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Environment

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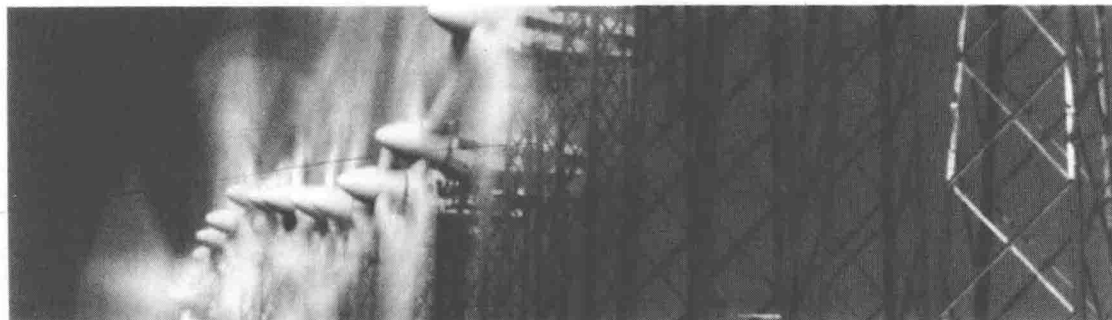
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ENVIRONMENT

Eighteenth Edition

99/00



EDITOR

John L. Allen

University of Connecticut

John L. Allen is professor of geography at the University of Connecticut. He received his bachelor's degree in 1963 and his M.A. in 1964 from the University of Wyoming, and in 1969 he received his Ph.D. from Clark University. His special area of interest is the impact of contemporary human societies on environmental systems.

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2. The World's Population: People and Hunger

Facing overview—United Nations photo by Ian Steele.

3. Energy: Present and Future Problems

Facing overview—United Nations photo by Sean Sprague.

4. Biosphere: Endangered Species

Facing overview—U.S. Fish and Wildlife Service Photo by James Powell.

5. Resources: Land, Water, and Air

Facing overview—photo courtesy of U.S. Department of Agriculture. 148-149, 151—Photos from the Bureau of Reclamation.

6. Pollution: The Hazards of Growth

Facing overview—U.S. Department of Agriculture Soil Conservation Service photo.

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Eighteenth Edition

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In publishing ANNUAL EDITIONS we recognize the enormous role played by the magazines, newspapers, and journals of the public press in providing current, first-rate educational information in a broad spectrum of interest areas. Many of these articles are appropriate for students, researchers, and professionals seeking accurate, current material to help bridge the gap between principles and theories and the real world. These articles, however, become more useful for study when those of lasting value are carefully collected, organized, indexed, and reproduced in a low-cost format, which provides easy and permanent access when the material is needed. That is the role played by ANNUAL EDITIONS.

New to ANNUAL EDITIONS is the inclusion of related World Wide Web sites. These sites have been selected by our editorial staff to represent some of the best resources found on the World Wide Web today. Through our carefully developed topic guide, we have linked these Web resources to the articles covered in this ANNUAL EDITIONS reader. We think that you will find this volume useful, and we hope that you will take a moment to visit us on the Web at <http://www.dushkin.com/> to tell us what you think.

As the millennium nears, environmental predicaments long foreseen by natural and social scientists have begun to emerge in a number of guises: population/food imbalances, problems of energy scarcity, acid rain, toxic and hazardous wastes, ozone depletion, water shortages, massive soil erosion, global atmospheric pollution, forest dieback and tropical deforestation, and the highest rates of plant and animal extinction the world has known in 65 million years.

These and other problems have worsened in spite of the increased environmental awareness and legislation that characterized the last decades of the 1900s. The problems resulted from centuries of exploitation and unwise use of resources, accelerated recently by the misguided environmental "counter-revolution," which typified public policy of the 1970s and 1980s and favored the short-term, expedient approach to problem solving over longer-term economic and ecological good sense. In Africa, for example, the drive to produce enough food to support a growing population has caused the use of increasingly fragile and marginal resources, resulting in the dryland deterioration that brings famine to that troubled continent. Similar social and economic problems have contributed to massive deforestation in Middle and South America and Southeast Asia.

