For Instructors

With this new edition, we are happy to announce our new partnership with *The National Geographic Society*, which shares our goals, as reflected in its statement of purpose: *Inspiring people to care about the planet.* One result of this new collaboration is the addition of many stunning and informative photographs, numerous maps, and several new stories of National Geographic Explorers—people who are making a positive difference in the world. With these new tools, we continue to tell of the good news from various fields of environmental science, hoping to inspire young people to commit themselves to making our world a more sustainable place to live for their own and future generations.

What's New in This Edition?

- *Our new partnership with National Geographic* has given us access to hundreds of amazing photographs, numerous maps, and inspiring stories of *National Geographic Explorers*—people who are leading the way in environmental science, education, or entrepreneurial enterprises.
- A *stunning new design* with a National Geographic look that enhances visual learning.
- *Campus Sustainability boxes:* short descriptions about what selected U.S. colleges and universities are doing to make their institutions more sustainable.
- *Three social science principles of sustainability.* These complement the three scientific principles of sustainability that we have long used to explain how life on Earth has sustained itself for billions of years, and they act as guidelines for making a possible transition to more sustainable economies and societies.
- *New Core Case Studies* for 6 of the book's 11 chapters that serve as an integrating theme throughout each chapter. They bring important real-world stories to the forefront for use in applying those chapters' concepts and principles.
- *Two new end-of-chapter exercises: Doing Environmental Science* and *Global Environment Watch* research projects give students challenging new ways to apply the material.

Sustainability Is the Integrating Theme of This Book

Sustainability, a watchword of the 21st century for those concerned about the environment, is the overarching theme of this textbook. You can see the sustainability emphasis by looking at the Brief Contents (p. vii).

Six principles of sustainability play a major role in carrying out this book's sustainability theme. These principles are introduced in Chapter 1. They are depicted in Figure 1-2 (p. 6), in Figure 1-5 (p. 9), and on the back cover of the student edition and are used throughout the book, with each reference marked in the margin by the symbol shown here at the right (see pp. 62 and 218).

We use the following five major subthemes to integrate material throughout this book.

- ***Natural Capital.*** Sustainability depends on the natural resources and ecosystem services that support all life and economies. See Figures 1-3, p. 7, and 10-4, p. 220.
- ***Natural Capital Degradation.*** We describe how human activities can degrade natural capital. See Figures 1-7, p. 11, and 7-17, p. 160.
- ***Solutions.*** We present existing and proposed solutions to environmental problems in a balanced manner and challenge students to use critical thinking to evaluate them.
- ***Trade-offs.*** The search for solutions involves trade-offs, because any solution requires weighing advantages against disadvantages. Our Trade-offs diagrams located in several chapters present the benefits and drawbacks of various environmental technologies and solutions to environmental problems.
- ***Individuals Matter.*** Throughout the book, Individuals Matter boxes and some of the Case Studies describe what various scientists and concerned citizens (including several National Geographic Explorers) have done to help us work toward sustainability (see pp. 82 and 240). Also, a number of What Can You Do? diagrams describe how readers can deal with the problems we face (see Figures 9-12, p. 202, and 10-30, p. 242).

Other Key Features of This Textbook

- ***Up-to-Date Coverage.*** Our textbooks have been widely praised for keeping users up to date in the rapidly changing field of environmental science. We have used thousands of articles and reports published in 2010–2013 to update the information and concepts in this book. Major new or updated topics include planetary boundaries that indicate ecological tipping points (Science Focus 3.3, p. 72) and the rising threat of ocean acidification (Science Focus 11.2, p. 252), along with other important topics.
- ***Concept-Centered Approach.*** To help students focus on the main ideas, we built each major chapter section around a key question and one or two key concepts, which state the section's most important take-away messages. In each chapter, all key questions are listed at the front of the chapter, and each chapter section

begins with its key question and concepts (see pp. 29 and 31). Also, the concept applications are highlighted and referenced throughout each chapter.

