-9937

WCML  
**Wilderness Conservancy at Mountain Lake**  
Route 700  
Mountain Lake VA 24136  
(703) 626-7614

WCV  
**The Wildlife Center of Virginia**  
P. O. Box 98  
Weyers Cave VA 24486  
(703) 234-9453

WG  
**Washington Gas**  
6801 Industrial Road, Room 249  
Springfield VA 22151  
(703) 750-5522

WI/TF  
**Watershed Initiative/TheTides Foundation**  
P. O. Box 6662  
Annapolis MD 21401  
(410) 268-4459

WJ  
**Westview on the James**  
1231 West View Road  
Goochland VA 23063  
(804) 457-4210

WM  
**Watermen's Museum**  
309 Water Street  
Yorktown VA 23690  
(804) 887-2641

WMHR  
**Waste Management of Hampton Roads**  
401 E Street  
Hampton VA 23661  
(804) 838-6008

WRI  
**World Resources Institute**  
1709 New York Ave., NW  
Washington DC 20006  
1(800)822-0504

# General Environmental Education



While environmental education involves many disciplines with different emphases, programs meant to prepare students to understand challenges and make informed decisions must be undergirded by science-based knowledge.

These are some of the broad elements that environmental education programs incorporate to help their audiences become environmentally literate:

*Knowledge:* an understanding of how the environment functions in the natural world, how people use it, how issues arise, questions are resolved, choices are weighed and policy formed. An understanding of the principles of ecology, natural resource management, social studies and public policy is essential.

*Awareness:* an ability to perceive, understand differences and analyze perceptions about the environment.

*Skills:* the physical, mental, and social skills necessary to identify, investigate, monitor, and resolve issues.

*Attitudes:* a framework of concerns for other people and their needs, and for the environment.

*Participation:* helping people use their acquired knowledge and skills to make choices and take thoughtful and responsible actions.

Curriculum specialists recommend that environmental learning should involve real problems and issues, use interactive, hands-on techniques, consider many perspectives, and present unbiased information.

## awards

### ***Conservation Teacher of the Year Award***

#### *Available from:*

John Marshall Soil and Water Conservation District

This award recognizes an educator in Fauquier County who has demonstrated exceptional effort in teaching students about conservation-related topics. All grade levels are eligible.

#### *Ordering instructions:*

Contact JMSWCD for information on what types of projects are eligible.

### ***Prince William County Litter Control Council Awards***

#### *Available from:*

Prince William County Litter Control Council

Awards for Youth of the Year, Ecology Club of the Year, and Environmental Educator of the Year honor excellence in environmental education in Prince William County.

#### *Ordering instructions:*

Call PWCLCC for information.

### ***Excellence in Environmental Education Awards***

#### *Available from:*

U. S. Environmental Protection Agency - Region III

This award recognizes outstanding contributions to environmental education in EPA - Region III.

#### *Ordering instructions:*

Contact EPA for additional information.

### ***Earthwatcher Award***

#### *Available from:*

Virginia Living Museum

Selected middle and secondary teachers in each of four regions of Virginia are awarded \$1,000 each. Winners will have completed or have on-going class projects that help protect the environment, human health or species.

#### *Ordering instructions:*

Call VLM for an application.

### ***Conservation Awards Program***

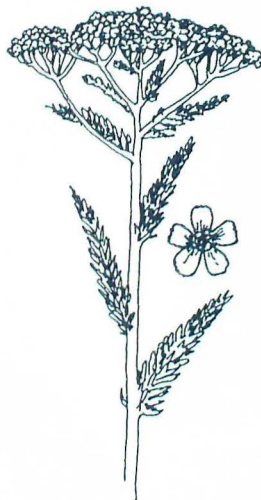
#### *Available from:*

Virginia Wildlife Federation

Individuals and groups are eligible for awards for accomplishments in conservation in Virginia. There are 14 categories of awards, including Youth Conservationist of the Year.

#### *Ordering instructions:*

Annual program information and nomination forms are available from VWF in July of each year.



## classes/workshops

### ***Experimental Research and Design***

#### *Available from:*

Appalachian Power Company

Program designed for teachers, students and PTA groups to teach basic principles necessary for designing and implementing scientific research and experiments. Geared toward preparation for science fairs.

#### *Ordering instructions:*

Programs are available to school groups in Southwest Virginia. Call APCO to schedule or for list of current programs.

### ***Children's Environmental Workshops***

#### *Available from:*

Audubon Naturalist Society

Classes and workshops (1-hour to 1-day) for elementary age students and teachers involve hands-on, outdoor, child-centered experiences.

#### *Ordering instructions:*

Contact ANS for list of programs available and scheduling information.

### ***Children's Environmental Workshops***

*Available from:*

Audubon Naturalist Society

Classes and workshops (1-hour to 1-day) for elementary age students and teachers involve hands-on, outdoor, child-centered experiences.

*Ordering instructions:*

Contact ANS for list of programs available and scheduling information.

### ***Environmental Education Program***

*Available from:*

Caroline Furnace Lutheran Camp

CFLC provides programs in 4 curricular areas and many subjects; single day and residential programs are available.

*Ordering instructions:*

Charges vary with length of program; contact CFLC to schedule.

### ***Maymont Park Nature Center and Children's Farm***

*Available from:*

Maymont Foundation

These hands-on programs use Maymont's animals and grounds. Program concepts include senses, seasons, food chains, water quality, aquatic life, endangered species, plants, trees, and insects. Programs vary in length from 30 minutes to two hours.

*Ordering instructions:*

Contact MF; cost for programs varies from \$8 - \$30.

### ***Teacher Workshops***

*Available from:*

National Aquarium in Baltimore

Schools or school districts can arrange half-day or full-day workshops for groups of 10 to 30 teachers. All workshops have conservation as part of the program; groups may choose from a list of established topics or arrange for a special topic.

*Ordering instructions:*

Contact NAIB; fees are \$125 (half day) or \$200 (full day), plus travel expenses.

### ***NatureQuest***

*Available from:*

National Wildlife Federation

This program provides participants with training, resources, and a model to develop an individualized nature program. The 3-day workshop trains camp program directors, outdoor and environmental educators, naturalists, and nature and science counselors. Sessions are available throughout the year.

*Ordering instructions:*

Contact NWF for descriptive brochure and registration information.

### ***Washington Action Workshop***

*Available from:*

National Wildlife Federation

This week-long conference, hosted by the Washington Action Workshop, is for citizens to learn about environmental issues and supporting environmental legislation.

*Ordering instructions:*

Contact NWF for additional information.

### ***EARTHDAY Everyday Program***

*Available from:*

Science Museum of Western Virginia

A program for 5th - 6th graders that uses hands-on activities to discover some of the causes of pollution and how to stop it.

*Ordering instructions:*

Call SMWV to schedule the program.

### ***Environmental Explorers***

*Available from:*

The Mariners' Museum

A variety of environmental programs for young people are available.

*Ordering instructions:*

Contact MM for a complete list of programs available and registration information.

### ***Environmental Programs***

*Available from:*

The Mariners' Museum

A variety of short programs are available for school groups. Titles include: "Camouflage and Survival," "All the Same, But Different," and "Warm Water = Pollution?"

*Ordering instructions:*

Contact MM for scheduling information. Charges are \$2.25 - \$3.00 per student.

### ***Educator In-Service Workshops***

*Available from:*

The Wildlife Center of Virginia

These workshops provide teachers with practical techniques and ideas for incorporating environmental studies into their lesson plans. All participants receive a packet of information which includes activities and resource ideas.

*Ordering instructions:*

Call WCV. A three-hour workshop costs \$350 plus travel expenses.

### ***Educator's Environmental Institute***

*Available from:*

Union Camp/Paul D. Camp Community College

A three-week environmental studies course designed for area educators. The course provides classroom materials, field trips, awards and credits for recertification.

*Ordering instructions:*

Contact UC/PDCCC for course dates and application information.

### ***Teacher/Adult Leader Training***

*Available from:*

Virginia Cooperative Extension Service

Two- to six-hour workshops are available on a variety of environmental and nature education topics. Workshops can be designed to meet the needs of the group.

*Ordering instructions:*

Contact local extension office or VCES. Travel reimbursement may be required from for-profit organizations. A minimum of 20 participants is required.

### ***Teacher Training***

*Available from:*

Virginia Living Museum

Offered in cooperation with Hampton University, this intensive two-week course for elementary and middle school teachers is a hands-on lab and field exploration of the natural world.

*Ordering instructions:*

Call VLM for dates.

### ***Natural Resource Workshops***

*Available from:*

Virginia Resource-Use Education Council

These workshops offer training in environmental education teaching methods using curriculum supplements such as *Project WILD*, *Project Learning Tree*, *Project WET*, and *Virginia's State Parks...Your Backyard Classrooms*.

*Ordering instructions:*

Contact VRUEC for scheduling information. Workshops must be scheduled at least four weeks in advance; with more notice a workshop can be designed to meet specific needs.

### ***Outdoor Classroom***

*Available from:*

Wilderness Conservancy at Mountain Lake

This environmental cross-curriculum program for teachers and students of all ages offers several programs on a variety of topics.

*Ordering instructions:*

Contact WCML for program details and scheduling information.

## curriculum materials

### ***National Wildlife Week Kits***

#### *Available from:*

Department of Game and Inland Fisheries

During Wildlife Week, kits are distributed to elementary and middle schools. The kits are produced by the National Wildlife Federation and contain an educators' guide, a theme poster, a 12-picture poster, Wildlife Stamps, and a form for educators to request additional information about NWF's educational programs.

#### *Ordering instructions:*

Kits are mailed in March to all Virginia public and private school libraries. For more information or additional kits please send a written request to DGIF.

*Ecology is the scientific study of the places where plants and animals live and the reasons they live there and the way species relate to each other and to the physical environment.*

### ***Aquarium School Program Booklets***

#### *Available from:*

National Aquarium in Baltimore

These booklets complement current Aquarium school programs such as Sharks, Marshland Mysteries, and Coral Reefs.

#### *Ordering instructions:*

Contact NAIB for a complete listing of available titles and order form.

### ***NatureScope***

#### *Available from:*

National Wildlife Federation

This activity series is designed to help K - 8 educators incorporate science and environmental education into their teaching. There are 18 topics in the series; each issue includes background information, hands-on activities, ready-to-copy activity sheets, a glossary, and a bibliography.

#### *Ordering instructions:*

Contact NWF to order. Each title may be purchased for \$7.95 plus shipping, or the entire set is available for \$99.

### ***Environmental Activity Boxes***

#### *Available from:*

Prince William County Litter Control Council

This set of 8 boxes contains information and materials for hands-on lessons about litter and other environmental topics.

#### *Ordering instructions:*

Available for loan to Prince William County teachers only. Contact PWCLCC to reserve.

### ***Audubon Adventures***

#### *Available from:*

Richmond Audubon Society

Subscribers receive a monthly package of classroom materials for elementary students (with teacher's guide) on a variety of nature topics.

#### *Ordering instructions:*

An annual subscription is \$30; contact RAS for ordering information.

### ***Teacher Assistance Kits***

#### *Available from:*

U. S. Environmental Protection Agency - Region III

Kits are available to assist in environmental education promotional activities for K - 12 classrooms.

#### *Ordering instructions:*

Contact EPA for additional information.

### ***Center for Economic Education***

#### *Available from:*

Virginia Tech -- Center for Economic Education

Workshops, graduate course and curriculum materials for K-12 educators on environmental economics are provided.

#### *Ordering instructions:*

Free as available. Contact VATECH/CEE.



## education grants

### *Naturalist Activities*

*Available from:*

Virginia's Explore Park

This set of 25 short activities for elementary and middle school students is designed to heighten the learner's awareness of the world outside a classroom. The activities are hands-on and use an interdisciplinary approach to learning.

*Ordering instructions:*

Contact VEP; the set costs \$1.25.

### *Student Conservation Association Grants*

*Available from:*

Richmond Audubon Society

RAS provides educational grants to university Student Conservation Association groups nationwide.

*Ordering instructions:*

Contact RAS for more information.

### *Environmental Education Grants*

*Available from:*

U. S. Environmental Protection Agency - Region III

The grants program assists local or tribal education agencies, colleges or universities, state education or environmental agencies, non-profit organizations, and non-commercial educational broadcasters to develop environmental education projects or programs.

*Ordering instructions:*

Contact EPA for information on submission of proposals.

### *Virginia Mini-Grant Program*

*Available from:*

Virginia Environmental Endowment

Elementary and secondary schools and nonprofit, non-governmental organizations are eligible to apply for mini-grant awards of \$1,000-\$5,000 for projects that protect Virginia streams, rivers, wetlands, and waters of the Chesapeake Bay.

*Ordering instructions:*

Contact VEE for application guidelines. Deadlines for submissions are January 15, May 15 and September 15 each year.

### *Environmental Issues Projects Grants*

*Available from:*

Virginia Foundation for the Humanities and Public Policy

Grants are awarded for a variety of projects that consider environmental issues from the perspective of the humanities.

*Ordering instructions:*

Contact VFHPP for guidelines and application materials.

## events

### *Arborfest*

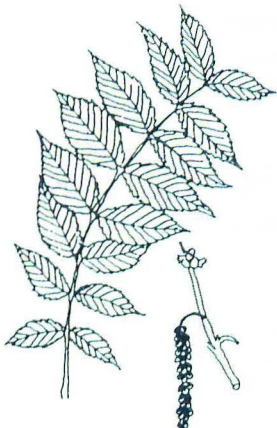
*Available from:*

State Arboretum of Virginia

This annual (October) environmental event for adults and children has a different theme every year.

*Ordering instructions:*

Contact SAV for this year's date and theme.



## exhibits

### ***Wildlife Exhibit***

*Available from:*

Virginia Wildlife Federation

These displays depict activities and services provided by VWF; they are suitable for events such as county fairs, Earth Day celebrations, and National Hunting and Fishing Day.

*Ordering instructions:*

Contact VWF to schedule.

## field trips/site tours

### ***Long-distance Environmental Tours***

*Available from:*

Audubon Naturalist Society

ANS naturalists lead tours to sites of interest in the United States, Canada, and Central America.

*Ordering instructions:*

Cost varies with trip; contact ANS for information.

### ***Environmental Field Trips***

*Available from:*

Audubon Naturalist Society

Field trips (1-hour to 1-day) for adults to local and regional sites of environmental interest are available year-round.

*Ordering instructions:*

Cost varies with program; contact ANS for list of programs and dates.

### ***Rappahannock River Views***

*Available from:*

Friends of the Rappahannock

A variety of field trips are available including seasonal wildflower walks, historic walks, and tours of the Rappahannock canal system.

*Ordering instructions:*

Call FR for calendar of events; special program requests must be submitted one month in advance. Fees vary. Weekend and evening programs are available throughout the year; weekday programs are only available during the summer months.

### ***Maymont Foundation Field Trips***

*Available from:*

Maymont Foundation

Maymont is a 100-acre Victorian estate in Richmond with a museum, formal gardens, native wildlife exhibits, nature center, carriage collection, and children's farm.

*Ordering instructions:*

Tours can be scheduled Tuesday through Friday. Length of tour and price per person varies with type of tour requested. Contact MF for details.

### ***Conservation Summits***

*Available from:*

National Wildlife Federation

These week-long summer adventures for all ages and groups include guided field trips, wildlife workshops, environmental issues classes, and outdoor activities.

*Ordering instructions:*

Contact NWF for informative brochure.

### ***The Mountain Laurel Trail***

#### *Available from:*

National Wildlife Federation

The Mountain Laurel Trail is located at NWF's Laurel Ridge Conservation Education Center in northern Virginia. The self-guiding trail provides an opportunity to study the plants and animals of northern Virginia in their natural environments.

#### *Ordering instructions:*

The handicapped-accessible trail is open to the public daily from sunrise to sunset. Contact NWF for additional information on scheduled activities.

### ***Educational Programs***

#### *Available from:*

Roanoke County Parks and Recreation  
Outdoor Education

RCPR provides a variety of adventure and educational programs and trips to groups of all ages in the Roanoke Valley and the surrounding area.

#### *Ordering instructions:*

Contact RCPR for a brochure describing complete program offerings.

### ***Natural History Field Trips***

#### *Available from:*

Virginia Museum of Natural History

Museum staff conduct field trips to places of natural history interest around Virginia.

#### *Ordering instructions:*

Fees vary. Contact VMNH for a list of current programs and registration information.

### ***Interdisciplinary Field Trips***

#### *Available from:*

Virginia's Explore Park

Interpretive programs are offered on a variety of subjects, including historic building construction methods, Appalachian music, homesteading in western Virginia, Virginia wildlife, and forestry practices.

#### *Ordering instructions:*

Because programs are designed to fit the needs of visiting groups, call VEP at least two weeks in advance of visit. Visitors are charged \$1.50 per person.

## **networking/referral services**

### ***Greater Rappahannock Environmental Education Network***

#### *Available from:*

Friends of the Rappahannock

GREEN is a regional resource and advisory council for the development, planning, and implementation of environmental education programs and projects for teachers.

#### *Ordering instructions:*

Teachers in the City of Fredericksburg and Stafford, Spotsylvania, King George, and Caroline Counties may call FR for a schedule of workshops and information on regional resources.

### ***Resource Clearinghouse***

#### *Available from:*

U. S. Environmental Protection  
Agency - Region III

EPA is a clearinghouse for national environmental education resources.

#### *Ordering instructions:*

Contact EPA for information.

### ***Legislative Hotline***

#### *Available from:*

Virginia Environmental Network

During sessions of the General Assembly, a 3-minute recorded message is updated daily about the status of bills concerned with environmental issues.

#### *Ordering instructions:*

The Hotline phone number changes annually; contact VEN for the current number.

## newsletters/magazines

### ***The Potomac Flier***

#### *Available from:*

Fairfax Audubon Society

This newsletter is published 8 times during the year about the activities of FAS and regional environmental news.

#### *Ordering instructions:*

Contact FAS; non-members are charged an annual subscription fee of \$10.

### ***News and Views***

#### *Available from:*

National Association of Biology Teachers

This publication of NABT is issued five times a year, with news of awards, grants, resources, opportunities, programs, and events of interest to biology educators.

#### *Ordering instructions:*

Distributed to members of NABT (dues \$40/yr). Will exchange newsletter at no cost with other appropriate organizations.

### ***ECO***

#### *Available from:*

Prince William County Litter Control Council

This monthly newsletter for Prince William County Ecology Clubs contains environmental information, activities, and ideas for clubs.

#### *Ordering instructions:*

Contact PWCLCC; an annual subscription costs \$5.

### ***Virginia Explorer***

#### *Available from:*

Virginia Museum of Natural History

This quarterly natural history magazine is written for the general public.

#### *Ordering instructions:*

Free to VMNH members (call for membership information). Organizations may subscribe for \$12 annually.

### ***Au Naturel***

#### *Available from:*

Virginia Museum of Natural History

This quarterly newsletter lists museum exhibits and educational programs.

#### *Ordering instructions:*

Free to VMNH members; call for membership information.

### ***The Federation Record***

#### *Available from:*

Virginia Wildlife Federation

This newsletter of the Virginia Wildlife Federation is published bimonthly.

#### *Ordering instructions:*

The newsletter is provided to members of VWF (annual membership \$25); contact VWF for membership information. Bulk distribution is available on a one-time basis to educational groups.