The economic problems generated by resource scarcity have caused the relaxation of environmental quality standards or have contributed to the refusal to enact environmentally sound protective measures that are viewed as too costly. The lack of adequate environmental policy has been particularly apparent in those countries that are striving to become economically developed. But even in the more highly developed nations, the economic climate has favored the slackening of environmental controls. In the name of jobs for the timber industry, for example, many of the last areas of old-growth forests in the United States are imperiled, and in the name of mineral resource development, a threat to one of the nation's treasures—Yellowstone National Park—was removed only by a last-second presidential "deal" that transferred a proposed mining operation elsewhere. In addition, concerns over energy availability have created the need for military action to save the developed nations' access to cheap oil and have prompted increasing reliance on technological quick fixes.

There is some reason to hope that, globally, a new environmental consciousness is awakening at the dawning of a new millennium. The dissolution of the Soviet Union lifted the Iron Curtain, and the environmental horror stories that have emerged from Eastern Europe and the newly independent states that made up the former USSR have given new incentives to international cooperation. Several major publications have named the 1990s "The Decade of the Environment," major international conferences have been held on such subjects as

global warming, and there is growing public clamor to do something about environmental quality before it is too late.

The articles contained in *Annual Editions: Environment 99/00* have been selected for the light they shed on these and other problems and issues. The selection process was aimed at including material that will be readily assimilated by the general reader. Additionally, every effort has been made to choose articles that encourage an understanding of the nature of the environmental problems that beset us and how, with wisdom and knowledge and the proper perspective, they can be solved or at least mitigated. Accordingly, the selections in this book have been chosen more for their intellectual content than for their emotional tone. They have been arranged into an order of topics—the global environment, population and food, energy, the biosphere, resources, and pollution—that lends itself to a progressive understanding of the causes and effects of human modifications of Earth's environmental systems. We will not be protected against the ecological consequences of human actions by remaining ignorant of them. Although the knowledge gained through the use of this book may not allow any of us to escape the environmental predicament, it should ensure that we do not continue to act and react in ways that will make that predicament worse.

The World Wide Web sites in this edition can be used to further explore the topics. These sites will be cross-referenced by number in the topic guide. In addition, this edition contains both a newly refreshed *Environmental Information Retrieval* guide and glossary.

Readers can have input into the next edition of *Annual Editions: Environment* by completing and returning the postpaid article rating form at the back of the book.



John L. Allen
Editor

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To the Reader

Topic Guide

Selected World Wide Web Sites

Overview

1. **A Special Moment in History**, Bill McKibben, *The Atlantic Monthly*, May 1998. iv
World **population** has grown more in the last 50 years than in the last 4 million years, and more people have been added to the world total in the 1990s than existed in 1600. This tremendous increase in **population growth** is the consequence of the Industrial Revolution and the changes in public health that accompanied it. The next few decades will determine the fate of the world through choices that people make in technology and lifestyle. 2
2. **The Global Challenge**, Michael H. Glantz, *The World & I*, April 1997. 4
The world's atmosphere and oceans are truly **global commons**, shared by all nations and peoples. Because the two interlocked systems circulate freely around the globe, impacts on **air and water quality** produced by human action are also shared. The capacity of the global **atmospheric and oceanic systems** to withstand human modifications is being tested by increasing human demands. 6
3. **Windows on the Future: Global Scenarios & Sustainability**, Gilberto C. Gallopín and Paul Raskin, *Environment*, April 1998. 8
The construction of **scenarios** or glimpses of future alternative worlds provides a unique way to evaluate the impact of continued **population growth** on the global environment. Of all possible future worlds, only one scenario allows for transcending the industrial culture of the present without descending into chaos. That scenario requires the development of **sustainability** as the guiding principle behind the world's technological systems. 22
4. **Human Domination of Earth's Ecosystems**, Peter M. Vitousek, Harold A. Mooney, Jane Lubchenco, and Jerry M. Melillo, *Science*, July 25, 1997. 26
Human domination of the planet is measured by the facts that between one-third and one-half of the world's surface has undergone **land transformation** by humans, **atmospheric change** from increased carbon dioxide is under way, more than half of the available surface **freshwater systems** are used by people, and many **plant and animal species** have become extinct, with more to follow. 36



The Global Environment: An Emerging World View

Four selections provide information on the current state of Earth and the changes we will face.