- ***Science-Based Coverage.*** Chapters 2–8 cover scientific principles important to the course and discuss how scientists work (see Brief Contents, p. vii). Important environmental science topics are explored in depth in Science Focus boxes distributed among the chapters throughout the book (see pp. 94 and 203) and integrated throughout the book in various Case Studies (see pp. 238 and 256) and in numerous figures.
- ***Global Perspective.*** This book also provides a global perspective, first on the ecological level, revealing how all the world's life is connected and sustained within the biosphere, and second, through the use of information and images from around the world. This includes dozens of maps in the basic text and in Supplement 6. Half of these maps are new and more than half of the new maps are from National Geographic. At the end of each chapter is a Global Environment Watch exercise that applies this global perspective (see p. 245).
- ***Core Case Studies.*** Each chapter opens with a Core Case Study (see pp. 78 and 190), which is applied throughout the chapter. These applications are indicated by the notation (**Core Case Study**) wherever they occur (see pp. 88 and 155). Each chapter ends with a *Tying It All Together* box (see pp. 96 and 213), which connects the Core Case Study and other material in the chapter to some or all of the principles of sustainability.
- ***Case Studies.*** In addition to the 11 Core Case Studies, many additional Case Studies (see pp. 92, 200, and 238) appear throughout the book (and are listed in the Detailed Contents, pp. viii–xvi). Each of these provides an in-depth look at specific environmental problems and their possible solutions. We also have included very brief descriptions of efforts on several college campuses to study or apply principles of sustainability in our new *Campus Sustainability* stories that appear in several of the book's chapters (see pp. 210 and 270).
- ***Critical Thinking.*** The Preface for Students (p. xxiii) describes critical thinking skills, and specific critical thinking exercises are used throughout the book in several ways:
  - As more than 100 *Thinking About* exercises that ask students to analyze material immediately after it is presented (see pp. 35 and 264).
  - In all *Science Focus* boxes.
  - In dozens of *Connections* boxes that stimulate critical thinking by exploring the often surprising connections related to environmental problems (see pp. 18 and 195).
  - In the captions of many of the book's figures (see Figures 3-15, p. 63, and 9-8, p. 198).
  - In end-of-chapter questions (see pp. 97 and 214).
- ***Visual Learning.*** With a new design heavily influenced by material from National Geographic and hundreds of photographs, this is the most visually appealing environmental science textbook available (see Figures 3-21, p. 71; 7-16, p. 159; and 10-18, p. 229). Also included are many diagrams designed to present complex ideas in understandable ways relating to the real world (see Figures 3-3, p. 54; 3-17, p. 66; and 4-2, p. 79).
- ***In-Text Study Aids.*** Each chapter begins with a list of *Key Questions* showing how the chapter is organized (see p. 217). When a new *key term* is introduced and defined, it is printed in boldface type, and all such terms are summarized in the glossary at the end of the book. More than 100 *Thinking About* exercises reinforce learning by asking students to think critically about the implications of various environmental issues and solutions immediately after they are discussed in the text (see p. 226). The captions of many figures contain similar questions that get students to think about the figure content (see Figure 10-28, p. 238). In their reading, students also encounter *Connections* boxes, which briefly describe connections between human activities and environmental consequences, environmental and social issues, and environmental issues and solutions (see p. 226). Finally, the text of each chapter wraps up with three *Big Ideas* (see p. 242), which summarize and reinforce three of the major take-away messages from each chapter, and a *Tying It All Together* section that relates the Core Case Study and other chapter content to the principles of sustainability (see p. 243). Again, this reinforces the main messages of the chapter along with the themes of sustainability to give students a stronger understanding of how it all ties together.

Each chapter ends with a *Chapter Review* section containing a detailed set of review questions that include all the chapter's key terms in bold type; *Critical Thinking* questions that encourage students to think about and apply what they have learned to their lives; *Doing Environmental Science*—an exercise that will help students to experience the work of various environmental scientists; a *Global Environment Watch* exercise taking students to Cengage's GREENR site, where they can use this tool for interesting research related to chapter content; and a *Data Analysis* or *Ecological Footprint Analysis* problem built around ecological footprint data or some other environmental data set. (See pp. 243–245.) And at the end of the book, we have included a comprehensive glossary that includes definitions of all key terms as well as many other terms that are important to environmental science.