### ***Explorations***

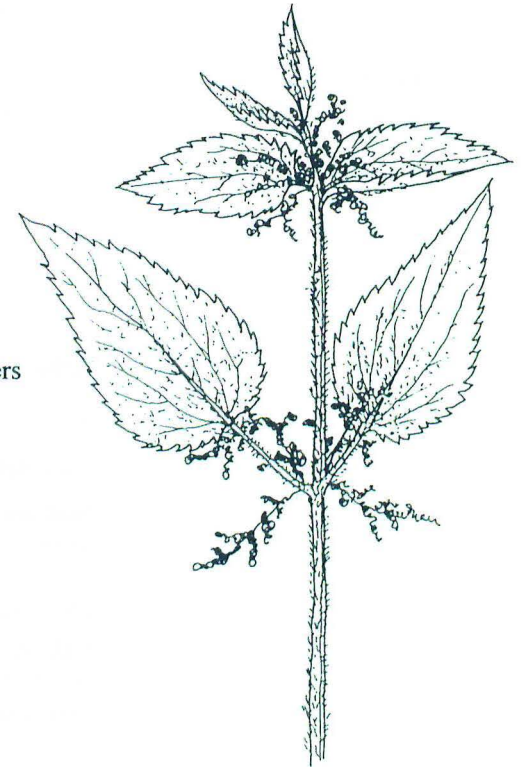
#### *Available from:*

Virginia's Explore Park

This quarterly newsletter describes events and programs at VEP. The newsletter also updates the general public on the process of construction as the park nears its 1994 grand opening.

#### *Ordering instructions:*

Contact VEP to be placed on the mailing list.



## outreach programs/speakers

### ***Environmental Education Program***

#### *Available from:*

Department of Game and Inland Fisheries

This folder of educational literature describes practices that promote sound land use and encourage wildlife habitat restoration. The materials are useful for landowners, homeowners, or civic groups.

#### *Ordering instructions:*

Contact DGIF for folder.

### ***Group Presentations***

#### *Available from:*

John Marshall Soil and Water Conservation District

A limited number of presentations for school and community groups are available. Priority is given to topics related to water quality, agricultural conservation, and urban erosion concerns. Equipment demonstrations may be available (converting yard debris to mulch with a chipper-shredder, covering old newspapers to animal bedding with a bedding chopper).

#### *Ordering instructions:*

No charge; schedule at least three months in advance.

### ***Arboretum Speakers Bureau***

#### *Available from:*

State Arboretum of Virginia

Staff are available to speak on a variety of environmental topics.

#### *Ordering instructions:*

Call early for reservations. Travel reimbursement may be required for long distances.

### ***Speakers Bureau***

#### *Available from:*

Versar, Inc.

Speakers are available on a variety of environmental topics. Versar is an environmental consulting firm in northern Virginia.

#### *Ordering instructions:*

Contact VI for a list of available topics and scheduling information.

### ***Speakers Bureau***

#### *Available from:*

Virginia Commonwealth University - Office of Environmental Studies

Speakers are available for presentations on a variety of environmental topics for high school groups in the Richmond metropolitan area.

#### *Ordering instructions:*

Contact VCU - OES for scheduling information; several weeks advance notice is required.

### ***The Bay Team***

#### *Available from:*

Virginia Institute of Marine Science

Two experienced classroom teachers travel throughout Virginia demonstrating exemplary environmental education teaching methods. The lessons are appropriate for all grade levels.

#### *Ordering instructions:*

Contact VIMS to request a brochure and registration form.

### ***Speakers Bureau***

#### *Available from:*

Virginia's Explore Park

Speakers are available for presentations to groups of all ages on a variety of topics including endangered species, historic issues, land use, and biodiversity.

#### *Ordering instructions:*

Contact VEP; groups must pay travel expenses of speaker.

## publications

### ***Blue Ridge Environmental Network***

#### *Available from:*

Blue Ridge Environmental Network

This 27-page directory of environmentally active organizations in Roanoke and the surrounding area includes descriptions of groups as well as a listing of current activities of each group.

#### *Ordering instructions:*

Contact BREN. No charge, but donations are appreciated.

### ***John Marshall SWCD Annual Report***

#### *Available from:*

John Marshall Soil and Water Conservation District

This annual report booklet details all programs that the district has assisted with or conducted throughout the year and provides insight into the workings of an SWCD.

#### *Ordering instructions:*

Fauquier County residents may contact JMSWCD to receive a copy.

### ***Earth Day Guide: How to Plan, Publicize, and Produce an Earth Day celebration***

#### *Available from:*

Maymont Foundation

This resource guide is complete with sample letters, activities, and photographs designed to help individuals plan, produce, and publicize an Earth Day celebration.

#### *Ordering instructions:*

No charge; call MF.

### ***Conservation Directory***

#### *Available from:*

National Wildlife Federation

This annual publication of NWF is an up-to-date, detailed resource for information on environmental conservation, education, legislation, and natural resource management.

#### *Ordering instructions:*

Available for \$18 plus shipping from NWF.

### ***Environmental Educator's Resource Guide***

#### *Available from:*

Prince William County Litter Control Council

The guide is a binder of resources, activities, and information for use in teaching about the environment.

#### *Ordering instructions:*

Contact PWCLCC for ordering information; cost is \$50. All Prince William County schools and public libraries have a copy.

### ***Virginia Environmental Voting Summary***

#### *Available from:*

Virginia Environmental Network

This publication lists General Assembly members' votes on key environmental bills; two editions (1991, 1992) are available.

#### *Ordering instructions:*

No charge; contact VEN for a copy.

## slide shows/films

### ***Earth Day Every Day - You Can Make a Difference!***

*Available from:*

National Wildlife Federation

This 15-minute filmstrip for elementary and middle school students shows how to celebrate Earth Day every day by making wise environmental choices.

*Ordering instructions:*

Available for \$5 from NWF. Also available as a slide set.

## videos

### ***Public Service Announcements on Pollution Prevention***

*Available from:*

Versar, Inc.

Seven PSAs are available which are suitable for television use. Subjects include environmental data, educating kids, windpower, and pesticide-free farming.

*Ordering instructions:*

No charge; contact VI to order.

### ***In Partnership With Earth***

*Available from:*

Versar, Inc.

A 58-minute video featuring John Denver and former EPA Administrator Bill Reilly that discusses pollution prevention and recycling, and how different groups are responding to this challenge.

*Ordering instructions:*

Can be purchased from VI for \$40 plus \$4 postage, or rented for \$20.

### ***A/V Library***

*Available from:*

Virginia Cooperative Extension Service

Videos and slide/tape sets are available on a variety of nature and environmental topics.

*Ordering instructions:*

Contact local extension office.

Requests must be made at least three weeks in advance, and materials can be borrowed for one week. No charge for use of the materials, although borrower must pay return postage.

### ***A Planning Guide to Field Study Programs***

*Available from:*

Virginia Cooperative Extension Service

This video and companion teacher's guide will help with planning, organizing, and conducting an outdoor field study program for youths.

*Ordering instructions:*

Contact local extension service or VCES. Videos may be borrowed at no charge (borrowers must pay return postage); single copies of manual are free.

### ***Voices of Vision: The Future of Virginia's Environment***

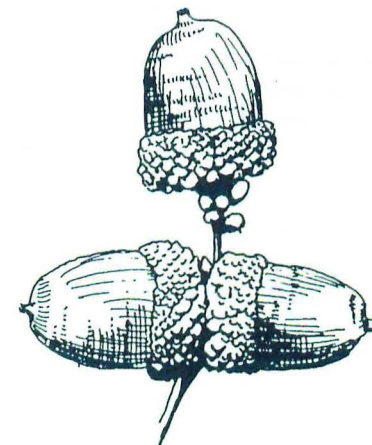
*Available from:*

Virginia Water Resources Research Center

This 17-minute video focuses on some of Virginia's greatest environmental challenges: water use, land use, waste management, and protecting the Chesapeake Bay.

*Ordering instructions:*

May be borrowed from VWRRC for a 15-day period; no charge.



## youth camp/projects

### **Boy Scout Field Day**

#### *Available from:*

Colonial Soil and Water Conservation District

The annual Boy Scout Field Day at Camp Chickahominy is an environmental event where Scouts learn the importance of soil and water conservation. They can continue on their own to obtain their Soil and Water Conservation Merit Badge.

#### *Ordering instructions:*

Contact CSWCD; charge is \$2.50 per person.

### **Friendship Environmental Education**

#### *Available from:*

Friendship Environmental Education

One- to five-day programs for students and educators are available at a 700-acre "classroom" for ecology studies along the Rivanna River.

#### *Ordering instructions:*

Call (800) 873-3223. Rates are variable, depending on length of stay, accommodations, and programming. A typical 3-day program costs approximately \$65 per student. Teacher workshops are free.

### **Summer Discovery Series**

#### *Available from:*

Maymont Foundation

This children's nature camp uses Maymont's grounds, animals, and exhibits as a living laboratory. The program includes live animal study, aquatic collecting, and nature hikes. Sessions are mornings from June through August; length of sessions vary.

#### *Ordering instructions:*

Call MF for details; cost is \$10 - \$75, depending on length of session.

### **Teen Adventure**

#### *Available from:*

National Wildlife Federation

This program allows kids ages 14 - 17 to discover nature by hiking and backpacking in wilderness areas and participating in daily nature awareness activities.

#### *Ordering instructions:*

Contact NWF for informative brochure.

### **Youth and Family Programs**

#### *Available from:*

Virginia Living Museum

A wide variety of programs are available for children and families after school, on weekends and in the summer. Topics vary seasonally and include nature study, science expeditions, activities and field trips to interesting sites.

#### *Ordering instructions:*

Call the VLM for a current copy of program guide, Adventurer. Fees vary. Members receive early notices of program offerings and discounts.



### **Wildlife Camp**

#### *Available from:*

National Wildlife Federation

This program is an opportunity for kids ages 9 - 13 to gain environmental knowledge and skills for living in the out-of-doors through a blend of nature study, games, hiking, swimming, and exploring.

#### *Ordering instructions:*

Contact NWF for informative brochure.



### ***EnviroAdventures***

*Available from:*

Virginia Wildlife Federation

These environmental summer camp programs for students ages 15 - 17 provide outdoor educational activities that involve the participants in exploring and learning about the natural world and the value of its resources.

*Ordering instructions:*

Contact VWF for additional information and an application.

### ***Environmental Education Program***

*Available from:*

Westview on the James

Hands-on learning takes place in a 780-acre outdoor laboratory setting. Topics for study include aquatic ecology, limnology, biology, ecology, and chemistry. Programs are geared for groups of 30.

*Ordering instructions:*

Contact WJ for scheduling information. A four-hour program costs \$5 per participant plus a \$60 instructor fee.

# Air



Air — the atmosphere — is a thin band of gases that surrounds the Earth. These gases, which include oxygen and carbon dioxide, are constantly moving and are affected by sunlight and water vapor. Air is an essential part of nature's life support system because all living things depend on it to survive.

Air quality management is a complex undertaking. In Virginia, the Department of Environmental Quality works with industry and federal and local governments to maintain and improve air quality. This partnership approach and technological advances hold great promise for further air quality improvement.

Virginia is focusing particularly on ozone pollution which is formed when certain kinds of chemicals — volatile organic compounds (VOCs) and nitrogen oxides — combine in the presence of sunlight. VOCs come from sources such as gasoline, paints, cleaning fluids, inks and automobile exhaust. Nitrogen oxides come from some industrial processes. They also are formed when fuels such as coal, oil and gasoline are burned.

## curriculum materials

### ***Acid Rain***

*Available from:*

Great Explorations in Math and Science

A collection of eight activities for grades 6-10 that combines scientific inquiry and critical thinking as students learn about acids, how pH changes after a rainstorm, conduct experiments, and present a play about the effects on aquatic life.

*Ordering instructions:*

Cost is \$11.00 plus \$1.50 shipping. Quantity discounts available. Units on the greenhouse effect and solar energy are also available. Call GEMS for order form.

### ***Acid Rain Reader***

*Available from:*

The Acid Rain Foundation

Provides a general overview and glossary on acid rain. Can be used independently or in conjunction with interdisciplinary curriculum. For grades 4-8.

*Ordering instructions:*

Single copies available for \$2.50 each plus \$3.50 shipping. Classroom set of 25 copies is \$45.95 plus \$6.00 shipping. Other materials are available; contact TARF for an order form.

### ***Our Blanket of Air***

*Available from:*

Virginia's Explore Park

Six pages of hands-on activities for elementary school students teach an understanding of life's dependence upon air.

*Ordering instructions:*

No charge; contact VEP.

## newsletters/magazines

### ***Moving People***

*Available from:*

Moving People of Northern Virginia

This bimonthly newsletter features information on the Washington regional effort to meet the federal clean air standards.

*Ordering instructions:*

Contact MPNV; an annual subscription costs \$5.

## outreach programs/speakers

### ***Speakers Bureau***

*Available from:*

Commonwealth Gas

Staff from CG, a natural gas utility, are available to speak to groups on energy and air quality.

*Ordering instructions:*

Contact a local CG office in Richmond, Petersburg, South Hill, Portsmouth, Lynchburg, Staunton, Harrisonburg, Lexington, Covington, Manassas, Fredericksburg, Culpeper or Warrenton.

*One trillion tons of air sit over Virginia.*

## posters

### *Natural Gas and the Environment*

*Available from:*

Commonwealth Gas

This poster, suitable for middle and high school students, shows ways in which natural gas is used and how it benefits air quality.

*Ordering instructions:*

Free -- one per classroom. Contact a local CG office in Richmond, Petersburg, South Hill, Portsmouth, Lynchburg, Staunton, Harrisonburg, Lexington, Covington, Manassas, Fredericksburg, Culpeper or Warrenton.

## slide shows/films

### *Let's Clear the Air*

*Available from:*

National Wildlife Federation

This 15-minute filmstrip for elementary and middle school students explains what causes air pollution and describes what is being done to control it. It also explains the problem of acid rain.

*Ordering instructions:*

Available from NWF for \$5. Also available as a slide set.

## videos

### *The Road to Clean Air*

*Available from:*

Commonwealth Gas

This 10-minute video, suitable for general public and middle and high school students, shows ways in which natural gas is used and how it benefits air quality.

*Ordering instructions:*

Free rental. Contact a local CG office in Richmond, Petersburg, South Hill, Portsmouth, Lynchburg, Staunton, Harrisonburg, Lexington, Covington, Manassas, Fredericksburg, Culpeper or Warrenton.

*Releases of major industrial chemicals into the air have decreased by 54 percent since 1987, according to the Toxic Release Inventory.*



# Animals



A wide variety of animals thrive in Virginia, and people have many ways to enjoy these creatures: they watch birds, hunt or fish, identify animal “signs,” and photograph wildlife.

Virginia’s wildlife species are managed by several state agencies working in partnership with private groups, individuals and corporations. A broad range of techniques help manage game and nongame animals — from hunting and trapping to habitat restoration. Virginia’s approach is to ensure optimum populations while enabling Virginia to grow economically.

Some of Virginia’s species use an uncommon habitat. Other species such as deer and beaver are highly adaptable. Others, such as the bald eagle, have responded well to management efforts and their populations are rebounding.

## classes/workshops

### ***Project WILD***

*Available from:*

Department of Game and Inland Fisheries

This multidisciplinary wildlife education program is designed for K-12 classroom teachers and non-formal educators. The materials consist of two activity guides made available during teacher workshops.

*Ordering instructions:*

Contact DGIF for information on a workshop in your area.

### ***Recreational Angling Instructor Course***

*Available from:*

Department of Game and Inland Fisheries

During this 8- to 12-hour workshop for educators participants learn basic freshwater angling and ecology. They are also provided with the Aquatic Resource Education Curriculum and taught how to use it in developing classroom lessons.

*Ordering instructions:*

Contact DGIF for additional information.



## curriculum materials

### ***Zoopack***

*Available from:*

Virginia Zoological Society

This 12-page full-color teacher's guide to the zoo provides on-site information as well as classroom activities for elementary age students.

*Ordering instructions:*

No charge; contact VZS.

## exhibits

### ***Wildlife Exhibit***

*Available from:*

The Wildlife Center of Virginia

This traveling exhibit consists of an environmental pictorial display and staff handlers with unreleaseable wild animals.

*Ordering instructions:*

Schedule with WCV at least 8 weeks in advance, as staffing is limited.

### ***Natural History Exhibits Program***

*Available from:*

Virginia Museum of Natural History  
Interactive and educationally effective traveling exhibits.

*Ordering instructions:*

Call VMNH for a complete listing of exhibits. Fees vary (\$200 - \$1000).

## field trips/site tours

### **Zoo Tours**

#### *Available from:*

Mill Mountain Zoological Park

Self-guided tours through zoo exhibits (consisting of domestic and exotic species) are available. Occasionally it is possible to arrange for a docent or a live animal program.

#### *Ordering instructions:*

Fees vary with time of year; reservations with MMZP are necessary for groups of ten or more.

### **Site Tours**

#### *Available from:*

National Fisheries Research Center

This 400-acre facility is a center for fisheries research. Exhibits open to the public include: displays depicting the importance of fish and water to humans; pools with live fish; and nature trails.

#### *Ordering instructions:*

Contact NFRC to arrange a visit.

### **Birdwalks**

#### *Available from:*

Richmond Audubon Society

RAS conducts birding field trips in the Richmond area.

#### *Ordering instructions:*

Contact RAS for additional information.

### **Aquarium Tours**

#### *Available from:*

Virginia Institute of Marine Science

The VIMS Aquarium focuses on York River and Chesapeake Bay species and habitats. Specific exhibits are being developed which will highlight research in progress at the Institute. Tours are primarily self-directed and self-guided.

#### *Ordering instructions:*

Visits must be pre-arranged; group size is limited to 30. Please contact VIMS to schedule; no charge, but must make reservations at least six weeks in advance.

### **Natural Science Surveys**

#### *Available from:*

Virginia Living Museum

These 45-minute museum programs for K-5th graders introduce various life sciences topics -- animal adaptations, food webs, predation.

#### *Ordering instructions:*

Call the Reservations Coordinator at VLM. \$3.50 per student; certain area schools (ADM contract) are free.

### **Site Tours**

#### *Available from:*

Virginia Museum of Natural History

VMNH offers tours of the exhibit halls during regular hours for groups of all ages and abilities. Exhibits focus on current research in natural history and environmental issues.

#### *Ordering instructions:*

Admission is free. Call VMNH in advance to arrange for a program or a docent.

### **Zoo Tours**

#### *Available from:*

Virginia Zoological Society

Docent-led tours or live animal demonstrations are available for school groups.

#### *Ordering instructions:*

Call VZS at least six weeks in advance to schedule.

### **FOCUS**

#### *Available from:*

Virginia Zoological Society

45-minute presentations are available for elementary age groups on various topics with live animals and biofacts.

#### *Ordering instructions:*

Contact VZS; must schedule at least four weeks in advance. Fees are \$1 per student plus zoo admission.

## newsletters/magazines

### ***The Naturalist News***

*Available from:*

Audubon Naturalist Society

This monthly 24-page newspaper covers local and regional environmental issues and includes book reviews and original articles.

*Ordering instructions:*

Provided to ANS members; contact ANS for membership information.

### ***Richmond Audubon Society Newsletter***

*Available from:*

Richmond Audubon Society

This newsletter covers issues of interest to the Richmond Audubon Society.