UNIT 2

The World's Population: People and Hunger

Four selections examine the problems the world will have in feeding its ever-increasing population.

Overview

- 5. Before the Next Doubling**, Jennifer D. Mitchell, *World Watch*, January/February 1998.

Almost twice as many people inhabit Earth now as in 1960. At some point over the next century, the world's **population** could double again. When the **doubling line** of a population occurs in small time spans, the amount of time available to make the necessary adjustments in agriculture, housing, education, and other components of the global infrastructure becomes critically short.

- 6. How Much Food Will We Need in the 21st Century?** William H. Bender, *Environment*, March 1997.

Most of the recent debate over **food scarcity** has focused on the potential for increasing the food supply. Scientists are now growing concerned over the ways in which **intensive land use** and the heavy applications of **agricultural chemicals** necessary to grow more food have damaged environmental systems. The answer is "low-fat" agriculture with less reliance on animal products and more on grain.

- 7. Food Scarcity: An Environmental Wakeup Call**, Lester Brown, *The Futurist*, January/February 1998.

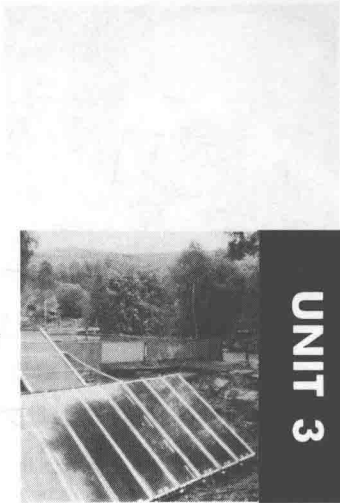
The **environmental deterioration** that the world has undergone during the last few decades cannot continue without having serious consequences for the **global economy**. The most likely sector through which environmental decline becomes economic decline is the system of food production or **agriculture**. Future food security depends upon creating an environmentally sustainable agriculture.

- 8. The Myth of Global Hunger**, Dennis T. Avery, *The World & I*, January 1997.

The specter of a **global food crisis** may be a false one, created by what some perceive as shrinking food reserves but are really economic adjustments in the form of intentionally reduced **agricultural production**. While the amount of land farmed has risen only slightly in the last 50 years, food production has actually soared as the result of new, improved crop varieties. Coupled with stabilizing population growth, more productive crops should greatly reduce food insecurity.

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9. **Beam It Down: How the New Satellites Can Power the World**, Martin I. Hoffert and Seth D. Potter, *Technology Review*, October 1997.
One of the most rapidly growing communications technologies is the **low-earth-orbit (LEO) satellite** that can provide communication links to virtually every place on Earth. The fleets of these satellites that will soon be in place should be pressed into double duty as **solar energy** collectors that would relay uninterrupted beams of clean and cheap electrical power to Earth.
- 73
10. **The End of Cheap Oil**, Colin J. Campbell and Jean H. Laherrère, *Scientific American*, March 1998.
In the 1970s, sudden price increases for crude oil awoke the world to the dependence on this **energy resource**. Since global production of **conventional oil** will begin to decline significantly by 2010, the world's economy is in for another oil crunch. The world's industrial nations must face the end of abundant and cheap oil upon which their economic systems depend by investing more in **energy research**.
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11. **Sunlight Brightens Our Energy Future**, Randy Quinn, *The World & I*, March 1997.
Solar energy has been the ultimate goal of those in search of the perfect energy source, largely because of its potentially inexpensive utilization and its nonpolluting character. New technologies are being developed that could make solar power a **conventional energy source** within the next 5 to 10 years. The most promising technology is that based upon converting sunlight directly into electricity through **photovoltaics**.
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12. **Inherit the Wind**, Harvey Wasserman, *The Nation*, June 16, 1997.
The use of **wind power** to generate electricity is the world's fastest-growing energy source. But in the United States, because of Americans' addictions to fossil fuel and nuclear power, uncertainty over public utility deregulation, and the media's tendency to downplay wind power as a viable **renewable energy** source, what once seemed to be a promising technology has faltered.