Supplements for Instructors

- ***Environmental Science MindTap.*** MindTap is a new personal learning experience that combines all your digital assets—readings, multimedia, activities, and assessments—into a singular learning path to improve student outcomes.
- ***Instructor Companion Site.*** Everything you need for your course in one place! This collection of book-specific lecture and class tools is available online via www.cengage.com/login. Access and download PowerPoint presentations, images, instructor's manual, videos, and more.
- ***Cognero.*** Cengage Learning Testing Powered by Cognero is a flexible, online system that allows you to do the following:
  - author, edit, and manage test bank content from multiple Cengage Learning solutions
  - create multiple test versions in an instant
  - deliver tests from your LMS, your classroom, or wherever you want
- ***Transparencies.*** Online Transparency Correlation Guide. This guide correlates the transparency set created for *Living in the Environment 17e, Environmental Science 13e, Sustaining the Earth 10e,* and *Essentials of Ecology 6e* to the new editions of these texts: *Living in the Environment 18e, Environmental Science 14e, Sustaining the Earth 11e,* and *Essentials of Ecology 7e.* To acquire the set of 250 printed transparencies and 250 electronic masters, please ask your local Cengage Learning Sales Representative or call 1-800-423-0563.
- ***Aplia.*** Aplia™ is a Cengage Learning online homework system dedicated to improving learning by increasing student effort and engagement. Aplia makes it easy for instructors to assign frequent online homework assignments. Aplia provides students with prompt and detailed feedback to help them learn as they work through the questions, and features interactive tutorials to fully engage them in learning course concepts. Automatic grading and powerful assessment tools give instructors real-time reports of student progress, participation, and performance, and Aplia's easy-to-use course management features let instructors flexibly administer course announcements and materials online. With Aplia, students will show up to class fully engaged and prepared, and instructors will have more time to do what they do best. . . teach.
- ***BBC Videos for Environmental Science.*** This large library of BBC clips are informative, short clips of current news stories on environmental issues from around the world. These clips are a great way to start a lecture or spark a discussion. Available on the Instructor Companion Site and within MindTap.
- ***Global Environment Watch.*** Updated several times a day, the Global Environment Watch is a focused portal into GREENR—the Global Reference on the Environment, Energy, and Natural Resources—an ideal one-stop site for classroom discussion and research projects. This resource center keeps courses up to date with the most current news on the environment. Users get access to information from trusted academic journals, news outlets, and magazines, as well as statistics, an interactive world map, videos, primary sources, case studies, podcasts, and much more.
- ***Virtual Field Trip in Environmental Issues.*** This supplement brings the field to you, with dynamic panoramas, videos, photographs, maps, and quizzes covering important topics within environmental science. A case study approach covers the issues of keystone species, the role of climate change in extinctions, invasive species, the evolution of a species in relation to its environment, and an ecosystem approach to sustaining biodiversity. Students are engaged, interacting with real issues to help them think critically about the world around them.

Help Us Improve This Book or Its Supplements

Let us know how you think this book can be improved. If you find any errors, bias, or confusing explanations, please e-mail us about them at:

- mtg89@hotmail.com
- spoolman@tds.net

Most errors can be corrected in subsequent printings of this edition, as well as in future editions.

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G. Tyler Miller
Scott E. Spoolman

Guest Essayists

Guest essays by the following authors are available online: **M. Kat Anderson**, ethnoecologist with the National Plant Center of the USDA's Natural Resource Conservation Center; **Lester R. Brown**, president, Earth Policy Institute; **Alberto Ruz Buenfil**, environmental activist, writer, and performer; **Robert D. Bullard**, professor of sociology and director of the Environmental Justice Resource Center at Clark Atlanta University; **Michael Cain**, ecologist and adjunct professor at Bowdoin College; **Herman E. Daly**, senior research scholar at the School of Public Affairs, University of Maryland; **Lois Marie Gibbs**, director, Center for Health, Environment, and Justice; **Garrett Hardin**, professor emeritus (now deceased) of human ecology, University of California, Santa Barbara; **John Harte**, professor of energy and resources, University of California, Berkeley; **Paul G. Hawken**, environmental author and business leader; **Jane Heinze-Fry**, environmental educator; **Paul F. Kamitsuja**, infectious disease expert and physician; **Amory B. Lovins**, energy policy consultant and director of research, Rocky Mountain Institute; **Bobbi S. Low**, professor of resource ecology, University of Michigan; **John J. Magnuson**, Director Emeritus of the Center for Limnology, University of Wisconsin, Madison; **Lester W. Milbrath**, director of the research program in environment and society, State University of New York, Buffalo; **Peter Montague**, director, Environmental Research Foundation; **Norman Myers**, tropical ecologist and consultant in environment and development; **David W. Orr**, professor of environmental studies, Oberlin College; **Noel Perrin**, adjunct professor of environmental studies, Dartmouth College; **David Pimentel**, professor of insect ecology and agricultural sciences, Cornell University; **John Pichtel**, Ball State University; **Andrew C. Revkin**, environmental author and environmental reporter for the New York Times; **Vandana Shiva**, physicist, educator, environmental consultant; **Nancy Wicks**, ecopioneer and director of Round Mountain Organics; and **Donald Worster**, environmental historian and professor of American history, University of Kansas.

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Cumulative List of Reviewers

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