*Ordering instructions:*

Contact RAS; subscriptions are \$23.

## organizational membership

### ***Trout Unlimited***

*Available from:*

Trout Unlimited

This organization provides a variety of educational services and programs about America's coldwater fisheries.

*Ordering instructions:*

Contact TU for information on membership and other services.

*Virginia is home to approximately 100 species of mammals, 134 species of reptiles and amphibians, 411 bird species, 210 freshwater fish species, and thousands of invertebrate species.*

## outreach programs/speakers

### ***Where Have All the Bluebirds Gone?***

*Available from:*

Fauquier Outdoor Lab

This 45-minute lecture (with slides) is about the life history of bluebirds, causes of population decline, and what must be done to help.

*Ordering instructions:*

Contact FOL; charge is \$45 plus travel expenses.

### ***Outreach Program***

*Available from:*

Mill Mountain Zoological Park

Zoo staff are available to speak on a variety of topics such as mammals, reptiles, birds of prey, and backyard habitats. Programs are usually accompanied by curriculum guides.

*Ordering instructions:*

Fees range from \$35 to \$100 depending on distance traveled, group size, and time of program. Contact MMZP.

### ***Outreach Programs***

*Available from:*

National Aquarium in Baltimore

NAIB offers 1-hour to 1-day programs on marine animals and habitat for groups of all ages. Trained naturalists will travel throughout Maryland and Northern Virginia.

*Ordering instructions:*

Costs vary with length of program and distance traveled. Contact NAIB for details and to schedule programs.

### ***Audubon Speakers***

*Available from:*

Richmond Audubon Society

Speakers are available to groups in the Greater Richmond area for presentation on several environmental issues.

*Ordering instructions:*

No charge; contact RAS.



## **Environmental Education Outreach Programs**

### *Available from:*

The Wildlife Center of Virginia

These interactive programs which include stories, songs, games, activities, and up-close experiences with native wildlife.

### *Ordering instructions:*

Programs must be scheduled at least three weeks in advance; programs cost \$125 plus travel expenses. Call WCV.

## **Chesapeake Bay Marine Lab**

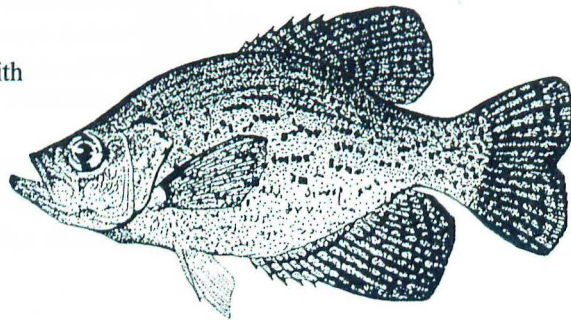
### *Available from:*

Virginia Marine Science Museum

The traveling Marine Lab is a 26-foot truck equipped with functioning aquaria and touch tanks that bring the Chesapeake Bay to your doorstep.

### *Ordering instructions:*

Contact VMSM; fees vary with program.



## **Wildlife Speakers**

### *Available from:*

Virginia Wildlife Federation

Speakers are available statewide to discuss the activities of VWF and various environmental topics.

### *Ordering instructions:*

Contact VWF; requests will be referred to the appropriate district organization.

## **posters**

### **Common Saltwater Sportfish of Virginia**

#### *Available from:*

Department of Game and Inland Fisheries

This full color poster features 24 of Virginia's common saltwater sportfish.

#### *Ordering instructions:*

Send DGIF a check for \$8 (payable to "Treasurer of Virginia"); quantities are available at a discount.

### **Common Freshwater Fish of Virginia**

#### *Available from:*

Department of Game and Inland Fisheries

This poster (with identification key) features 23 common freshwater fish of Virginia.

#### *Ordering instructions:*

Send DGIF a check for \$8 (payable to "Treasurer of Virginia"); quantities are available at a discount.

## **Roanoke Logperch**

### *Available from:*

Friends of the Roanoke

This poster is a color photograph of an underwater scene featuring the endangered Roanoke River Logperch.

### *Ordering instructions:*

Available from FRO for \$3 plus \$1.50 shipping.

*A place where any animal lives or is commonly found is called its habitat. The ability of a species to withstand changes or adapt to its environment varies depending upon its locomotion, food source and shelter requirements.*

***Informational Pamphlets***

*Available from:*

Audubon Naturalist Society

Several pamphlets are available on topics related to birding; titles include "Waterfowl Migration in the Chesapeake Bay Region," "The Care and Feeding of Baby Birds," and "Nest Boxes for the Birds in Your Backyard."

*Ordering instructions:*

No charge; contact ANS.

***Endangered Species Blueprint***

*Available from:*

National Wilderness Institute

A four-color summary report of how the federal endangered and threatened species program works, including many policy aspects-- listing, recovery, costs and delisting. Report is focused on program effectiveness and cost to taxpayers.

*Ordering instructions:*

Price is \$15.00. Contact NWI for information on other natural resource topics.

***Is Aetosaur a Dinosaur?***

*Available from:*

Virginia Museum of Natural History

This children's book is based on dinosaur tracks found in Culpeper, Virginia.

*Ordering instructions:*

Available from VMNH for \$11.95 plus \$1.50 shipping.

***Chadwick Forever***

*Available from:*

Watershed Initiative/The Tides Foundation

This is the latest in the popular "Chadwick the Crab" series of children's books by Priscilla Cummings. Chadwick and his friends meet and learn about endangered species.

*Ordering instructions:*

Available from WI/TF for \$8.95; educational discounts are available.

***Discover Wildlife in Your World***

*Available from:*

National Wildlife Federation

This 10-minute filmstrip for elementary and middle school students is filled with tips and ideas for discovering and attracting wildlife in urban, suburban, and rural settings.

*Ordering instructions:*

Contact NWF for information.

***We Care About Eagles***

*Available from:*

National Wildlife Federation

This 15-minute filmstrip for elementary and middle school students offers a close look at eagles and the environmental problems that have threatened some species. Discover how conservationists are trying to solve these problems.

*Ordering instructions:*

Available from NWF for \$5. Also available as a slide set.

## videos

## youth camp/projects

### ***Predators! They're Part of the Picture***

#### *Available from:*

National Wildlife Federation

This 15-minute filmstrip for elementary and middle school students shows the power and beauty of predators. Predators are often surrounded by misconceptions.

#### *Ordering instructions:*

Available from NWF for \$5; also available as a slide set.

### ***A Question of Balance: Protecting Virginia's Endangered Species***

#### *Available from:*

Department of Agriculture and Consumer Services

This 16-minute video discusses the relationship between pesticides and Virginia's endangered plants, animals, birds, and aquatic creatures.

#### *Ordering instructions:*

Contact DACS; can be borrowed for up to three weeks.

### ***Wildlife Internship Program***

#### *Available from:*

Mill Mountain Zoological Park

A number of volunteer opportunities which provide a close look at wildlife management are available.

#### *Ordering instructions:*

Contact MMZP for volunteer program brochure.

*Wildlife related hobbies and activities generate \$59 billion in business each year in the United States and \$1.3 billion in Virginia alone.*

### ***Birds Slide Show***

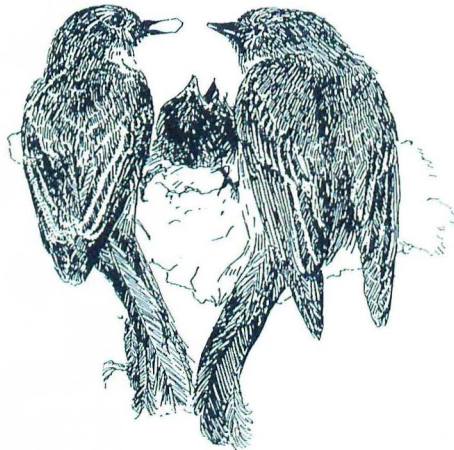
#### *Available from:*

Richmond Audubon Society

A slide program about birds is available for elementary students in Richmond and surrounding counties.

#### *Ordering instructions:*

Contact RAS for scheduling information.



### ***Summer Safari***

#### *Available from:*

Virginia Zoological Society

The 7-week day camp for elementary age students at the zoo involves visits with animals, behind-the-scenes tours, games, songs, and crafts.

#### *Ordering instructions:*

Children must have completed kindergarten. Fees vary (\$50 - \$100); contact VZS for registration information.

# Biosphere

The biosphere is the layer of the Earth that includes all plant and animal life, air, soil and water. It includes a variety of ecosystems that are connected by natural cycles. There are many cycles in nature, e.g. the water cycle, oxygen cycle and carbon cycle, that transfer matter and energy in ecosystems. Scientists are working to understand how these systems interact and the effects of change on them. Issues affecting the biosphere are complex and controversial because they involve dynamic ecosystems, multiple governments and differing interpretations of data in an area of unsettled science. Projections are made using mathematical models, based on many assumptions.



## curriculum materials

### ***Global Warming and the Greenhouse Effect***

*Available from:*

Great Explorations in Math and Science

A collection of eight activities for grades 7-10 that help students explore this current topic. Includes activities such as building a model of the atmosphere, comparing the amounts of CO<sub>2</sub> in car exhaust, and analyzing articles with different viewpoints.

*Ordering instructions:*

Cost is \$11.00 plus \$1.50 shipping. Quantity discounts available. Call GEMS for order form.

### ***Educational Services Catalog***

*Available from:*

National Geographic Society

This annual catalog lists dozens of books, films, videos, learning kits, maps, games and software suitable for teaching preK - 12 and adult science, math, geography, social studies, and language arts. A wide variety of topics are covered including specific biomes, ecosystems and migratory species.

*Ordering instructions:*

Catalog is free from NGS; prices for products vary. Films and videos can be previewed and rented for educational uses.

### ***Rain Forests: Tropical Treasures***

*Available from:*

National Wildlife Federation

This activity guide is one unit in the NatureScope series designed to help K - 8 educators incorporate science and environmental education into their teaching. The guide includes background information, hands-on activities, ready-to-copy activity sheets, a glossary, and a bibliography. It also includes a list of places to visit to see rain forest exhibits.

*Ordering instructions:*

Contact NWF to order. The unit is \$7.95 plus shipping or the entire 18 volume set is available for \$99.

### ***Connections***

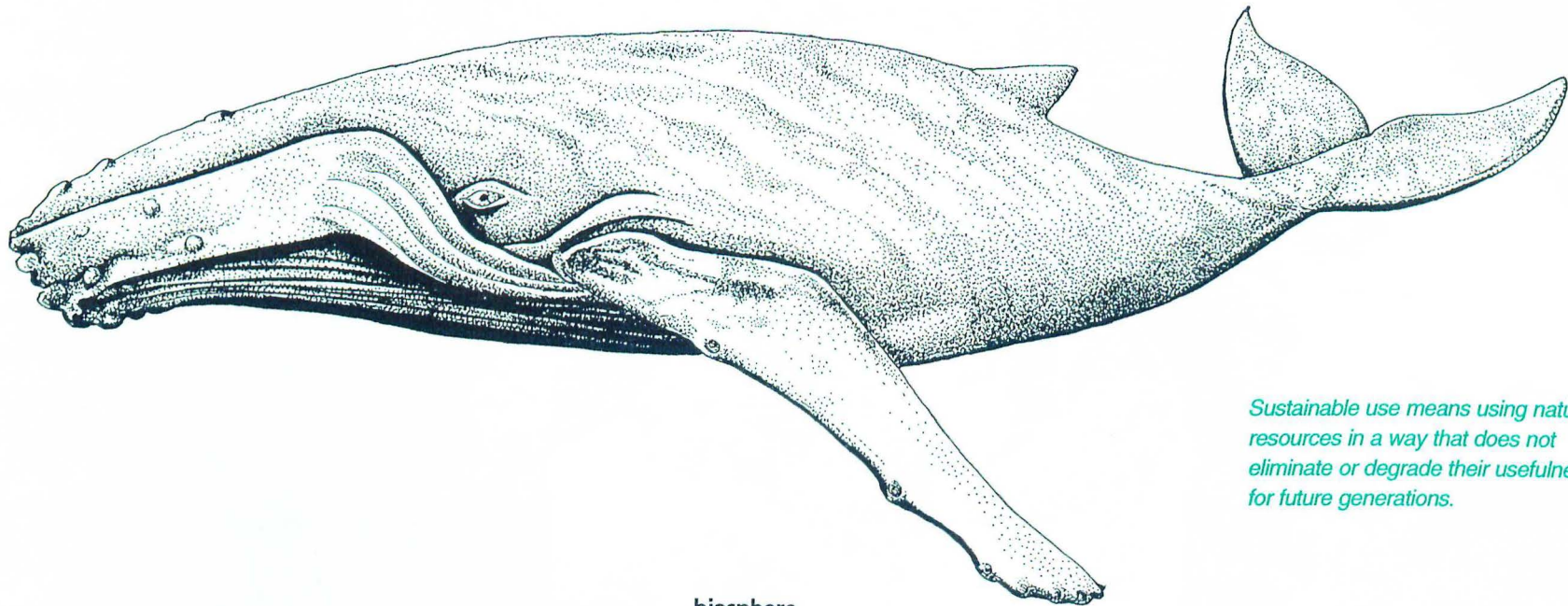
*Available from:*

Population Reference Bureau

A teaching kit to help students understand the links between population and the environment in the context of sustainable development. Includes a Student Resource Book, Teacher's Guide, World Population Data Sheet and World Environment Data Sheet.

*Ordering instructions:*

The complete kit is \$13.00 Additional copies of the Student Resource Book are \$8.00 each and data sheets are \$3.00 each. Orders under \$50.00 must be prepaid with a \$1.00 or 3% (whichever is greater) shipping fee.



*Sustainable use means using natural resources in a way that does not eliminate or degrade their usefulness for future generations.*

## ***Teacher's Guide to World Resources 1992-93***

### *Available from:*

World Resources Institute

This 130-page handbook for high school science, geography and social studies teachers, is a companion to the World Resources 1992-93 book. The book contains the latest information on essential economic, population and natural resource conditions and trends for 153 countries. The teacher's guide contains step-by-step lesson plans, reproducible handouts, transparency masters and reading lists for teaching about sustainable development, watershed pollution, deforestation, biodiversity, population growth, poverty, and pollution.

### *Ordering instructions:*

The teacher's guide is \$5.95 and the reference book is \$19.95. A 20% discount is available to secondary faculty. Other materials are also available; contact WRI for a free publications catalog.

## **field trips/site tours**

### ***Global Ecology Study Trips***

#### *Available from:*

Friendship Environmental Education  
Naturalist-led study trips to Belize or the Galapagos take place in July or August and are appropriate for ages 13 or older.

#### *Ordering instructions:*

Call (800) 873-3223. Costs range from \$1,500 to \$2,700.

*An ecosystem is a community of plants and animals and their interactions within a specific natural environment. Within the biosphere there are smaller ecosystems such as forest ecosystems, pond ecosystems, coral reef ecosystems, marine and fresh water ecosystems.*

## **publications**

### ***Sea Level Rise***

#### *Available from:*

UCAR Office for Interdisciplinary Earth Studies

One in a series of publications on climate and global change for public education produced by NOAA and UCAR. The reports are written by knowledgeable scientists and science writers.

#### *Ordering instructions:*

Contact UCAR for a copy.

## **slide shows/films**

### ***Fragile Earth***

#### *Available from:*

NASA Central Operation of Resources for Teachers.

Slide set focuses on the conditions which affect Earth's crust, waters, and atmosphere. Photos and satellite images illustrate how nature and people have changed Earth. Produced by the Smithsonian Institution.

#### *Ordering instructions:*

Submit a written request to NASA CORE on school letterhead for a catalog and order form. Cost is \$8.50 plus \$2.00 shipping.

## videos

### ***Mission to Planet Earth***

*Available from:*

NASA Central Operation of Resources  
for Teachers

This videotape features presentations by  
scientists describing ongoing NASA  
research, along with activities for the  
classroom use.

*Ordering instructions:*

Submit a written request to NASA  
CORE on school letterhead for a  
catalog and order form; copies are  
\$21.00 each plus \$3.50 for shipping.

### ***Spaceship Earth: A Global Geography***

*Available from:*

South Carolina Educational TV

This set of 10 30-minute programs uses  
satellite images from space and from  
the ground to explore and explain the  
interaction of Earth's dynamic human  
and physical systems. Each segment  
can be used independently. An  
instructor's guide and a viewer's guide  
are also available.

*Ordering instructions:*

Each tape in the series costs \$39.95  
plus \$2.50 shipping; the entire set may  
be purchased for \$300 plus \$10  
shipping. The instructor's guide and  
the viewer's guide are available for \$5  
per copy. Contact SCETV for  
additional information and an order  
form.

*Natural Resources are physical and biotic  
elements in the environment — air, soil,  
water, forests, grass, minerals, rocks, wild-  
life, and fish. Some of these are dynamic  
and renewable and with management can  
be replenished indefinitely. Others, such  
as mineral reserves, are considered non-  
renewable because they take extensive  
periods of time to form.*

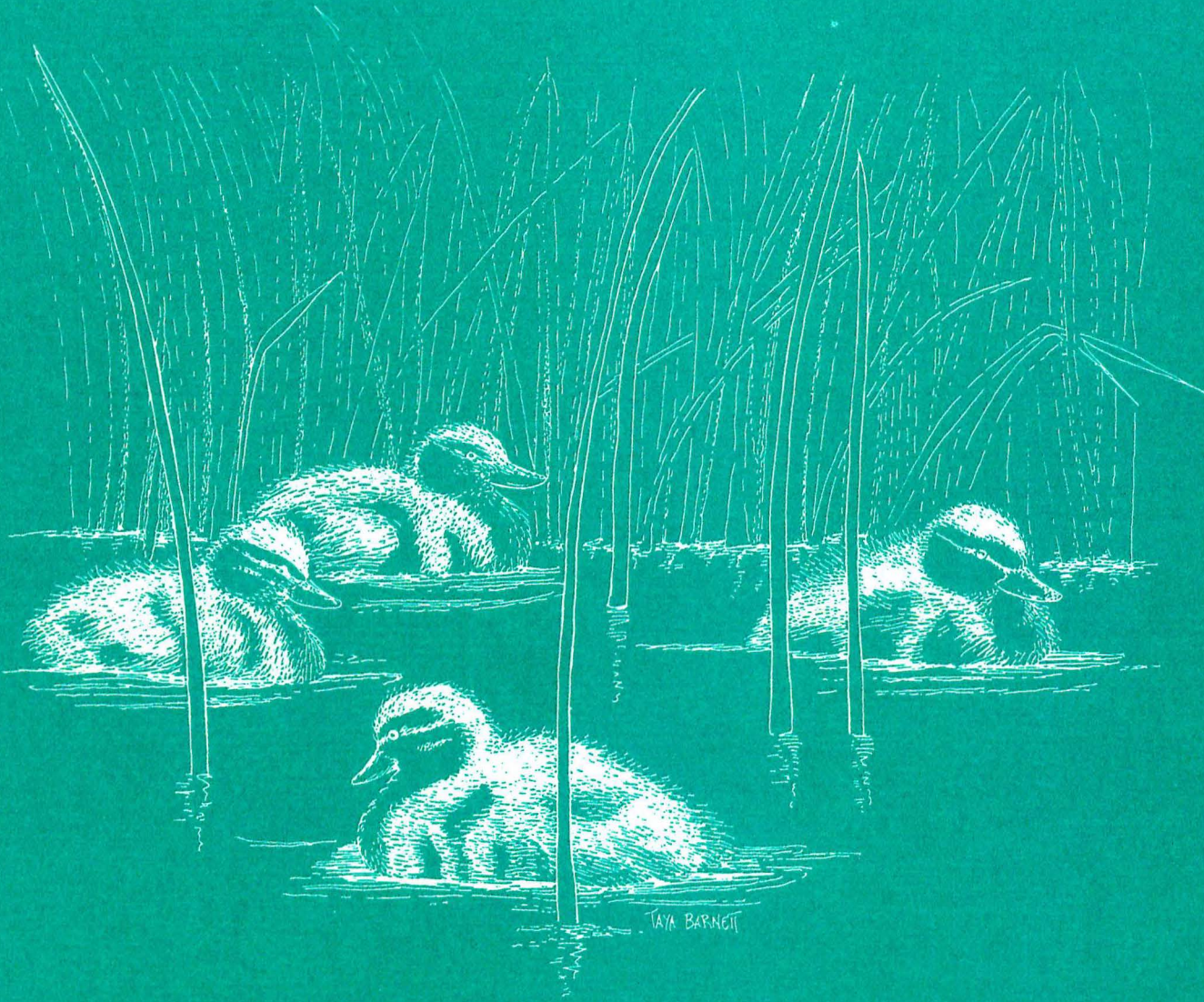
# Chesapeake Bay

In 1983, Virginia joined with Maryland, Pennsylvania, the District of Columbia and the federal government in a long-term effort to enhance the Chesapeake Bay and its living resources such as underwater grasses and other aquatic life.