Energy: Present and Future Problems

Four articles consider the problems of meeting present and future energy needs. Alternative energy sources are also examined.



Biosphere: Endangered Species

Seven articles examine the problems in the world's biosphere. Not only are plants and animals endangered, but many human groups are also disastrously affected by deforestation and primitive agricultural policies.

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13. **The Work of Nature**, Yvonne Baskin, *Natural History*, February 1997. 90

Global changes in land use and climate produce a reduction in **plant and animal species** and the diversity of ecosystems is threatened. Loss of natural **biodiversity** creates costly changes in water or nutrient cycles, fire regimes, rainfall, and soil vitality. It also threatens **human health** as emergent or resurgent diseases occupy opened ecological niches.

14. **Strategies for Conserving Biodiversity**, Walter V. Reid, *Environment*, September 1997. 95

International conventions on biological diversity have given rise to such research programs as the **Global Biodiversity Assessment**, an unofficial but effective set of studies that have pointed the way to the magnitude of the **biodiversity** crisis and ways to design effective **ecosystem conservation** strategies. **Extinction rates** are projected to remain at their highest levels in 65 million years, but there are some indications that policies can be developed to deal with the problem.

A. PLANTS

15. **Old Growth for Sale**, Douglas Gantenbein, *Audubon*, May/June 1998. 103

In 1993, with great fanfare, a "timber summit" attended by President Clinton produced the **Northwest Forest Plan** that was intended to slash logging on federal lands by 85 percent and manage forests for wildlife, fish, and recreation. Five years later, thousands of trees in the Northwest's **old growth forests**, some of them as old as four centuries, continue to be cut.

16. **Green Awakening in a Poor Country**, Howard Youth, *World Watch*, September/October 1998. 106

For generations, Honduras has endured **slash-and-burn farming** and rapid **population growth**, a lethal combination for the country's **forest environment**. But a new national park and the hope of **ecotourism** has begun to shape a home-grown social contract that could save the remaining Honduran tropical forests. The Honduran experiment tells us a great deal about the politics of conservation in other small and valuable places.

17. **The Burning Season**, Stephen Howard, *The World Today*, July 1998. 113

Since the middle of 1997, large-scale **forest fires** have been reported in more than 10 countries, and at least 50,000 square kilometers of forest have been burned. Most of these fires were the primary agent of **land clearance**. The economic, social, and environmental consequences of such burning are profound. At worst, it is a catastrophic cycle of **environmental deterioration**, at best, a new move to husband scarce forest resources.

B. ANIMALS

- 18. Not in My Backyard**, Anthony Brandt, *Audubon*, September/October 1997. **117**
Wildlife populations are rapidly encroaching on America's suburbs—and vice versa. Problems have ranged from damage to ornamental shrubs to the spread of diseases such as **Lyme disease**. No one is certain how to deal with the problems. Most of the big environmental battles have been fought over remote wilderness rather than suburban backyards and policy makers are ill-equipped to deal with problems much closer to home.
- 19. Wild Success**, Karl Hess Jr., *Reason*, October 1997. **122**
For millions of African farmers who must compete with protected wildlife species for scarce resources, the idea of locking up large tracts of land in **wildlife preserves** is a threat to continued human existence in adjacent areas. In southern Africa, changes in **conservation strategy** give villagers an economic stake in wildlife preservation and could alter the way we think about and profit from natural resources.

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A. LAND

- 20. Asia Is Losing Ground**, Gary Gardner, *World Watch*, November/December 1996. **134**
Throughout the Pacific Rim area of burgeoning economies, rapid development of **industrialization** is threatening land formerly used for farming. Since few of the "Asian tigers" are agriculturally self-sustaining, the loss of precious **farmland** is crucial. The need to import more food reduces many of the economic benefits of development and produces new national problems in the form of potential **food shortages**.
- 21. Oceanfront Battlefront**, Jon R. Luoma, *Audubon*, July/August 1998. **141**
Along the Atlantic coast of the United States, a battle is being waged between private property interests and the natural forces of **coastal erosion**. By definition, beaches are dynamic areas that change with the cycles of calm and storm that characterize the coastal environment. Human intervention in natural processes, such as the building of seawalls, often creates more problems than it solves, including damaging **coastal ecosystems** that provide habitat to all kinds of wildlife.

B. WATER

- 22. Dam Fools**, James V. DeLong, *Reason*, April 1998. **146**
Federal **water management** primarily has meant the construction of dams across free-flowing rivers, producing reservoirs for **flood control, irrigation, or power generation**. But many dams built in the 1950s and 1960s are unnecessary and ecologically unsound, disturbing river flows and altering the balance between a stream and its valley. Environmentalists are suggesting that many dams in the western United States should be removed before the damage they have done becomes irreversible.



**Resources:
Land, Water,
and Air**

Six selections discuss the environmental problems affecting our land, water, and air resources.



Pollution: The Hazards of Growth

Five selections weigh the environmental impacts of the growth of human population.

23. **The Deep Green Sea**, Edward Carr, *The Economist*, 154
May 23, 1998.

For millennia, the ocean has seemed boundless in its resources and infinite in its capacity to withstand human interference. Now, the sea is suffering from **overfishing** and **pollution**. Scientific ignorance and the sea's lack of natural boundaries frustrate efforts to design institutions to manage the world's **marine environments**, which would all respond favorably to policies that would stop subsidizing marine destruction and would limit human access to marine resources.

C. AIR

24. **The Great Climate Flip-Flop**, William H. Calvin, *The Atlantic Monthly*, January 1998. 168

The popular understanding of **climate change** is an enhanced **greenhouse effect** that, predictions say, could cause coastal flooding and severe weather. But paradoxically, the **global warming** brought on by an accelerated greenhouse effect could also lead to abrupt cooling. A change in ocean currents in the North Atlantic that would accompany a drastic cooling trend would pose massive problems for Europe.

25. **Warming Up to Kyoto**, Bill McKibben, *Audubon*, 176
March/April 1998.

In December 1997, an international conference on **global warming** was held in Kyoto, Japan. This marked the beginning of efforts to define the necessary limits of human enterprise and was the first step in a political process that may last into the next century. Two central facts emerged: the United States is still unwilling to come to grips with the problem of **climate change** by limiting **carbon dioxide emissions**, and there is an enormous gap in attitude between the rich and poor nations.

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26. **Nowhere to Hide: The Global Spread of High-Risk Synthetic Chemicals**, Jennifer D. Mitchell, *World Watch*, March/April 1997. 182

The world production of **synthetic organic chemicals** has risen exponentially in this century. The risks of exposure to these chemicals through accidental contact, **biological accumulation**, and unpredictable synergistic effects are increasing as well, with unfavorable consequences that are only now becoming known. Unfortunately, the burden of proof as to whether a chemical compound may be released for sale is often the responsibility of regulatory agencies rather than the chemical manufacturers.

27. **Recycling Human Waste: Fertile Ground or Toxic Legacy?** Gary Gardner, *World Watch*, January/February 1998. 191

Recycling of **human waste** is not anything new. For thousands of years farmers in the Orient have used "night soil" on their fields to maintain fertility. Unfortunately, modern farming methods and sewage treatment systems have greatly complicated the risks of using our most obvious **fertilizer**, since human wastes often mix freely with heavy metals, pesticides, dioxins, petroleum products, and other **toxic wastes**, making it unusable even after treatment.

28. **Earth's Last Gasp?** Daniel A. Lashof, *USA Today Magazine* (Society for the Advancement of Education), May 1997. 198

Scientists have been observing the buildup of **greenhouse gases** in the atmosphere for decades and have become increasingly concerned over the potential for **global warming** that such an increase portends. If **atmospheric pollution** is not controlled, the average rate of warming over the next century will probably be greater than during any period in the last 10,000 years.