One of the main influences on the Bay is excess nutrients such as nitrogen and phosphorus. In 1987, the jurisdictions agreed to specific goals for reducing nutrients in the Bay and the rivers that flow into it.

Enhancing the water quality and living resources of the Bay is the centerpiece of Virginia's Bay management program. The effort involves many initiatives, ranging from building new sewage treatment plants, to planting sea grasses, to working cooperatively with farmers, businesses and homeowners.

After a decade of work, there are strong signs that the Bay ecosystem is recovering—for example, underwater grasses and striped bass are returning in areas where they had been scarce or absent for years.





## classes/workshops

### ***Educational Programs***

#### *Available from:*

Chesapeake Bay National Estuarine Research Reserve

Training programs are available for middle and high school teachers in using the Oceanography Forum on Learning Link. Workshops and programs on other topics are being developed.

#### *Ordering instructions:*

Contact CBNERR for scheduling information.

### ***Chesapeake Bay Invertebrate Lab***

#### *Available from:*

Science Museum of Western Virginia

A program for 1st -7th graders that uses live and preserved specimens from the museum's touch tank to illustrate the unique Chesapeake Bay ecosystem. Pollution problems and solutions are also discussed.

#### *Ordering instructions:*

Call SMWV to schedule the program.

### ***Celebrate the Chesapeake Bay***

#### *Available from:*

The Mariners' Museum

A wide variety of educational programs about the Chesapeake Bay are available for groups of all ages.

#### *Ordering instructions:*

Contact MM for fees and scheduling information.

### ***Chesapeake Bay Watershed***

#### *Available from:*

USFWS Chesapeake Bay Field Office

This teacher in-service training on the Bay and associated watershed includes an overview of the geology, geography, and natural history of the watershed with an emphasis on showing how stewardship of the land relates to cleaner waterways. The program is available to groups of 12 to 25; participants will receive free teaching materials.

#### *Ordering instructions:*

No charge; contact USFWS/CBFO to schedule.

## curriculum materials

### ***4-H Chesapeake Bay Projects***

#### *Available from:*

Virginia Cooperative Extension Service

These three units are for middle school students on Chesapeake Bay issues (soil erosion, nutrients, and underwater plants).

#### *Ordering instructions:*

Contact local extension office/4-H agent.

### ***Chesapeake Bay Teaching Materials Lending Library***

#### *Available from:*

Virginia Institute of Marine Science

This collection contains over 100 videos, software packages, activity guides, and other aids for teaching about the Bay and other environmental issues.

#### *Ordering instructions:*

Contact VIMS to request a catalog of materials.

## events

### ***Estuaries Day***

#### *Available from:*

Chesapeake Bay National Estuarine Research Reserve

This festival, held annually on the third Saturday in September, celebrates coastal environments and resources. The day-long event is held at York River State Park and features river cruises, games, canoe trips, and exhibits with estuarine and environmental themes. Appropriate for all ages.

#### *Ordering instructions:*

Contact CBNERR for additional information.



## exhibits

### ***Traveling Exhibit***

#### *Available from:*

Alliance for the Chesapeake Bay

This exhibit about the activities of ACB includes a tri-fold display, slide show, and copies of ACB publications and is available with staff for fairs and meetings.

#### *Ordering instructions:*

Available at no cost from ACB; please schedule several weeks in advance.

### ***Research and Education for Virginia's Estuaries***

#### *Available from:*

Chesapeake Bay National Estuarine Research Reserve

This traveling exhibit describes the Reserve's research, monitoring, education, and volunteer efforts.

#### *Ordering instructions:*

Contact CBNERR to schedule. Must schedule for at least two weeks.

## field trips/site tours

### ***Bill Portlock Field Studies***

#### *Available from:*

Bill Portlock

Field studies can be arranged for school or other groups; topics can include Chesapeake Bay ecology, marsh ecology, ornithology, and general environmental education.

#### *Ordering instructions:*

Contact BPFs to specify details. Daily fee is \$300; mileage is charged for travel to sites more than 50 miles from Bowling Green.



### ***Taskinas Creek Field Trips***

#### *Available from:*

Chesapeake Bay National Estuarine Research Reserve

Taskinas Creek, a CBNERR site within York River State Park, is open to school groups. Teachers are responsible for programming and activities.

#### *Ordering instructions:*

Contact CBNERR to arrange a visit.

### ***Chesapeake Bay: A Way of Life***

#### *Available from:*

The Mariners' Museum

This one-day study program of the Bay includes a Museum visit, an environmental study, and an exploration of Hampton Roads Harbor.

#### *Ordering instructions:*

Contact MM for scheduling information; the program costs \$17.50 per student.

### ***Virginia Marine Science Museum***

#### *Available from:*

Virginia Marine Science Museum

This facility houses 100,000 gallons of fresh and salt water aquaria and numerous hands-on exhibits designed to involve the visitor in every aspect of the state's marine environment.

#### *Ordering instructions:*

Contact VMSM for information about fees and group reservations. A membership program is also available.

### ***York River Cruises***

#### *Available from:*

Watermen's Museum

1 1/2-hour cruises aboard a 42-foot Chesapeake deadrise highlight ways the York River has been used by watermen and the methods used to harvest its products.

#### *Ordering instructions:*

Contact WM to schedule; the cruise costs \$7.50 per passenger.

## networking/referral services

### **Chesapeake Regional Information Service**

#### *Available from:*

Alliance for the Chesapeake Bay

This regional hotline provides information about the Chesapeake Bay restoration effort. Callers can listen to recorded information about Bay news, request printed information, or speak directly with the CRIS Director for answers to specific questions.

#### *Ordering instructions:*

Call (800) 662-CRIS from a touch-tone phone.

*Two of the country's top shipping ports — Baltimore Harbor and Hampton Roads — lie in the Chesapeake. Nearly 50,000 commercial vessel trips are recorded annually from Bay ports.*

## newsletters/magazines

### **Bay Journal**

#### *Available from:*

Alliance for the Chesapeake Bay

This newsletter, a public education service of the Chesapeake Bay Program, is intended to inform the public about issues and events that affect the Chesapeake Bay and to expose readers to ways in which they may help preserve and protect the Chesapeake Bay.

#### *Ordering instructions:*

Free; contact ACB for ordering information.

### **CBF News**

#### *Available from:*

Chesapeake Bay Foundation

This newsletter is published for CBF members.

#### *Ordering instructions:*

Contact CBF for membership information.

### **Bay Watcher Bulletin**

#### *Available from:*

Chesapeake Bay Foundation

This newsletter provides information on the active corps of CBF volunteers known as Bay Watchers and focuses on legislative issues, citizen involvement, and conservation projects.

#### *Ordering instructions:*

Contact CBF for information about volunteering.

### **a fair Bay**

#### *Available from:*

Chesapeake Bay National Estuarine Research Reserve

This quarterly newsletter features articles about research and monitoring in progress on Reserve sites; a regular feature, "Species Watch," about species found on Reserve sites that have or have had ecological problems; and news about the program, its work, and its volunteers.

#### *Ordering instructions:*

Contact CBNERR.

## posters

### **Inside the Chesapeake Bay**

#### *Available from:*

Alliance for the Chesapeake Bay

This poster is a graphic portrait of the Bay and some of the many facets of this national treasure and the forces that can harm it.

#### *Ordering instructions:*

Contact ACB. Single copies are free; multiple copies available with payment of postage.

### **Chesapeake**

#### *Available from:*

Watershed Initiative/The Tides Foundation

This full-color interactive poster of the Bay's brackish communities was designed by the Environmental Arts Center. A color overlay lifts to reveal underwater life and natural history text.

#### *Ordering instructions:*

Available for \$24.95 from WI/TF; instructors' discounts available.

## publications

### **Baybook**

#### *Available from:*

Alliance for the Chesapeake Bay

This 32-page guide gives tips for reducing water pollution at home.

#### *Ordering instructions:*

Contact ACB. Single copies are free; each additional copy is \$1.

### **River Fact Sheets**

#### *Available from:*

Alliance for the Chesapeake Bay

This series consists of 1-page fact sheets about the Chesapeake Bay and each of its tributaries. Each fact sheet includes a map, a brief history of the region, and a description of the particular problems and possible remedies for each river basin.

#### *Ordering instructions:*

Available free from ACB.

### **Chesapeake Watershed Educational Materials Catalog**

#### *Available from:*

Watershed Initiative/The Tides Foundation

This catalog lists Chesapeake Bay watershed educational materials available at a discount to educators.

#### *Ordering instructions:*

Contact WI/TF for a copy.

### **Chesapeake Bay: Nature of the Estuary, A Field Guide**

#### *Available from:*

Watershed Initiative/The Tides Foundation

This field guide to the common plants and animals of the wetlands and waters of the Bay and its tributaries is a primer on Bay ecology. It was written and illustrated by Christopher White and Karen Teramura and includes line drawings of more than 350 species in nine major habitats.

#### *Ordering instructions:*

Available for \$12.95 from WI/TF; instructors' discounts available.

### **Endangered and Threatened Wildlife of the Chesapeake Bay Region**

#### *Available from:*

Watershed Initiative/The Tides Foundation

This handbook to endangered and threatened plants and animals of Delaware, Maryland, and Virginia includes color photographs and maps.

#### *Ordering instructions:*

Available for \$5.50 from WI/TF.

### **Life in the Chesapeake Bay**

#### *Available from:*

Watershed Initiative/The Tides Foundation

This illustrated guide to fish, invertebrates, and plants of the Chesapeake Bay includes line drawings of 335 species. It was written and illustrated by R. L. and A. J. Lippson.

#### *Ordering instructions:*

Available from WI/TF for \$15.95; educational discounts are available.

### **Chadwick and the Garplegrungen**

#### *Available from:*

Watershed Initiative/The Tides Foundation

This is one of the "Chadwick the Crab" series of children's books by Priscilla Cummings. Chadwick and his friends encounter green and purple gunk in the Bay and try to get rid of it.

#### *Ordering instructions:*

Available from WI/TF for \$8.95; educational discounts available.

### **Turning the Tide: Saving the Chesapeake Bay**

#### *Available from:*

Watershed Initiative/The Tides Foundation

This book summarizes the current state of the Bay and includes recommendations for improving it. It was written by Tom Horton and William Eichbaum.

#### *Ordering instructions:*

Available from WI/TF for \$14.95.

## slide shows/films

### ***Land and Water: Managing Growth in the Chesapeake Region***

#### *Available from:*

Alliance for the Chesapeake Bay

This 20-minute slide/tape program describes how land development and population growth are affecting the Chesapeake Bay region and explores a wide variety of ideas and solutions for managing growth more effectively.

#### *Ordering instructions:*

Available for loan at no cost to schools and organizations; contact ACB.

## videos

### ***Chesapeake: The Twilight Estuary***

#### *Available from:*

Alliance for the Chesapeake Bay

This 40-minute video, produced by Maryland Sea Grant, documents the search for causes of the decline of Bay grasses and makes a strong connection between land activities and water quality.

#### *Ordering instructions:*

Available for loan at no cost to schools and organizations; contact ACB.

## youth camp/projects

### ***Chesapeake Bay Youth Conservation Corps***

#### *Available from:*

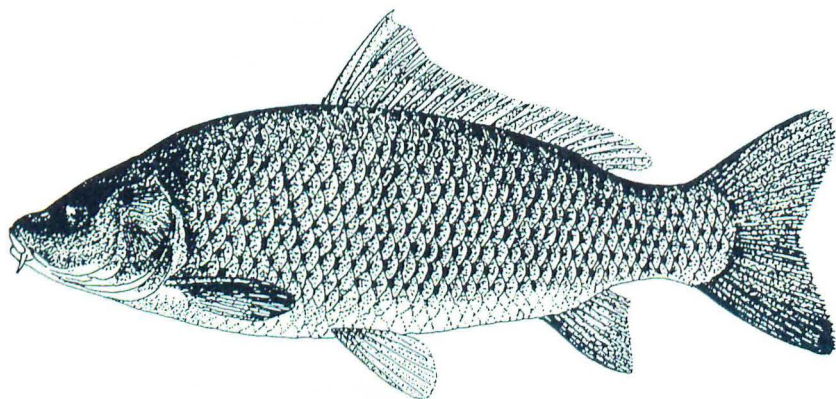
Chesapeake Bay Youth Conservation Corps

This program involves at-risk teens of the South Hampton Roads area in environmental projects on the Bay and its tributaries. The program provides services such as water testing and wetland restoration; participants also build blue bird and wood duck boxes.

#### *Ordering instructions:*

Contact CBYCC for additional information.

*Significant progress in reducing nutrients entering the Potomac River, a Bay tributary, has been made — phosphorus nutrients were reduced 38 percent from point sources and 17 percent from nonpoint sources and nitrogen was reduced two percent from point sources and 15 percent from nonpoint sources between 1985 and 1993.*



### ***School of the Bay***

#### *Available from:*

Rappahannock Preservation Society

Boat and canoe trips and student research programs can be scheduled dealing with Bay ecology and oyster reef technology.

#### *Ordering instructions:*

Call RPS to arrange. A modest fee is charged.

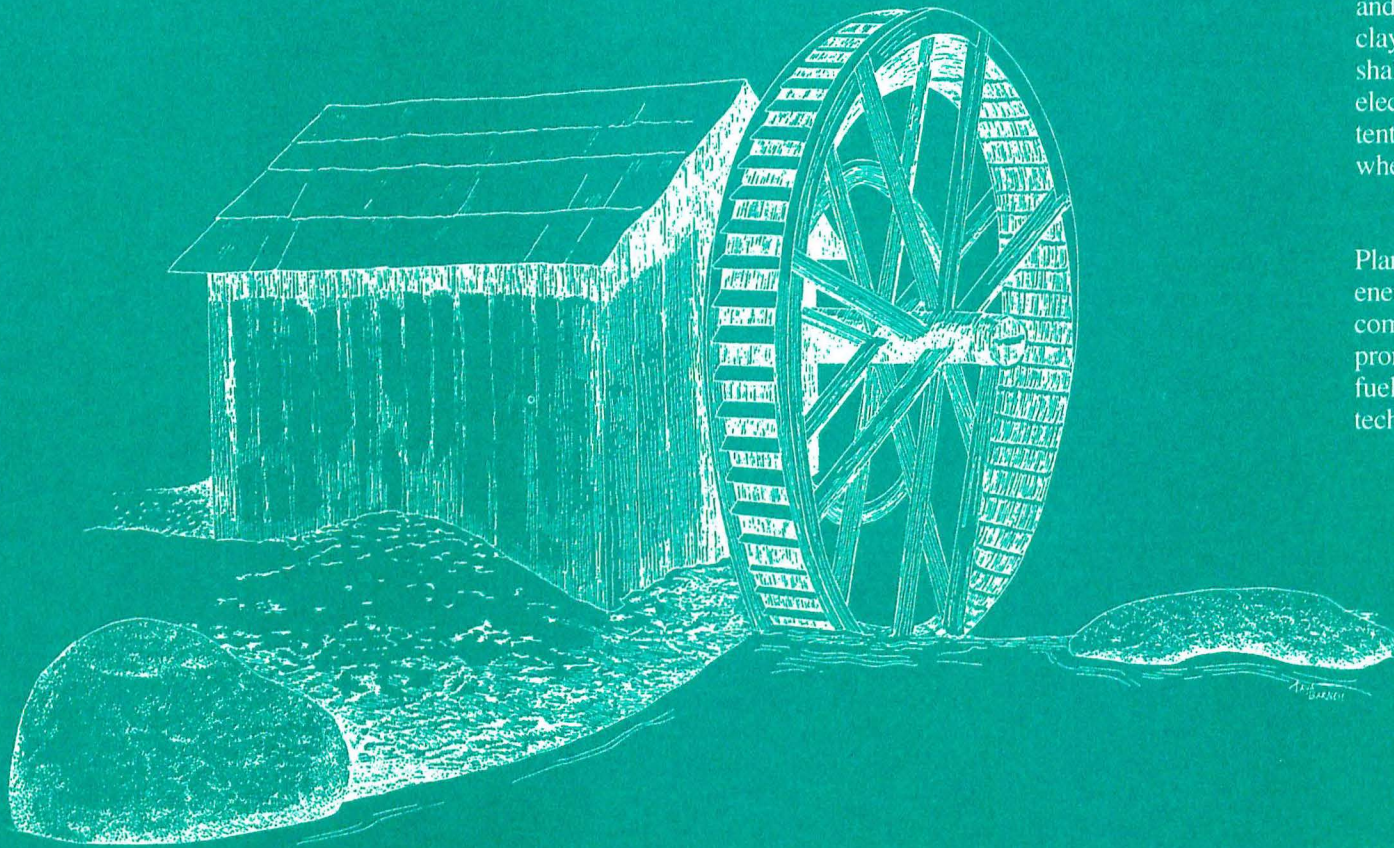
*The Bay is the largest estuary in the contiguous United States. The annual commercial harvest of finfish and shellfish from the Bay is more than 687 million pounds.*

# Energy & Minerals

Producing energy for people and businesses, as well as extracting and transporting the mineral resources used for energy production, is vital to Virginia's future. Virginia is committed to wise management to ensure both economic and environmental health and is working with industry to reduce air and water pollution and waste disposal concerns associated with energy production.

Beneath Virginia's five physiographic provinces (Coastal, Piedmont, Blue Ridge, Valley and Ridge, and Cumberland Plateaus) lie rocks and minerals of different ages, kinds and character, including coal, oil, natural gas, clay, granite, limestone, sand, gravel and shale. Much of Virginia's coal is used for electric power generation. Its low sulfur content produces fewer sulfur-dioxide emissions when burned.

In 1991, Virginia adopted a State Energy Plan, a wide variety of strategies to conserve energy and develop alternative fuels. Utility companies have taken strong measures to promote conservation practices, alternative fuel development, and pollution reduction technologies.



## classes/workshops

### ***Virginia Power Teacher Workshops***

#### *Available from:*

Virginia Power - Educational Services

Each year a variety of workshops are offered to educators. They feature hands-on activities and/or panel discussions with environmental and energy experts.

#### *Ordering instructions:*

Write to VP for a list of upcoming programs.

## curriculum materials

### ***Resources and the Environment***

#### *Available from:*

Appalachian Power Company

Interdisciplinary workshop presents curriculum developed by Texas A&M University for earth science teachers. Materials provide middle and high school students with a real problem to solve using laboratory data, field studies and mining/mineralogy experts.

#### *Ordering instructions:*

Workshops are available to school groups in Southwest Virginia. Call APCO to schedule.

## field trips/site tours

### ***APCO Tours***

#### *Available from:*

Appalachian Power Company

Tours of power plants and hydro-electric facilities for teachers and school groups are available throughout the Appalachian service area.

#### *Ordering instructions:*

Tours are available to school groups in Southwest Virginia. Call APCO at least one week in advance. Group size will vary depending upon facility.

### ***Commonwealth Gas Tours***

#### *Available from:*

Commonwealth Gas

Tours of facilities are available to school groups.

#### *Ordering instructions:*

Contact a local CG office in Richmond, Petersburg, South Hill, Portsmouth, Lynchburg, Staunton, Harrisonburg, Lexington, Covington, Manassas, Fredericksburg, Culpeper or Warrenton.

### ***Virginia Power Facility Tours***

#### *Available from:*

Virginia Power - Community Affairs

Tours of power facilities are available to groups.

#### *Ordering instructions:*

Contact the VP facility in your area. Schedule at least two weeks in advance.

*Virginia leads the nation in the production of kyanite, a mineral found in the Piedmont which is used for ceramics and glass to resist cracking, warping and deforming at high temperatures.*

## outreach programs/speakers

### ***APCO Speakers Bureau***

*Available from:*

Appalachian Power Company

Staff are available on a variety of subjects relating to energy and energy issues.

*Ordering instructions:*

Speakers are available for students, teachers and the general public in Southwest Virginia. Call APCO at least one week in advance.

### ***Speakers Bureau***

*Available from:*

Commonwealth Gas

Staff from CG, a natural gas utility, are available to speak to groups about energy and air quality.

*Ordering instructions:*

Contact a local CG office in Richmond, Petersburg, South Hill, Portsmouth, Lynchburg, Staunton, Harrisonburg, Lexington, Covington, Manassas, Fredericksburg, Culpeper or Warrenton.

### ***Virginia Power Classroom Presentations***

*Available from:*

Virginia Power

VP staff are available to speak to school groups on energy-related issues.

*Ordering instructions:*

Contact local VP office; call at least two weeks in advance.

## publications

### ***The Virginia Energy Savers Handbook: A Guide to Saving Energy, Money, and the Environment***

*Available from:*

Department of Mines, Minerals, and Energy

This comprehensive guide is intended for homeowners and individuals interested in learning ways they can save energy, money, and the environment in their homes, cars, and daily activities.

*Ordering instructions:*

Contact DMME for ordering information.

### ***The Energy Casebook Catalog***

*Available from:*

National Energy Education Development Project

This catalog lists energy education materials for grades 4-12. Fact sheets, games, plays, experiments, teacher and student training and an awards program are available.

*Ordering instructions:*

Prices vary; call NEED for free catalog.

### ***Natural Gas Vehicles, the Clean Way to Go With a Domestic Fuel***

*Available from:*

Washington Gas

This brochure provides information about the environmental advantages of natural gas as a fuel for vehicles.

*Ordering instructions:*

Contact WG to order. No charge, but quantities are limited.

*The total value of mineral production in Virginia in 1993 was \$1.2 billion.*



## videos

### ***Washington Gas, Natural Gas Vehicles and You***

*Available from:*

Washington Gas

This 8-minute video promotes the use of natural gas as a vehicle fuel and discusses the economic, environmental, domestic, and safety benefits of natural gas.

*Ordering instructions:*

Available from WG for loan to groups of 20 or more; no charge, but borrower must pay return postage.

*In economic value, bituminous coal is Virginia's most important mineral resource. In 1993, Virginia ranked eighth among coal-producing states. In that same year, more than 40 million tons of coal valued at \$1.12 billion were produced from the south-west Virginia coal field — most of it high-grade bituminous coal with a low sulfur content and higher heat energy value than standard-grade bituminous. Natural gas production in 1993 amounted to over 37 billion cubic feet, valued at more than \$84 million.*

# Historical Resources

Virginia's cultural and historic resources are among its most valuable assets and the Commonwealth is committed to encouraging private efforts to preserve them. Though many people may not automatically consider history a resource, visitors to the Commonwealth rank its history as one of the most important factors motivating them to come to Virginia. Among the places they want to see are the 1,650 designated architectural and archaeological sites that can be found across the state.

Virginia's landscape is also valued for its diverse scenic beauty and recreational opportunities — the Blue Ridge Mountains, the Shenandoah Valley, and the Chesapeake Bay, for example. Working farms, plantations, villages, urban neighborhoods, and rural landscapes bring to life the rich heritage that has shaped the lives of Virginia's citizens.



## curriculum materials

### ***Heritage Education Workbook***

#### *Available from:*

Preservation Alliance of Virginia

This 105-page workbook is intended for teaching elementary age students about Virginia's historic resources.

#### *Ordering instructions:*

Available for \$20 from PAV.

### ***Heritage Education Resource Kits***

#### *Available from:*

Roanoke Regional Preservation Office

Kits are available which contain books, curriculum materials, artifacts, and audio-visual programs. The kits will assist teachers in developing study units on archaeology and Virginia's native peoples.

#### *Ordering instructions:*

Kits are available from RRPO for loan; request at least two weeks in advance. No charge, but borrowers are responsible for pick-up and return of materials.

### ***Historical Perspective of the Roanoke Valley, 1750 - 1850***

#### *Available from:*

Virginia's Explore Park

This series of brochures is based on research on the Hofauger Homestead in the Roanoke Valley. Several topics are available including barn raising, spinning, and gardening.

#### *Ordering instructions:*

No charge; contact VEP for ordering information.

## events

### ***Virginia Indian Heritage Festival***

#### *Available from:*

Virginia Museum of Natural History

This annual 2-day event presents the culture of Native Americans and includes a powwow.

#### *Ordering instructions:*

Contact VMNH for additional information.

## publications

### ***The Rappahannock Scenic River Atlas***

#### *Available from:*

Friends of the Rappahannock

This 31-page atlas of historic sites on the Rappahannock River and its branches from Waterloo to Fredericksburg includes information about river access and river mileage.

#### *Ordering instructions:*

Available from FR for \$5 plus \$2 shipping.

### ***First People: The Early Indians of Virginia***

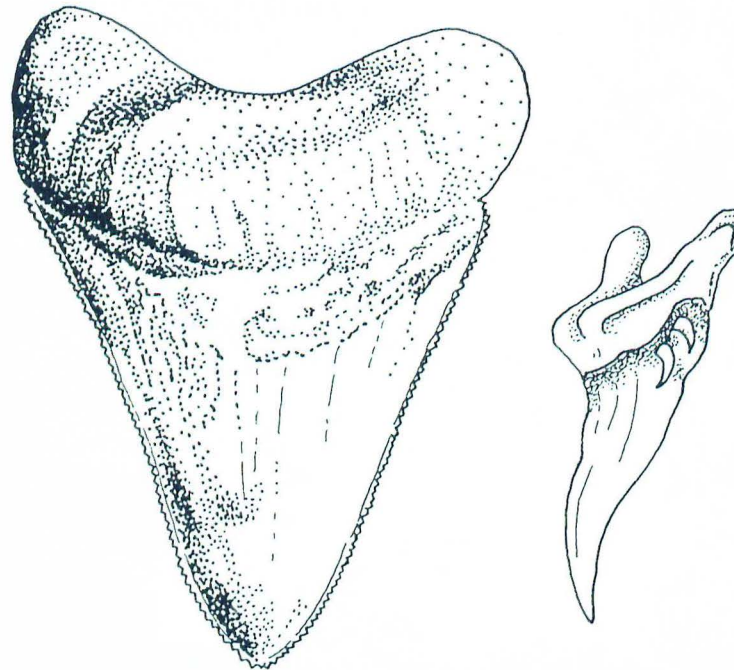
#### *Available from:*

University Press of Virginia

This is a history of Virginia's Indians from 9500 B.C. to the present, including their adaptations to a constantly changing environment.

#### *Ordering instructions:*

Available for \$11.95 plus shipping from UPV.



***Virginia Indians: An Educational Coloring Book***

*Available from:*

Virginia Museum of Natural History

This coloring book for elementary age students is based on the Sara Indians of the Virginia and North Carolina Piedmont. It emphasizes the relationship between Native Americans and their environment.

*Ordering instructions:*

Available from VMNH for \$2 plus \$0.50 postage.

**videos**

***The Architectural History of Western Virginia***

*Available from:*

Blue Ridge Public Television

This 25-minute video uses images of historic buildings and objects to present a visual and chronological narrative of the history of the upper reaches of the James, Roanoke, and New Rivers.

*Ordering instructions:*

Available for \$15 from BRPT.

***Archaeology and the Study of Native Americans in Western Virginia***

*Available from:*

Blue Ridge Public Television

This 15-minute video uses recent archaeological excavations in Salem to introduce a broad range of topics including principles of archaeology and ethics for preservation of historic resources.

*Ordering instructions:*

Available for \$15 from BRPT.

*The tourist industry generated by these resources brings more than \$9 billion annually to the state's economy and provides thousands of jobs.*



## Land, Soil & Agriculture

Agriculture is Virginia's largest industry and is the basis for a number of related industries, such as food processing and distribution. Virginia's agriculture includes field crops, vegetables, livestock, seafood, aquaculture, landscape and nursery products, the commercial horse industry and premium wines. Like those engaged in other industries, farmers have a keen interest in and have taken steps to ensure a healthy resource through careful stewardship.

For example, runoff from fertilizers, pesticides and animal wastes are managed to improve water quality. Several state and federal programs encourage farmers to use these environmentally sound methods, called "best management practices."

The formation of soil is a slow process. It can take a thousand years for an inch of topsoil to form from weathered rock. Rain and wind can move or erode soil that is exposed by land disturbing activities. Soil erosion contributes to water pollution and loss of land productivity, but can be managed by a variety of techniques such as contour farming, grass filter strips and stormwater detention basins.



## curriculum materials

### ***Raindrops Keep Falling on Your Head***

*Available from:*

Department of Conservation and Recreation

This kids' activity book on soil and water conservation contains puzzles, facts about soil and water, group and individual activities, and a centerfold coloring poster.

*Ordering instructions:*

Free; call or write DCR for a copy.

*Soil is a mixture of disintegrated rock and decomposed plant, insect and animal remains. The kind of rock, the climate and the topography of the land determine the kind of soil that forms.*

### ***Teaching Soil and Water Conservation: A Classroom and Field Guide***

*Available from:*

John Marshall Soil and Water Conservation District

This 30-page activity booklet for educators concentrates on soil particles, the erosion process, and agricultural methods for slowing erosion. The activities can be adapted for lower grades.

*Ordering instructions:*

Available only to Fauquier County residents; call JMSWCD. No charge; available as supplies last.

### ***Conserving Soil***

*Available from:*

John Marshall Soil and Water Conservation District

This materials packet contains a 17-page activity guide, 24 master activity sheets, 3 overhead transparencies, and a glossary. Units cover soils, erosion, and issues.

*Ordering instructions:*

Available only to Fauquier County residents; call JMSWCD. No charge; available as supplies last.

### ***Virginia Agriculture in the Classroom***

*Available from:*

Virginia Farm Bureau Federation

This curriculum, primarily targeted at fourth grade, covers history, geography, technological changes, economics, plant science and agricultural ecology. Teacher workshops and other resources are available, as well as materials for all age levels.

*Ordering instructions:*

For more information contact Ag in the Classroom coordinator at VFBF.

### ***Soil and Man - An Historical Perspective in the Roanoke Area***

*Available from:*

Virginia's Explore Park

This 20-page booklet describes the history of the development of soils in western Virginia and the influence of humans on these soils, and includes hands-on activities about properties of soil.

*Ordering instructions:*

No charge; contact VEP.

## field trips/site tours

### ***Conservation Field Trips***

*Available from:*

John Marshall Soil and Water Conservation District

A limited number of opportunities are available for Fauquier County classes to visit local farms. Students will be exposed to agricultural methods and conservation measures used on farms. Hands-on activities are often included.

*Ordering instructions:*

No charge; must schedule at least three months in advance. The teacher may be expected to assist with locating guest speakers.

*Agriculture generates approximately \$2.85 billion in farm income and supports more than 250,000 jobs—almost nine percent of the labor force.*

## newsletters/magazines

### **Colonial SWCD News**

*Available from:*

Colonial Soil and Water Conservation District

This quarterly newsletter covers Colonial SWCD activities as well as local, state, and national conservation issues.

*Ordering instructions:*

No charge; contact CSWCD to be placed on mailing list.

### **John Marshall SWCD Newsletter**

*Available from:*

John Marshall Soil and Water Conservation District

This quarterly newsletter, 4 - 6 pages, for Fauquier County residents covers local soil and water issues and includes tips, guidelines for agricultural cost-share assistance, upcoming events, and announcements from other resource agencies.

*Ordering instructions:*

Call or write JMSWCD to be placed on the mailing list.

## **VISION**

*Available from:*

Valley Conservation Council

This quarterly newsletter for VCC members reports about the activities of VCC and gives information about land preservation.

*Ordering instructions:*

Contact VCC for membership information.

## outreach programs/speakers

### **Environmental Conservation Presentations**

*Available from:*

Colonial Soil and Water Conservation District

Speakers are available to provide environmental conservation presentations with slides or other audio-visual materials.

*Ordering instructions:*

Contact CSWCD; no charge, but advance scheduling is required.

### **From the Blue Ridge to the Alleghenies: The Valley of Virginia**

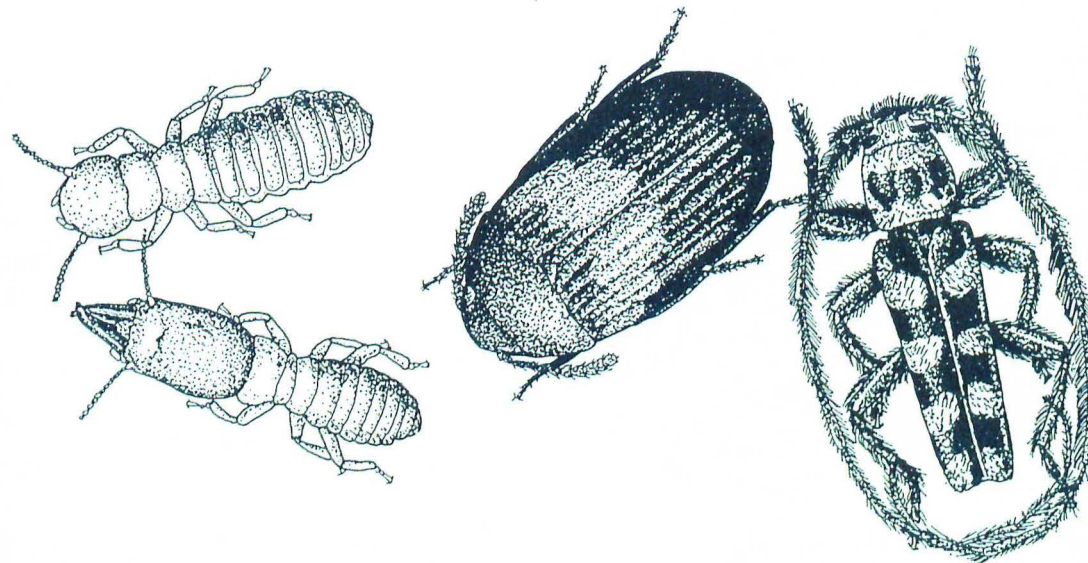
*Available from:*

Valley Conservation Council

Speakers are available (with slide show) to discuss growth issues in the Shenandoah Valley and options available for land protection.

*Ordering instructions:*

Contact VCC to schedule; service limited to Frederick, Shenandoah, Page, Alleghany, Highland, Bath, Rockbridge, Rockingham, Augusta, Botetourt, and Warren Counties. Donations are accepted.



## publications

### ***Soil and Water Stewardship Week Materials***

*Available from:*

John Marshall Soil and Water Conservation District

Soil and Water Conservation Week is observed each spring. The packet contains coloring books, a poster with activities, and bookmarks. The emphasis is on responsible actions for conservation, and there is a different theme each year.

*Ordering instructions:*

Available only to Fauquier County residents; call JMSWCD. No charge; available as supplies last.

### ***The Story of Land: Its Use and Misuse Through the Centuries***

*Available from:*

John Marshall Soil and Water Conservation District

This 15-page comic book for upper elementary students incorporates principles of soil and water conservation.

*Ordering instructions:*

Available only to Fauquier County residents. No charge; contact JMSWCD. Teachers may request a class set but must give at least one month advance notice.

### ***Exploring Careers in Agronomy, Crops, and Soils***

*Available from:*

John Marshall Soil and Water Conservation District

This 28-page booklet gives an overview of agronomy and related careers in research and in the field; a good resource for school counselors. It provides pointers on courses to take in high school and gives a list of related disciplines and job titles.

*Ordering instructions:*

Available only to Fauquier County residents. Contact JMSWCD; quantities are limited.

## slide shows/films

### ***This is Your Land***

*Available from:*

National Wildlife Federation

This 15-minute filmstrip for elementary and middle school students brings to life the beauty and variety of America's rich natural heritage. National parks, wilderness areas, and other public lands are featured.

*Ordering instructions:*

Available from NWF for \$5 plus shipping. Also available as a slide set.

### ***Soil: We Can't Grow Without It***

*Available from:*

National Wildlife Federation

This 15-minute filmstrip for elementary and middle school students describes how soil is formed and explores the different types of soils and the creatures that make their homes in soil. Human misuse of land is causing soil erosion, but steps can be taken to preserve this resource.

*Ordering instructions:*

Available for \$5 plus shipping from NWF. Also available as a slide set.



# Marine & Aquatic Resources

Virginia's commercial and recreational fisheries make significant contributions to the state's economy. In recent years the industry has been faced with a variety of challenges. Most notably, the spread of the diseases MSX and Dermo has seriously contributed to reduced commercial harvests of oysters in the Chesapeake Bay.

Fisheries management is complex because it is difficult to assess the size of the "stocks" and because environmental changes are often unpredictable. Population sizes, like all species, fluctuate naturally and many species are migratory.

In Virginia, the Marine Resources Commission sets the harvesting seasons, and determines equipment and methods for saltwater species. For example, recent regulations concerning blue crabs are designed to ensure it continues to be a commercially viable species.

Aquaculture is becoming more important to the economy of Virginia. Increasingly efficient techniques are being developed for culturing hard clams, oysters and bay scallops and for holding blue crabs until they shed.

Water-related recreation is also an industry in Virginia. Because countless Virginians enjoy fishing, boating, birding, going to seafood restaurants and to the beach, the protection of marine and aquatic resources will continue to be a priority.