29. **Our Real China Problem,** Mark Hertsgaard, *The Atlantic Monthly*, November 1997. 201

The price for the enormous growth of the Chinese economy is a vast degradation of the environment that has planetary implications. Chinese rates of coal use are the highest in the world and this dirty fuel adds more carbon dioxide to the atmosphere than any other. Although the Chinese government is aware of the need for **environmental protection**, it is also wary of doing anything to stifle the growth that promises to raise millions of Chinese out of abject poverty, which would be political suicide.

30. **Chemical Chokehold,** Gordon Feller, *The World & I*, May 1997. 211

The collapse of the Soviet Union left in its wake a number of newly independent countries that have severe pollution problems. Typical in many ways is the new republic of Azerbaijan, home of one of the world's worst hotspots of industrial **chemical pollution**. Cleanup of **toxic wastes** and renovation of the country's industrial base will require huge capital investments and significant international aid.

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Topic Guide

This topic guide suggests how the selections and World Wide Web sites found in the next section of this book relate to topics of traditional concern to environmental students and professionals. It is useful for locating interrelated articles and Web sites for reading and research. The guide is arranged alphabetically according to topic.

The relevant Web sites, which are numbered and annotated on pages 4 and 5, are easily identified by the Web icon () under the topic articles. By linking the articles and the Web sites by topic, this ANNUAL EDITIONS reader becomes a powerful learning and research tool.

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● AE: Environment

The following World Wide Web sites have been carefully researched and selected to support the articles found in this reader. If you are interested in learning more about specific topics found in this book, these Web sites are a good place to start. The sites are cross-referenced by number and appear in the topic guide on the previous two pages. Also, you can link to these Web sites through our DUSHKIN ONLINE support site at <http://www.dushkin.com/online/>.

The following sites were available at the time of publication. Visit our Web site—we update DUSHKIN ONLINE regularly to reflect any changes.

General Sources

1. eBlast: Britannica's Internet Guide

http://www.ebig.com/expanded_outline.html

This site presents extensive links to material on world geography and culture, encompassing material on wildlife, human lifestyles, and the environment.

2. EnviroLink

<http://www.enrirolink.org/>

One of the world's largest environmental information clearing houses, EnviroLink is a grassroots nonprofit organization that unites organizations and volunteers around the world and provides up-to-date information and resources through its Web site.

3. Library of Congress

<http://www.loc.gov/>

Examine this extensive Web site to learn about resource tools, library services/resources, exhibitions, and databases in many different subfields of environmental studies.

4. SocioSite: Sociological Subject Areas

<http://www.pscw.uva.nl/sociosite/TOPICS/>

This huge sociological site from the University of Amsterdam provides many discussions and references of interest to students of the environment, such as the links to information on ecology and consumerism.

5. U.S. Geological Survey

<http://www.usgs.gov/>

This site and its many links are replete with information and resources in environmental studies, from explanations of El Niño to discussion of concerns about water resources.

The Global Environment: An Emerging World View

6. Earth Science Enterprise

<http://www.hq.nasa.gov/office/mtp/>

This site will direct you to information about NASA's Mission to Planet Earth program and its Science of the Earth System. Surf here to learn about satellites, El Niño, and even "strategic visions" of interest to environmentalists.

7. National Geographic Society

<http://www.nationalgeographic.com/>

This site provides links to National Geographic's huge archive of maps, articles, and other documents. There is a great deal of material related to the atmosphere, the oceans, and other environmental topics.

8. Santa Fe Institute

<http://acoma.santafe.edu/>

This home page of the Santa Fe Institute—a nonprofit, multidisciplinary research and education center—will lead you to many interesting links related to its primary goal: to create a new kind of scientific research community, pursuing emerging science. A variety of topics related to the environment are addressed.