## classes/workshops

### ***The Virginia Angler Program***

*Available from:*

Department of Game and Inland Fisheries

This 8- to 12-hour course/workshop is designed to train educators (primarily physical education) in how to teach basic angling and aquatic resource education in the classroom.

*Ordering instructions:*

Contact DGIF directly. A minimum of 15 participants is required. Courses are scheduled at various times and locations.

### ***Virginia Boating Education Program***

*Available from:*

Department of Game and Inland Fisheries

Statewide, year-round classes promote safe and ethical boating practices on Virginia's waters.

*Ordering instructions:*

Call (800) 245-BOAT.

### ***Teachers on the Bay***

*Available from:*

Institute for Chesapeake Bay Studies

This graduate marine ecology course for K-12 teachers features extensive field studies and hands-on learning. A curriculum design element allows teachers to adapt materials to their own classrooms.

*Ordering instructions:*

Contact ICBS.

*A female blue crab, which spawns once in its life, may produce as many as two million eggs.*

## curriculum materials

### ***Curriculum Materials and Activities***

*Available from:*

National Aquarium in Baltimore

NAIB has published a wide range of materials, including the aquatic science curriculum "Living in Water."

*Ordering instructions:*

Contact NAIB for a complete listing and order form; cost varies (\$2 - \$12).

### ***4-H Marine/Aquatic Projects***

*Available from:*

Virginia Cooperative Extension Service

A series of units on marine and aquatic topics with games and activities is available. Four units are available for grades 3-6 (water, ecology, oceans, and resources) and three for grades 7-9 (water pollution, taxonomy, and adaptations).

*Ordering instructions:*

Contact local extension office/4-H agent.

### ***Marine Science Curriculum Guides***

*Available from:*

Virginia Marine Science Museum

A set of guides for teaching about marine science related topics is available for all grades and covers a variety of topics.

*Ordering instructions:*

Each guide costs \$5; contact VMSM for complete list of titles and ordering information.

*In monetary value, harvests of Chesapeake Bay blue crabs have accounted for half of the national harvests over the last 20 years.*

## events

### ***Community Fishing Clinics Program***

*Available from:*  
Department of Game and Inland Fisheries

This program is designed to provide consultation and materials to organizations interested in co-sponsoring fishing clinics in their communities.

*Ordering instructions:*  
A free brochure is available from DGIF; the organizational kit is available from DGIF for \$5 (send check payable to "Treasurer of Virginia").

## field trips/site tours

### ***Marine Science Programs***

*Available from:*  
Virginia Marine Science Museum  
A variety of programs are available for groups of all ages, both on-site at the Museum and in the field.

*Ordering instructions:*  
Contact VMSM for a current schedule of programs available; fees vary with program.

### ***Catch of the Day - Wooden Boats and Iron Men***

*Available from:*  
Watermen's Museum  
This 1 1/2-hour program offers students and teachers an opportunity to gain an appreciation for the life of the watermen.

*Ordering instructions:*  
Contact WM for scheduling information.

## outreach programs/speakers

### ***Ocean Encounters***

*Available from:*  
Ocean Encounters  
Programs in marine science are available to schools, daycare centers, camps, senior centers, libraries, museums, hospitals, home-schoolers, and others. Concepts are taught using hands-on activities and live marine invertebrates.

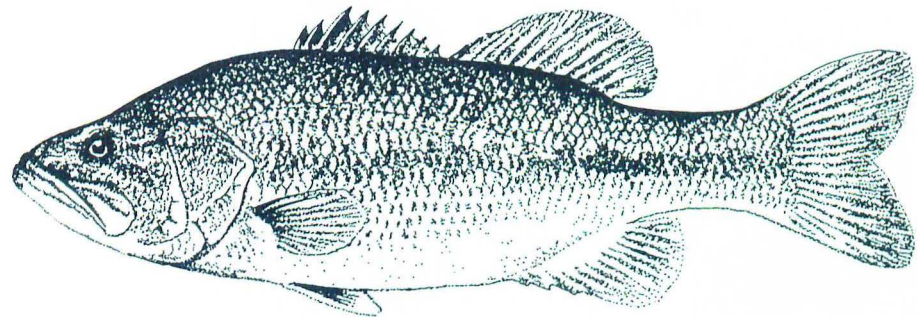
*Ordering instructions:*  
Call OE for contract; complete and return. Fees vary with program and distance traveled.

## publications

### ***Educational Publications***

*Available from:*  
Virginia Institute of Marine Science  
Several publications are available for teaching about the Bay and general marine science, including fact sheets, curriculum materials, and scientific reports.

*Ordering instructions:*  
Contact VIMS to request a publications list/order form.



# Trees, Plants & Forests

Virginia is botanically rich because of its wide range in climate, soils and topography. It has been called an “ecological crossroads” for its diverse range of natural communities.

Here, both southern and northern ecosystems can be found. Many northern species are at the southern extreme of their range in Virginia, and many southern species are at the northern extreme of their range.

Forests — plant communities comprising trees, shrubs and herbaceous plants — are a renewable resource that protects the soil from erosion, acts as windbreaks, helps recharge groundwater and provides lumber. The productivity of forests can be threatened by disease, insect damage, fire, poor air and water quality, and soil compaction from land disturbing activities.

Researchers are continually working to improve species resiliency. For example, a genetically improved loblolly pine was developed by the Department of Forestry. The Department also is testing resistant native chestnuts, previously a dominant tree in the Appalachians, but virtually wiped out by chestnut blight.



## classes/workshops

### ***Norfolk Botanical Garden***

#### *Available from:*

Norfolk Botanical Garden

A variety of horticulture classes and workshops for elementary students and the general public are scheduled continuous throughout the year.

#### *Ordering instructions:*

Classes generally have a fee. Contact NBG Education Department for a schedule.

### ***Arboretum Workshops***

#### *Available from:*

State Arboretum of Virginia

Classes and workshops are offered spring and fall. Some classes are appropriate for children.

#### *Ordering instructions:*

Contact SAV for list of classes and ordering information.

## curriculum materials

### ***Project Learning Tree***

#### *Available from:*

Department of Forestry

This national program provides lesson plans and teacher training about forest communities through free teacher workshops. Interdisciplinary activities focus on critical thinking and informed decision making about environmental issues.

#### *Ordering instructions:*

Workshops are scheduled throughout the state. Contact DOF for more information about workshops currently scheduled or how to arrange one in your area.

### ***Commonwealth of Virginia: School Gardening for Wildlife***

#### *Available from:*

Virginia Department of Game and Inland Fisheries and the Virginia Museum of Natural History

This curriculum package, available through school workshops, is intended to help schools create a wildlife garden on school grounds and use it as an outdoor laboratory for interdisciplinary learning.

#### *Ordering instructions:*

Contact DGIF or VMNH to schedule an on-site workshop.

## events

### ***Annual Tree Seedling Sales***

#### *Available from:*

Virginia Department of Forestry;  
Colonial Soil and Water Conservation District

Tree seedlings are available each spring for schools and outdoor classrooms from the Department of Forestry. The Colonial Soil and Water Conservation District also sponsors a spring sale of plants and shrubs to be used for erosion control or wildlife habitat construction.

#### *Ordering instructions:*

Trees can be ordered through DOF by requesting a catalog beginning October 1st. For more information call the forestry office in your locality. Also contact CSWCD for information about their plant species, a price list and ordering instructions.

## field trips/site tours

### ***Annual Fall Wildflower Sale***

*Available from:*

Virginia Living Museum

Native species, in 3-4 inch pots, ready for fall planting are featured. Staff and volunteers are available for consultation.

*Ordering instructions:*

Call VLM for date of sale. A special advance sale is held for museum members.

### ***Annual Wildflower Sales***

*Available from:*

Virginia Native Plant Society

Plants and shrubs, native to Virginia, are offered for sale each spring. Plants can be used for beautification and naturalization projects, to attract wildlife and to enhance outdoor classrooms.

*Ordering instructions:*

Write to the VNPS for more information.

### ***Norfolk Botanical Garden***

*Available from:*

Norfolk Botanical Garden

Tours for elementary students and the general public (30 - 45 minutes during the fall and spring) of 150-acre botanical garden on a lakefront. Site includes formal landscapes and natural forest, opportunity for ecological study, identification and research.

*Ordering instructions:*

Tours must be scheduled 30 days in advance with NBG Education Department.

### ***State Arboretum of Virginia Adult Tour Program***

*Available from:*

State Arboretum of Virginia

General and topical tours are available free of charge for groups; self-guided tours are also available.

*Ordering instructions:*

Call SAV; reservations are required.

### ***Arboretum School Tour Program***

*Available from:*

State Arboretum of Virginia

Nine different environmental topics are available to school groups. The programs are grade-level specific and include outdoor walks, hands-on activities, and take-home items.

*Ordering instructions:*

Reservations are required; call early. Call SAV for a free brochure describing the programs.

### ***Forestry and Wildlife Bus Tours***

*Available from:*

Virginia Tech College of Forestry and Wildlife Resources

Tours are scheduled each fall to visit private woodlands, industry or public lands which show management practices that demonstrate multiple-use forestry and wildlife management techniques to achieve income, recreation or other goals.

*Ordering instructions:*

Contact VATECH--CFWR or local extension agent for schedule and registration form. A small fee is charged.

## outreach programs/speakers

### ***The Problem of Invasive Exotic Plants***

*Available from:*

Virginia Native Plant Society

A speaker (with professional slides) will discuss the problem of invasive exotic plants destroying the habitat(s) of native plant species.

*Ordering instructions:*

Call VNPS to schedule; travel expenses must be reimbursed.

*In the early 1900s, only 10 percent of Virginia's 25.4 million acres were forest lands. Reforestation practices have re-established trees on 16 million acres — nearly two-thirds of the state.*

## publications

### ***Spring Wildflowers of the Blue Ridge Mountains: A Checklist***

*Available from:*

Blue Ridge Wildflower Society

This 14-page checklist gives common and scientific names of about 400 spring and early summer blooming trees, shrubs, and herbaceous plants.

*Ordering instructions:*

Available from BRWS for \$1.50.

### ***Plants: Improving Our Environment***

*Available from:*

John Marshall Soil and Water Conservation District

This 15-page educational comic book for upper elementary students incorporates principles of soil and water conservation.

*Ordering instructions:*

Available at no charge to Fauquier County residents; contact JMSWCD. Teachers may request a class set but must give at least one month advance notice.

### ***One Green Tree***

*Available from:*

John Marshall Soil and Water Conservation District

This 14-page educational comic book for elementary or middle school grades discusses all of the benefits that trees provide to the environment and includes a conservation ethic for replanting to replace harvested trees.

*Ordering instructions:*

Available to Fauquier County residents. No charge; contact JMSWCD. Teachers may request a class set but must give at least one month advance notice.

### ***The Urban Forest Activities Book***

*Available from:*

Virginia Tech College of Forestry and Wildlife Resources

This illustrated booklet produced by the USDA Forest Service contains word puzzles and songs for elementary students.

*Ordering instructions:*

Contact VATECH -- CFWR.

## slide shows/films

### ***Forests Are More Than Trees***

*Available from:*

National Wildlife Federation

This 20-minute filmstrip for elementary and middle school students shows the importance of forests. The program covers ecology, uses, recreation, habitats, and threats to forest welfare.

*Ordering instructions:*

Available from NWF for \$5. Also available as a slide set.

## videos

### ***Forests for the Chesapeake Bay***

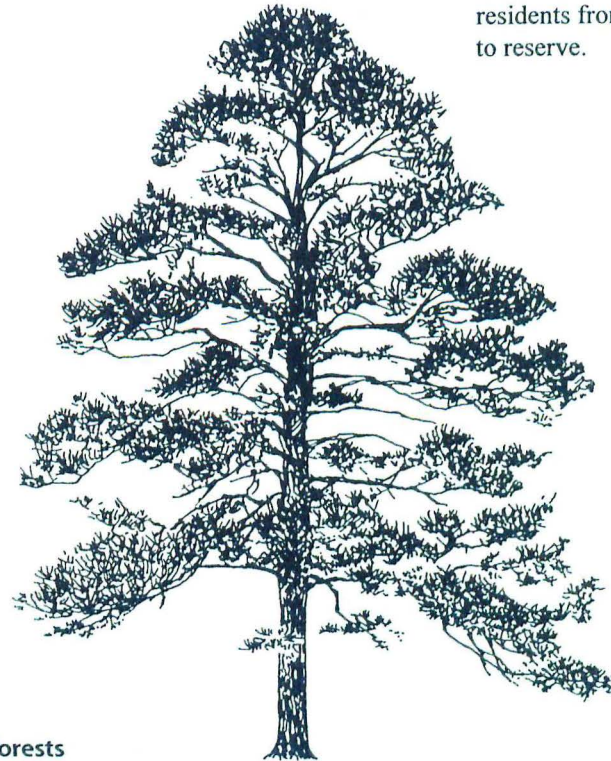
*Available from:*

John Marshall Soil and Water Conservation District

This 25-minute video is about the watersheds of the Bay, nonpoint source pollution, and how forests help protect the Bay. It includes footage of a forester visiting a private landowner to discuss management of forested property.

*Ordering instructions:*

Available for loan to Fauquier County residents from JMSWCD; call or write to reserve.



***4-H Program on Forestry and  
Wildlife***

*Available from:*

Virginia Tech College of Forestry and  
Wildlife Resources

An extracurricular environmental  
education program for youth.

*Ordering instructions:*

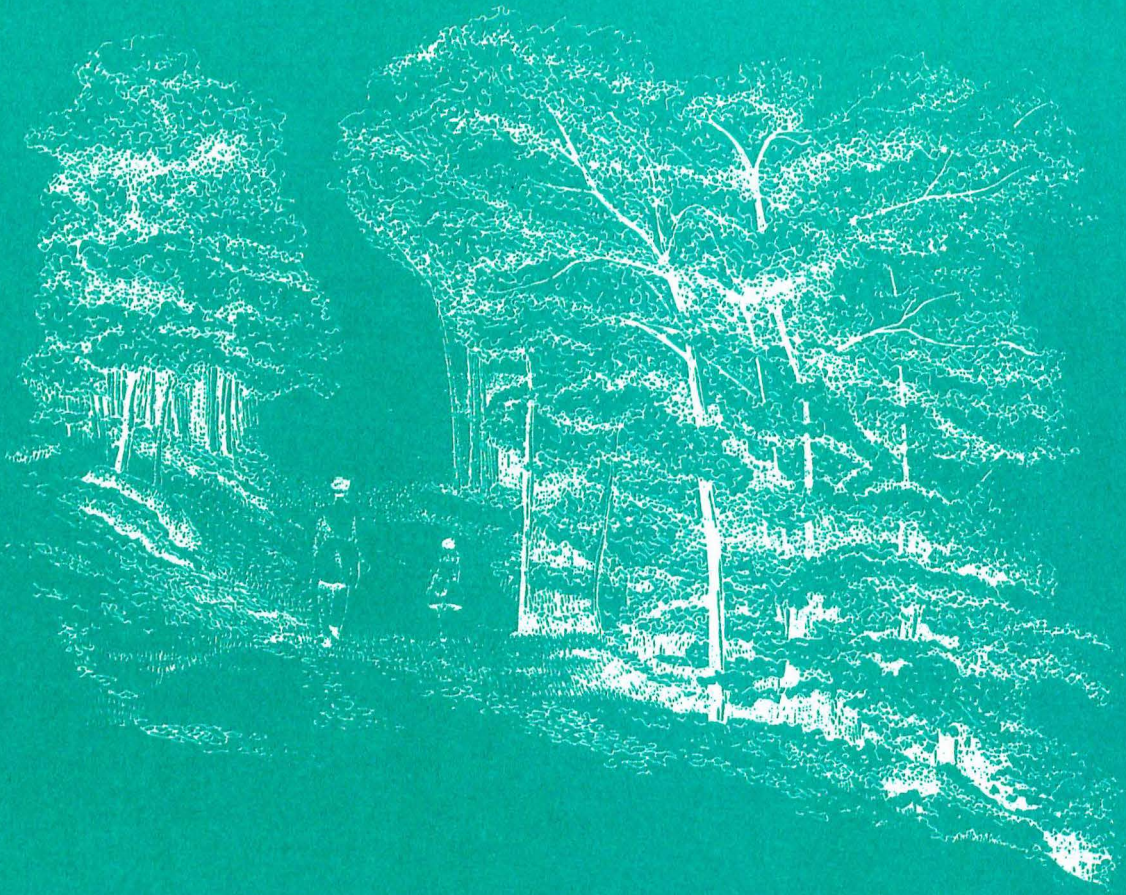
Contact VATECH--CFWR or local  
extension agent.

*The manufacture of wood products is a  
leading state industry.*





# Waste Management & Recycling



Approximately 58 percent of the 25,000 tons of waste generated each day in Virginia goes to landfills, 18 percent is incinerated, and 20 percent is recycled. These percentages are changing as individuals change their habits, local governments adopt management strategies and educational programs, and as businesses develop new products and markets for recycled goods.

Successful waste management employs a number of strategies, including the three Rs — reducing, reusing and recycling waste materials. Virginians can further reduce household waste by “pre-cycling” — buying items that can be repaired or reused instead of being thrown away.

Virginia works with industry and with communities to encourage voluntary recycling and the use of recycled materials. While local governments are developing waste management plans to achieve a 25 percent recycling rate by 1995, the rate of participating local governments in 1993 already was 27 percent.

To reduce pollution from disposal of solid waste, Virginia’s new landfills have synthetic and clay liners, collection and treatment of leachate, monitoring of groundwater and surface water for harmful chemicals, and monitoring for methane gas production.

## classes/workshops

### ***Youth Presenter Training Program***

*Available from:*

Prince William County Litter Control Council

This program trains volunteers to give presentations to youths. It consists of three parts: a two hour initial training, viewing a presentation, and conducting a presentation.

*Ordering instructions:*

Contact PWCLCC for scheduling information.

## curriculum materials

### ***The New Three Rs: Reduce, Reuse, and Recycle***

*Available from:*

Department of Environmental Quality

This booklet of activities to teach middle and high school students waste management concepts.

*Ordering instructions:*

Contact local recycling or litter control coordinator.

### ***Think Earth***

*Available from:*

Department of Environmental Quality

This package, suitable for grades 3-7, focuses on reducing solid waste and pollution. Students learn about trash and wastewater and ways to reduce generating them. Includes a video, 3 posters, and 8 lessons with blackline masters for reproducing.

*Ordering instructions:*

Contact DEQ to borrow kit for 2 weeks.

### ***Cycles for Science***

*Available from:*

Steel Recycling Institute

This high school curriculum supplement is designed around core areas of science (biology, chemistry, physics and earth science) and contain project-oriented lessons and hands-on activities covering a variety of waste management topics.

*Ordering instructions:*

Contact SRI for an order form. Other materials are available.

### ***Nature's For Me***

*Available from:*

Steel Recycling Institute

This activity kit for preschool teachers includes a guide for hands-on interactive activities, reference materials, a magnet and a special box in which to keep projects and other materials. Lessons help develop skills in classification, numbers, sequence, time and spatial relations.

*Ordering instructions:*

Cost is \$12.00 per kit. Contact SRI for list of other materials such as posters and coloring sheets.

## events

### ***Recycled Materials Contest***

*Available from:*

Prince William County Litter Control Council

This contest is for the best project made from recycled materials.

*Ordering instructions:*

Call PWCLCC for information.

### ***Recycled Costume Contest***

*Available from:*

Prince William County Litter Control Council

This contest is for the best costume made from recycled materials.

*Ordering instructions:*

Call PWCLCC for information.

*There are 146 local recycling programs in Virginia running 601 collection centers and curbside pick-up for nearly 700,000 residences. Many communities are now recycling phone books, white goods, yard waste and magazines as the market for recyclable materials improves.*

## field trips/site tours

### ***Environmental Shopping Tours***

*Available from:*

Prince William County Litter Control Council

These tours for students and adults at local grocery store promote awareness of smart shopping.

*Ordering instructions:*

Call PWCLCC for information.

### ***Recycle America Material Recovery Facility Tour***

*Available from:*

Waste Management of Hampton Roads

Groups may tour a 1000-plus tons per day recycling sorting plant. The program includes a presentation and shows container and paper sorting lines.

*Ordering instructions:*

No charge; call WMHR to schedule tour. Visitors must wear hard-soled shoes.

## newsletters/magazines

### ***Waste Watch***

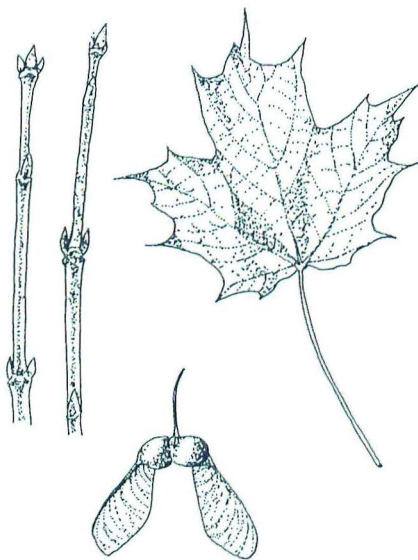
*Available from:*

Virginia Peninsulas Public Service Authority

This quarterly newsletter covers regional solid waste management projects, activities, and issues. Articles and information about school and community group recycling and cleanup efforts are welcome.

*Ordering instructions:*

Call VPPSA to be placed on mailing list.



## outreach programs/speakers

### ***Clean Valley Council Speaker***

*Available from:*

Clean Valley Council

A speaker/educator is available to speak on a variety of topics including recycling, litter control, household hazardous waste, environmental shopping, or marine debris.

*Ordering instructions:*

Programs are free to groups within the Roanoke Valley; travel expenses are required to visit classrooms outside the Roanoke Valley.

### ***Speakers Bureau***

*Available from:*

Prince William County Litter Control Council

Speakers are available for groups in Prince William county to discuss topics such as litter, recycling, waste reduction, hazardous waste, and environmental shopping.

*Ordering instructions:*

No charge; please call at least two weeks in advance to schedule.

### ***Recycling in the VPPSA Region***

*Available from:*

Virginia Peninsulas Public Service Authority

Presentations are available to groups of all ages on the Lower and Middle Peninsulas on a variety of topics related to recycling and solid waste management.

*Ordering instructions:*

No charge; call VPPSA at least two weeks in advance to schedule.

*Virginians generate about 3.5 pounds per person of solid waste each day.*

## publications

### ***Recycling and Litter Activities for Teachers***

*Available from:*

Department of Environmental Quality

A list of lesson plans, by grade level, from several curriculum supplements, such as Operation Waste Watch. Also includes a list of more than 50 curriculum guides.

*Ordering instructions:*

Call DEQ for a free copy. Multiple copies are available, also.

### ***A Citizen's Guide to Litter Control***

*Available from:*

Prince William County Litter Control Council

This pamphlet is designed to help citizens understand the laws and programs dealing with litter.

*Ordering instructions:*

Contact PWCLCC. Free to Prince William County residents; non-residents, \$1.

### ***Business Recycling Guide***

*Available from:*

Recycling Association of Central Virginia

This 14-page guide gives step-by-step instructions for setting up an office paper recycling program.

*Ordering instructions:*

Available for \$2 from RACV.

## videos

### ***Business Waste Recycling***

*Available from:*

Clean Valley Council

This 18-minute video describes the steps involved in starting a school or business recycling program.

*Ordering instructions:*

Available from CVC for \$22 plus \$2 shipping. Virginia residents must add Virginia sales tax (4.5%).

### ***Recycling and Litter Prevention Video Library***

*Available from:*

Department of Environmental Quality

More than 100 different videos concerning recycling, litter prevention, solid waste, and composting are available on loan for 2 weeks.

*Ordering instructions:*

Videos are free to borrow; users must pay return postage. Call DEQ for a list of titles, including the running time and year produced.

### ***The Clean Game***

*Available from:*

Prince William County Litter Control Council

This is a 25-minute video of an environmental quiz game between teens from three jurisdictions in Prince William County.

*Ordering instructions:*

Contact PWCLCC. Available for loan free of charge to Prince William County residents.

### ***YES I CAN!***

*Available from:*

Steel Recycling Institute

This video (approximately 15 minutes long) and teacher's guide for early elementary grades tells a story about a steel can that undergoes a series of experiences related to being purchased, used, recycled or thrown away.

*Ordering instructions:*

Cost is \$10.95 and includes postage. Contact SRI for list of other materials.

***Woodsy Owl Pollution Patrol  
Badge Program***

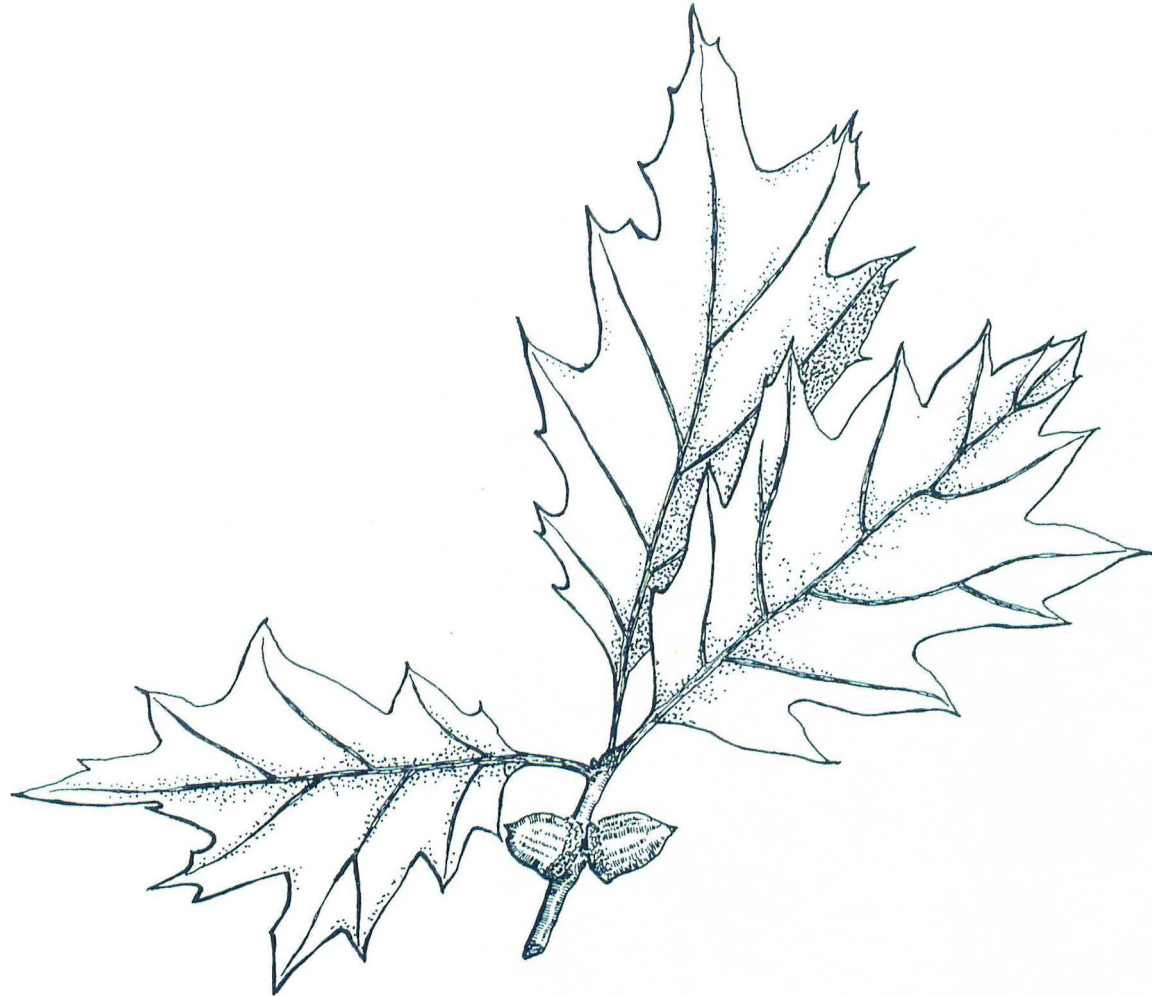
*Available from:*

Prince William County Litter Control  
Council

This program is a booklet of pollution  
prevention activities for children.  
Children must complete 10 of the  
activities to receive a certificate, badge,  
and membership card.

*Ordering instructions:*

Prince William County residents may  
contact PWCLCC for a copy of the  
activity booklet.

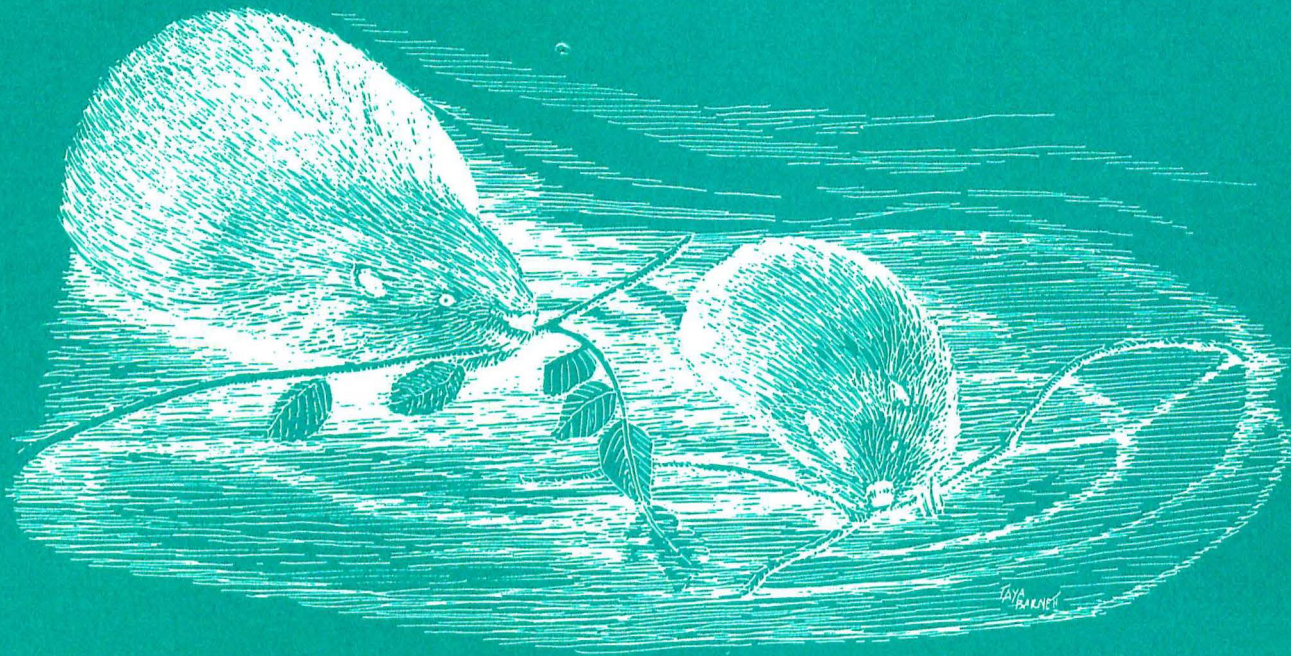


# Water Resources

Water quality is essential to human health, food production, wildlife habitat, industrial processes and recreational opportunities. The quality of both groundwater and surface water is affected by point and nonpoint source pollution.

Point sources are specific discharges, often from a pipe from facilities such as sewage treatment plants. These facilities obtain permits from the Department of Environmental Quality that set discharge limits based on scientific information. DEQ has placed emphasis on working with communities and private industries to adopt new technologies and methods to prevent water pollution.

Nonpoint source pollution consists of runoff from the land and can include sediments, nutrients, pesticides and other materials. A number of state programs, including voluntary partnerships with farmers, foresters and developers, are coordinated by the Department of Conservation and Recreation to reduce various kinds of runoff and improve water quality.



## awards

### ***American Water Works Association Science Fair Award***

#### *Available from:*

American Water Works Association  
AWWA contributes awards to regional science fairs for projects dealing with water. Students are awarded a \$50 savings bond and their teachers/advisors are awarded classroom supplies.

#### *Ordering instructions:*

Contact AWWA for information.

*Virginia's average yearly rainfall of 42 inches replenishes rivers, lakes and groundwater supplies.*

## classes/workshops

### ***Water Workshops***

#### *Available from:*

American Water Works Association  
Workshops and seminars are available for teachers about the water industry and water resources.

#### *Ordering instructions:*

Contact AWWA for a schedule of workshops.

### ***Community Approach to Watershed Protection***

#### *Available from:*

Virginia Center for the Environment  
Workshops and educational resources are available to help engage students in active projects that preserve and improve the environment of the local region and its watersheds.

#### *Ordering instructions:*

Available to the Charlottesville - Albemarle region. Contact VCE (formerly the Tandem Center for the Environment) for more information about environmental education resources, community events and projects.

## curriculum materials

### ***Educational Materials***

#### *Available from:*

American Water Works Association  
AWWA produces a variety of materials useful for teaching about water resources and water treatment. The local AWWA Education Committee will assist a school system in establishing a water resource education program and will provide initial materials.

#### *Ordering instructions:*

Contact AWWA for additional information.

*According to the 1994 Virginia Water Quality Assessment, only two percent of Virginia's rivers and streams monitored by the Department of Environmental Quality were categorized as not supporting use for fishing, swimming, drinking water, shellfish or aquatic life; a full 87 percent — over 30,000 miles — fully met water quality standards.*

### ***Water Resources Education Trunk***

#### *Available from:*

Department of Environmental Quality  
This suitcase is filled with a groundwater flow model, instructional videos, lesson plans, maps, posters, up-to-date reference books about water resources in Virginia and a Chesapeake Bay mini-unit. Materials are geared for grades 4 - 12 and include science, math, geography, language arts and social studies.

#### *Ordering instructions:*

Trunks can be borrowed for two weeks from state parks and Soil and Water Conservation field offices around the state or contact DEQ or DCR for location information.

### ***Project WET***

#### *Available from:*

Department of Environmental Quality  
A nationally developed program for preschool, elementary and secondary science, math, social studies and language arts. Materials are available through free teacher workshops.

#### *Ordering instructions:*

Contact DEQ for schedule of workshops.

## ***Water Games - Water Education Software***

### *Available from:*

Virginia Water Resources Research Center

Five water education programs are included on one diskette: Water Conservation; Water Trivia; Hot Water Cost; Drowning Man, and How Much Water Do You Weigh?

### *Ordering instructions:*

Available from VWRRC for \$5; specify IBM or Apple version.

## ***Groundwater Protection: What Would You Do?***

### *Available from:*

Virginia Water Resources Research Center

This computer software simulates groundwater protection and asks the user to find the source of well water contamination. It is appropriate for ages 13 to adult.

### *Ordering instructions:*

Available from VWRRC for \$5; only Apple IIe and IIc versions are available.

## ***Water and Me***

### *Available from:*

Virginia's Explore Park

This 5-page brochure contains short activities designed to give elementary age students an appreciation for water as a valuable renewable natural resource.

### *Ordering instructions:*

No charge; contact VEP.

*Virginia contains nine major river basins and more than 34,000 miles of perennial streams.*

## **organizational membership**

### ***Friends of the Shenandoah***

#### *Available from:*

Friends of the Shenandoah

This organization provides a variety of educational services to groups in Rockingham, Page, Warren, and Clarke Counties which are interested in the preservation of the Shenandoah River.

#### *Ordering instructions:*

Contact FS for information on membership and services.

## **publications**

### ***Water in Your Hands***

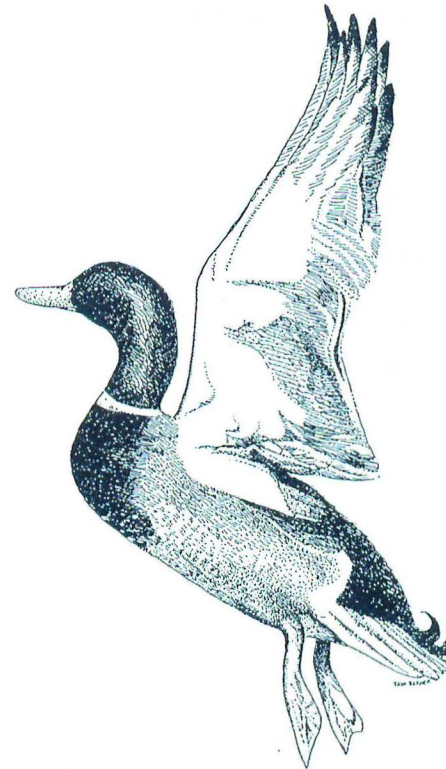
#### *Available from:*

John Marshall Soil and Water Conservation District

This 15-page educational comic book for upper elementary students incorporates principles of soil and water conservation.

#### *Ordering instructions:*

Available to Fauquier County residents. No charge; contact JMSWCD. Teachers may request a class set but must give at least one month advance notice.





### ***A Guide to Septic Systems and Alternatives***

*Available from:*

Virginia Water Resources Research Center

This 36-page booklet provides useful information to help citizens site and maintain home sewage systems, and includes information on alternatives to septic systems.

*Ordering instructions:*

Contact VWRRC. Single copies are free to Virginia residents; others, \$8.

### ***Springs of Virginia***

*Available from:*

Virginia Water Resources Research Center

This booklet describes the history and location of springs in Virginia, the threats to spring water quality, and management and protection approaches.

*Ordering instructions:*

Contact VWRRC. Single copies free to Virginia residents; others, \$5.

### ***Be Water Wise: Informative Brochure***

*Available from:*

Virginia Water Resources Research Center

This brochure uses a cartoon format to describe ways to conserve water around the home.

*Ordering instructions:*

Available free from VWRRC; please limit request to 30 copies.

### ***Getting the Lead Out***

*Available from:*

Virginia Water Resources Research Center

This 8-page informative report describes the risks and costs of lead in drinking water.

*Ordering instructions:*

Contact VWRRC. Single copies are free to Virginia residents; others, \$4.

## **slide shows/films**

### ***Water: We Can't Live Without It***

*Available from:*

National Wildlife Federation

This 14-minute filmstrip for elementary and middle school students shows how freshwater habitats support wildlife, what threatens our water supplies, and how we can conserve this vital resource.

*Ordering instructions:*

Available for \$5 plus shipping from NWF. Also available as a slide set.

### ***Threats to Virginia's Groundwater***

*Available from:*

Virginia Water Resources Research Center

This 18-minute program illustrates basic groundwater concepts and the importance of groundwater to Virginians.