9. United Nations

<http://www.unsystem.org/>

Visit this Official Web Site Locator for the United Nations System of Organizations to get a sense of the scope of international environmental inquiry today. Various UN organizations concern themselves with everything from maritime law to habitat protection to agriculture.

10. United Nations Environment Programme

<http://www.unep.ch/>

Consult this home page of UNEP for links to critical topics of concern to environmentalists, including desertification, migratory species, and the impact of trade on the environment. The site will direct you to useful databases and global resource information.

The World's Population: People and Hunger

11. The Hunger Project

<http://www.thp.org/>

Browse through this nonprofit organization's site to explore the ways in which it attempts to achieve its goal: the sustainable end to global hunger through leadership at all levels of society. The Hunger Project contends that the persistence of hunger is at the heart of the major security issues threatening our planet.

12. Penn Library Resources

<http://www.library.upenn.edu/resources/websitestest.html>

This vast site is rich in links to information about virtually every subject you can think of in environmental studies. Its extensive population and demography resources address such concerns as migration, family planning, and health and nutrition in various world regions.

13. World Health Organization

<http://www.who.ch/Welcom.html>

This home page of the World Health Organization will provide you with links to a wealth of statistical and analytical information about health and the environment in the developing world.

14. WWW Virtual Library: Demography & Population Studies

<http://coombs.anu.edu.au/ResFacilities/DemographyPage.html>

This is a definitive guide to demography and population studies. A multitude of important links to information about global poverty and hunger can be found here.

Energy: Present and Future Problems

15. Communications for a Sustainable Future

<gopher://csf.colorado.edu/>

This gopher site will lead you to information on topics in international environmental sustainability. It pays particular attention to the political economics of protecting the environment.

16. Energy and the Environment: Resources for a Networked World

<http://zebu.uoregon.edu/energy.html>

This University of Oregon site will point you to an extensive array of materials having to do with energy sources—both

renewable and nonrenewable—as well as other topics of interest to students of the environment.

17. Institute for Global Communication/EcoNet

<http://www.igc.org/igc/issues/energy/>

This environmentally friendly site provides links to dozens of governmental, organizational, and commercial sites having to do with energy sources. Resources address energy efficiency, renewable generating sources, global warming, and more.

18. U.S. Department of Energy

<http://www.doe.gov/>

Scrolling through the links provided by this Department of Energy home page will lead you to information about fossil fuels as well as a variety of sustainable/renewable energy sources.

Biosphere: Endangered Species

19. Friends of the Earth

<http://www.foe.co.uk/index.html>

Friends of the Earth, a nonprofit organization based in the United Kingdom, pursues a number of campaigns to protect the Earth and its living creatures. This site has links to many important environmental sites, covering such broad topics as ozone depletion, soil erosion, and biodiversity.

20. Smithsonian Institution Web Site

<http://www.si.edu/>

Looking through this site, which will provide access to many of the enormous resources of the Smithsonian, will give you a sense of the biological diversity that is threatened by humans' unsound environmental policies and practices.

21. Tennessee Green

<http://kornet.org/tngreen/>

Visit this site to find a wealth of information related to sustainability and ways that we can "lighten our load on the environment." It provides links to other environmental sites and guidance to articles and books.

22. World Wildlife Federation

<http://www.wwf.org/>

This home page of the WWF will lead you to an extensive array of links to information about endangered species, wildlife management and preservation, and more. It provides many suggestions for how you can take an active part in protecting the biosphere.

Resources: Land, Water, and Air

23. Global Climate Change

<http://www.puc.state.oh.us/consumer/gcc/index.html>

PUCO (Public Utilities Commission of Ohio) aims for this site to serve as a clearinghouse of information related to global climate change. Its extensive links provide for explanation of the science and chronology of global climate change, acronyms, definitions, and more.

24. National Oceanic and Atmospheric Administration

<http://www.noaa.gov/>

Through this home page of NOAA, part of the U.S. Department of Commerce, you can find information about coastal issues, fisheries, climate, and more. The site provides many links to research materials and other Web resources.