*Ordering instructions:*

May be borrowed at no cost (two week advance notice required) or purchased for \$50 from VWRRC. Also available as a video which can be purchased for \$25.

### ***Groundwater: Sculptor of Caves***

*Available from:*

Virginia Water Resources Research Center

This 5-minute program shows how groundwater creates caves and their formations.

*Ordering instructions:*

May be borrowed at no cost from VWRRC (must reserve at least two weeks in advance); may be purchased for \$35.

### ***From the River to the Tap***

*Available from:*

Virginia Water Resources Research Center

This 12-minute slide program shows the steps in treating water to make it safe for drinking.

*Ordering instructions:*

May be borrowed at no cost from VWRRC (two weeks' advance notice required). Also available as a video.

## videos

### ***Be Water Wise: Slide Set***

*Available from:*

Virginia Water Resources Research  
Center

This slide/tape program illustrates  
middle school students using and  
abusing water.

*Ordering instructions:*

Available for loan at no cost from  
VWRRC; please reserve at least two  
weeks in advance. May be purchased  
for \$35.

### ***Save Our Streams: A Guide to Water Quality Monitoring***

*Available from:*

John Marshall Soil and Water  
Conservation District

This 28-minute video provides a  
demonstration of stream monitoring  
techniques, including pollution  
problems, sampling, identifying  
organisms, and using a stream survey.

*Ordering instructions:*

Available for loan to Fauquier County  
residents from JMSWCD; call or write  
to reserve.

*Total water use in 1991 for domestic,  
public, industrial and agricultural purposes  
amounted to about 8 billion gallons per  
day. Ninety-eight percent of this came  
from groundwater. Groundwater is the  
primary source of drinking water for nearly  
1.5 million Virginians.*

*The average Virginian uses about 80  
gallons of water per day. Approximately 84  
percent enters a sewage or septic system.  
Water that enters a sewage system will  
ultimately be treated at a wastewater  
treatment plant.*

# Wetlands

Tidal and non-tidal wetlands are important natural resources in Virginia's landscape. Wetlands provide groundwater recharge, flood and erosion control, water purification, and habitat for wildlife and shellfish species. Virginia's approach is to maintain essential resources and provide for economic growth.

Wetlands include bogs, swamps, marshes and the shallow areas of bays, rivers and lakes—but wetlands are not always wet. A combination of three factors — soil type, plant species and hydrology — determine whether a site is considered a wetland.

Wetlands also include lands that undergo seasonal flooding or have saturated soils for some period during the growing season. For example, some forested floodplains do not contain water year-round. They undergo a wet-dry cycle that is essential to their functioning and ability to provide floodwater storage, water purification and habitat.



## curriculum materials

### ***WOW!: The Wonders of Wetlands***

#### *Available from:*

Environmental Concern, Inc.

This 160-page educators' guide to wetlands learning activities includes over 40 classroom and outdoor lessons for students in grades K-12.

#### *Ordering instructions:*

No charge for the guidebook; \$3.50 shipping. Contact EC for information on ordering multiple copies.

### ***Wading Into Wetlands***

#### *Available from:*

National Wildlife Federation

This 64-page curriculum guide is one of the Nature Scope activity series. The guide is appropriate for K - 8 and includes background information, hands-on activities, a glossary, and a bibliography.

#### *Ordering instructions:*

Contact NWF to order. Guides may be purchased for \$7.95 plus shipping.

## publications

### ***Landowner Guide to Wetland Assistance***

#### *Available from:*

Chesapeake Bay National Estuarine Research Reserve in Virginia

This brochure provides information about 18 federal, state, local, and non-profit organizations which provide assistance or information about wetlands to landowners.

#### *Ordering instructions:*

Write CBNERR to request a copy. Enclose a stamped, self-addressed business size envelope with your request.

### ***Wetland Flora***

#### *Available from:*

Virginia Institute of Marine Science

This series of one-page fact sheets was written by Gene Silberhorn of the VIMS Wetlands Program. Each of the 16 fact sheets describes a single wetland plant and its distribution, habitat, and ecological value.

#### *Ordering instructions:*

Contact VIMS for a list of titles.

### ***Wetlands Technical Reports***

#### *Available from:*

Virginia Institute of Marine Science

This series of reports was produced by scientists in the VIMS Wetlands Program. Titles include: Animals of the Intertidal Sand and Mud Flats; Tidal Wetland Values; Nontidal Wetland Functions and Values; Tidal Freshwater Swamps of the Lower Chesapeake Bay; and several others.

#### *Ordering instructions:*

Contact VIMS for a list of titles and ordering information.

### ***A Property Owner's Guide to Wetlands Permits***

#### *Available from:*

Virginia Water Resources Research Center

This 36-page booklet provides information on the wetlands permit process.

#### *Ordering instructions:*

Contact VWRRC. Single copies free to Virginia residents; others \$4.

## videos

### ***The Wealth in Wetlands***

#### *Available from:*

John Marshall Soil and Water Conservation District

This 23-minute video, produced by the National Association of Conservation Districts, shows how farmers are trying to restore and preserve wetlands on their land. It includes interviews with five farmers who explain why wetlands are important to them and methods used in restoration.

#### *Ordering instructions:*

Available for loan to Fauquier County residents. Call JMSWCD to reserve.

*Many communities have begun identifying and mapping wetlands to facilitate growth and resource protection.*



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Conservation Awards Program  
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Virginia Wildlife Federation  
John Marshall Soil and Water Conservation District  
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Institute for Chesapeake Bay Studies  
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Department of Game and Inland Fisheries  
Virginia Power - Educational Services  
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Audubon Adventures  
Chesapeake Bay Teaching Materials Lending Library  
Commonwealth of VA: School Gardening for Wildlife  
Connections  
Conserving Soil  
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Educational Services Catalog  
Environmental Activity Boxes  
Global Warming and the Greenhouse Effect  
Groundwater Protection: What Would You Do?  
Heritage Education Resource Kits  
Heritage Education Workbook  
Historical Perspective of the Roanoke Valley  
Marine Science Curriculum Guides  
National Wildlife Week Kits  
Naturalist Activities

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Virginia Cooperative Extension Service  
Great Explorations in Math and Science  
The Acid Rain Foundation  
National Aquarium in Baltimore  
Richmond Audubon Society  
Virginia Institute of Marine Science  
Virginia Museum of Natural History  
Population Reference Bureau  
John Marshall Soil and Water Conservation District  
National Aquarium in Baltimore  
Steel Can Recycling Institute  
American Water Works Association  
National Geographic Society  
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Great Explorations in Math and Science  
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Prince William County Litter Control Council  
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The Wildlife Center of Virginia  
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Legislative Hotline  
Resource Clearinghouse

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Alliance for the Chesapeake Bay  
Friends of the Rappahannock  
Virginia Environmental Network  
U. S. Environmental Protection Agency - Region III

#### section

Chesapeake Bay  
general environmental education  
general environmental education  
general environmental education

### newsletters/magazines

#### name

a fair Bay  
Au Naturel  
Bay Journal  
Bay Watcher Bulletin  
CBF News

#### organization

Chesapeake Bay National Estuarine Research Reserve  
Virginia Museum of Natural History  
Alliance for the Chesapeake Bay  
Chesapeake Bay Foundation  
Chesapeake Bay Foundation

#### section

Chesapeake Bay  
general environmental education  
Chesapeake Bay  
Chesapeake Bay  
Chesapeake Bay

#### newsletters/magazines

Colonial SWCD News  
ECO  
Explorations  
John Marshall SWCD Newsletter  
Moving People  
News and Views  
Richmond Audubon Society Newsletter  
The Federation Record  
The Naturalist News  
The Potomac Flier  
Virginia Explorer  
VISION  
Waste Watch

Colonial Soil and Water Conservation District  
Prince William County Litter Control Council  
Virginia's Explore Park  
John Marshall Soil and Water Conservation District  
Moving People of Northern Virginia  
National Association of Biology Teachers  
Richmond Audubon Society  
Virginia Wildlife Federation  
Audubon Naturalist Society  
Fairfax Audubon Society  
Virginia Museum of Natural History  
Valley Conservation Council  
Virginia Peninsulas Public Service Authority

land, soil & agriculture  
general environmental education  
general environmental education  
land, soil & agriculture  
air  
general environmental education  
animals  
general environmental education  
animals  
general environmental education  
general environmental education  
land, soil & agriculture  
waste management & recycling

#### organizational membership

##### name

Friends of the Shenandoah  
Trout Unlimited

##### organization

Friends of the Shenandoah  
Trout Unlimited

##### section

water resources  
animals

#### outreach programs/speakers

##### name

APCO Speakers Bureau  
Arboretum Speakers Bureau  
Audubon Speakers  
Chesapeake Bay Marine Lab  
Clean Valley Council Speaker  
Environmental Conservation Presentations  
Environmental Education Outreach Programs  
Environmental Education Program  
From the Blue Ridge to the Alleghenies...  
Group Presentations  
Ocean Encounters  
Outreach Program

##### organization

Appalachian Power Company  
State Arboretum of Virginia  
Richmond Audubon Society  
Virginia Marine Science Museum  
Clean Valley Council  
Colonial Soil and Water Conservation District  
The Wildlife Center of Virginia  
Department of Game and Inland Fisheries  
Valley Conservation Council  
John Marshall Soil and Water Conservation District  
Ocean Encounters  
Mill Mountain Zoological Park

##### section

energy & minerals  
general environmental education  
animals  
animals  
waste management & recycling  
land, soil & agriculture  
animals  
general environmental education  
land, soil & agriculture  
general environmental education  
marine & aquatic resources  
animals

## outreach/speakers

Outreach Programs  
Recycling in the VPPSA Region  
Speakers Bureau  
Speakers Bureau  
Speakers Bureau  
Speakers Bureau  
The Bay Team  
The Problem of Invasive Exotic Plants  
Virginia Power Classroom Presentations  
Where Have All the Bluebirds Gone?  
Wildlife Speakers

National Aquarium in Baltimore  
Virginia Peninsulas Public Service Authority  
Commonwealth Gas  
Prince William County Litter Control Council  
Virginia's Explore Park  
Versar, Inc.  
VCU - Office of Environmental Studies  
Virginia Institute of Marine Science  
Virginia Native Plant Society  
Virginia Power  
Fauquier Outdoor Lab  
Virginia Wildlife Federation

animals  
waste management & recycling  
air, energy & minerals  
waste management & recycling  
general environmental education  
general environmental education  
general environmental education  
general environmental education  
trees, plants & forests  
energy & minerals  
animals  
animals

## posters

### name

Chesapeake  
Common Freshwater Fish of Virginia  
Common Saltwater Sportfish of Virginia  
Inside the Chesapeake Bay  
Natural Gas and the Environment  
Roanoke Logperch

### organization

Watershed Initiative/The Tides Foundation  
Department of Game and Inland Fisheries  
Department of Game and Inland Fisheries  
Alliance for the Chesapeake Bay  
Commonwealth Gas  
Friends of the Roanoke

### section

Chesapeake Bay  
animals  
animals  
Chesapeake Bay  
air  
animals

## publications

### name

A Citizen's Guide to Litter Control  
A Guide to Septic Systems and Alternatives  
A Property Owner's Guide to Wetlands Permits  
Baybook  
Be Water Wise: Informative Brochure  
Blue Ridge Environmental Network  
Business Recycling Guide  
Chadwick and the Garplegrungen  
Chadwick Forever

### organization

Prince William County Litter Control Council  
Virginia Water Resources Research Center  
Virginia Water Resources Research Center  
Alliance for the Chesapeake Bay  
Virginia Water Resources Research Center  
Blue Ridge Environmental Network  
Recycling Association of Central Virginia  
Watershed Initiative/The Tides Foundation  
Watershed Initiative/The Tides Foundation

### section

waste management & recycling  
water resources  
wetlands  
Chesapeake Bay  
water resources  
general environmental education  
waste management & recycling  
Chesapeake Bay  
animals

**publications**

Chesapeake Bay: Nature of the Estuary...  
Chesapeake Educational Materials Catalog  
Conservation Directory  
Earth Day Guide: How to Plan, Publicize...  
Educational Publications  
Endangered and Threatened Wildlife...  
Endangered Species Blueprint  
Environmental Educator's Resource Guide  
Exploring Careers in Agronomy, Crops, and Soils  
First People: The Early Indians of Virginia  
Getting the Lead Out  
Informational Pamphlets  
Is Aetosaur a Dinosaur?  
John Marshall SWCD Annual Report  
Landowner Guide to Wetland Assistance  
Life in the Chesapeake Bay  
Natural Gas Vehicles, the Clean Way to Go...  
One Green Tree  
Plants: Improving Our Environment  
River Fact Sheets  
Recycling and Litter Activities for Teachers  
Soil and Water Stewardship Week Materials  
Spring Wildflowers of the Blue Ridge Mountains  
Springs of Virginia  
The Energy Casebook Catalog  
The Rappahannock Scenic River Atlas  
The Story of Land: Its Use and Misuse...  
The Urban Forest Activities Book  
The Virginia Energy Savers Handbook...  
Turning the Tide: Saving the Chesapeake Bay  
Virginia Environmental Voting Summary  
Virginia Indians: An Educational Coloring Book  
Water in Your Hands  
Wetland Flora  
Wetlands Technical Reports

Watershed Initiative/The Tides Foundation  
Watershed Initiative/The Tides Foundation  
National Wildlife Federation  
Maymont Foundation  
Virginia Institute of Marine Science  
Watershed Initiative/The Tides Foundation  
National Wilderness Institute  
Prince William County Litter Control Council  
John Marshall Soil and Water Conservation District  
University Press of Virginia  
Virginia Water Resources Research Center  
Audubon Naturalist Society  
Virginia Museum of Natural History  
John Marshall Soil and Water Conservation District  
Chesapeake Bay National Estuarine Research Reserve  
Watershed Initiative/The Tides Foundation  
Washington Gas  
John Marshall Soil and Water Conservation District  
John Marshall Soil and Water Conservation District  
Alliance for the Chesapeake Bay  
Department of Environmental Quality  
John Marshall Soil and Water Conservation District  
Blue Ridge Wildflower Society  
Virginia Water Resources Research Center  
National Energy Education Development Project  
Friends of the Rappahannock  
John Marshall Soil and Water Conservation District  
VA Tech College of Forestry and Wildlife Resources  
Department of Mines, Minerals, and Energy  
Initiative/The Tides Foundation  
Virginia Environmental Network  
Virginia Museum of Natural History  
John Marshall Soil and Water Conservation District  
Virginia Institute of Marine Science  
Virginia Institute of Marine Science

Chesapeake Bay  
Chesapeake Bay  
general environmental education  
general environmental education  
marine & aquatic resources  
Chesapeake Bay  
animals  
general environmental education  
land, soil & agriculture  
historic resources  
water resources  
animals  
animals  
general environmental education  
wetlands  
Chesapeake Bay  
air  
trees, plants & forests  
trees, plants & forests  
Chesapeake Bay  
waste management & recycling  
land, soil & agriculture  
trees, plants & forests  
water resources  
energy & minerals  
historic resources  
land, soil & agriculture  
trees, plants & forests  
energy & minerals  
Chesapeake Bay  
general environmental education  
historic resources  
water resources  
wetlands  
wetlands

## slide shows/films

### name

Be Water Wise: Slide Set  
Birds Slide Show  
Discover Wildlife in Your World  
Earth Day Every Day...  
Forests Are More Than Trees  
Fragile Earth  
From the River to the Tap  
Groundwater: Sculptor of Caves  
Land and Water: Managing Growth...  
Let's Clear the Air  
Mission to Planet Earth  
Predators! They're Part of the Picture  
Soil: We Can't Grow Without It  
Spaceship Earth: A Global Geography  
This is Your Land  
Threats to Virginia's Groundwater  
Water: We Can't Live Without It  
We Care About Eagles

### organization

Virginia Water Resources Research Center  
Richmond Audubon Society  
National Wildlife Federation  
National Wildlife Federation  
National Wildlife Federation  
NASA CORE  
Virginia Water Resources Research Center  
Virginia Water Resources Research Center  
Alliance for the Chesapeake Bay  
National Wildlife Federation  
NASA Central Operation of Resources for Teachers  
National Wildlife Federation  
National Wildlife Federation  
South Carolina Education Television  
National Wildlife Federation  
Virginia Water Resources Research Center  
National Wildlife Federation  
National Wildlife Federation

### section

water resources  
animals  
animals  
general environmental education  
trees, plants & forests  
biosphere  
water resources  
water resources  
Chesapeake Bay  
air  
biosphere  
animals  
land, soil & agriculture  
biosphere  
land, soil & agriculture  
water resources  
water resources  
animals

## videos

### name

A Planning Guide to Field Study Programs  
A Question of Balance: Protecting Virginia's ...  
A/V Library  
Archaeology and the Study of Native...  
Business Waste Recycling  
Chesapeake: The Twilight Estuary  
Forests for the Chesapeake Bay  
In Partnership With Earth  
PSAs on Pollution Prevention  
Recycling and Litter Prevention Video Library

### organization

Virginia Cooperative Extension Service  
Department of Agriculture and Consumer Services  
Virginia Cooperative Extension Service  
Blue Ridge Public Television  
Clean Valley Council  
Alliance for the Chesapeake Bay  
John Marshall Soil and Water Conservation District  
Versar, Inc.  
Versar, Inc.  
Department of Environmental Quality

### section

general environmental education  
animals  
general environmental education  
historic resources  
waste management & recycling  
Chesapeake Bay  
trees, plants & forests  
general environmental education  
general environmental education  
waste management & recycling

**videos**

Save Our Streams: A Guide to Water...  
The Architectural History of Western Virginia  
The Clean Game  
The Road to Clean Air  
The Wealth in Wetlands  
Voices of Vision: The Future of ...  
Washington Gas, Natural Gas Vehicles and You  
YES I CAN!

John Marshall Soil and Water Conservation District  
Blue Ridge Public Television  
Prince William County Litter Control Council  
Commonwealth Gas  
John Marshall Soil and Water Conservation District  
Virginia Water Resources Research Center  
Washington Gas  
Steel Recycling Institute

water resources  
historic resources  
waste management & recycling  
energy & minerals  
wetlands  
general environmental education  
air  
waste management & recycling

**youth camp/projects**

**name**

4-H Program on Forestry and Wildlife  
Boy Scout Field Day  
Chesapeake Bay Youth Conservation Corps  
EnviroAdventures  
Environmental Education Program  
Friendship Environmental Education  
School of the Bay  
Summer Discovery Series  
Summer Safari  
Teen Adventure  
Wildlife Camp  
Wildlife Internship Program  
Woodsy Owl Pollution Patrol Badge Program  
Youth and Family Program

**organization**

VA Tech College of Forestry and Wildlife Resources  
Colonial Soil and Water Conservation District  
Chesapeake Bay Youth Conservation Corps  
Virginia Wildlife Federation  
Westview on the James  
Friendship Environmental Education  
Rappahannock Preservation Society  
Maymont Foundation  
Virginia Zoological Society  
National Wildlife Federation  
National Wildlife Federation  
Mill Mountain Zoological Park  
Prince William County Litter Control Council  
Virginia Living Museum

**section**

trees, plants & forests  
general environmental education  
Chesapeake Bay  
general environmental education  
general environmental education  
general environmental education  
Chesapeake Bay  
general environmental education  
animals  
general environmental education  
general environmental education  
animals  
waste management & recycling  
general environmental education