25. National Operational Hydrologic Remote Sensing Center

<http://www.nohrsc.nws.gov/>

Flood imagery is available at this site of the NOHRSC, which works with the U.S. National Weather Service to track weather-related information.

26. Virtual Seminar in Global Political Economy/Global Cities & Social Movements

<http://csf.colorado.edu/gpe/gpe95b/resources.html>

This site of Internet resources is rich in links to subjects of interest in regional environmental studies, covering topics such as sustainable cities, megacities, and urban planning. Links to many international nongovernmental organizations are included.

27. Websurfers Biweekly Earth Science Review

<http://shell.rmi.net/~michaelg/index.html>

This is a biweekly compilation of Internet sites devoted to the terrestrial and planetary sciences. It includes a list of hyperlinks to related earth science sites and news items. A great deal of information about climate and the atmosphere can be found here.

Pollution: The Hazards of Growth

28. IISDnet

<http://iisd1.iisd.ca/>

This site of the International Institute for Sustainable Development, a Canadian organization, presents information through links on business and sustainable development, developing ideas, and Hot Topics. Linkages is its multimedia resource for environment and development policymakers.

29. School of Labor and Industrial Relations: Hot Links

<http://www.ssc.msu.edu/~lir/hotlink.htm>

This Michigan State University SLIR page takes you to sites regarding industrial relations throughout the world. It has links to U.S. government and statistics, newspapers and libraries, international intergovernmental organizations and more. With this level of access, you should be able to research virtually every labor and industrial relations topic of relevance in environmental studies.

30. Space Research Institute

<http://arc.iki.rssi.ru/Welcome.html>

For a change of pace, browse through this home page of Russia's Space Research Institute for information on its Environment Monitoring Information Systems, the IKI Satellite Situation Center, and its Data Archive.

31. Worldwatch Institute

<http://www.worldwatch.org/>

The Worldwatch Institute is dedicated to fostering the evolution of an environmentally sustainable society in which human needs are met without threatening the health of the natural environment. This site provides access to *World Watch* magazine and *State of the World 1998*. Click on Alerts and Press Briefings for discussions of current problems.

32. WWW-LARCH-LK Archive: Sustainability

<http://www.clr.toronto.edu/ARCHIVES/HMAIL/larchl/0737.html>

This site gives you the opportunity to read—and respond to—a discourse on sustainability, with many different opinions and viewpoints represented.

We highly recommend that you review our Web site for expanded information and our other product lines. We are continually updating and adding links to our Web site in order to offer you the most usable and useful information that will support and expand the value of your Annual Editions. You can reach us at: <http://www.dushkin.com/annualeditions/>.

Unit Selections

1. **A Special Moment in History**, Bill McKibben
2. **The Global Challenge**, Michael H. Glantz
3. **Windows on the Future: Global Scenarios & Sustainability**, Gilberto C. Gallopín and Paul Raskin
4. **Human Domination of Earth's Ecosystems**, Peter M. Vitousek, Harold A. Mooney, Jane Lubchenco, and Jerry M. Melillo

Key Points to Consider

- ❖ In what parts of the world does human population growth pose the greatest problems for the future of environmental systems? How has the growing awareness of global environmental systems created more unanimity regarding environmental problems among the international scientific community?
- ❖ What are "global commons"? How does management of commonly held resources pose different problems from management of other kinds of resources?
- ❖ What is meant by the term "scenarios" and how does the use of scenario analysis aid policy makers in coming up with appropriate environmental strategies? How does the concept of sustainability fit into the various scenarios describing the world's future?
- ❖ How are human enterprises linked to changes in global biogeochemistry? Are there ways of measuring the role of humans in modifying global systems, and if so, what are they?



Links

www.dushkin.com/online/

6. **Earth Science Enterprise**
<http://www.hq.nasa.gov/office/mtpe/>
7. **National Geographic Society**
<http://www.nationalgeographic.com/>
8. **Santa Fe Institute**
<http://acoma.santafe.edu/>
9. **United Nations**
<http://www.unsystem.org/>
10. **United Nations Environment Programme**
<http://www.unep.ch/>

These sites are annotated on pages 4 and 5.