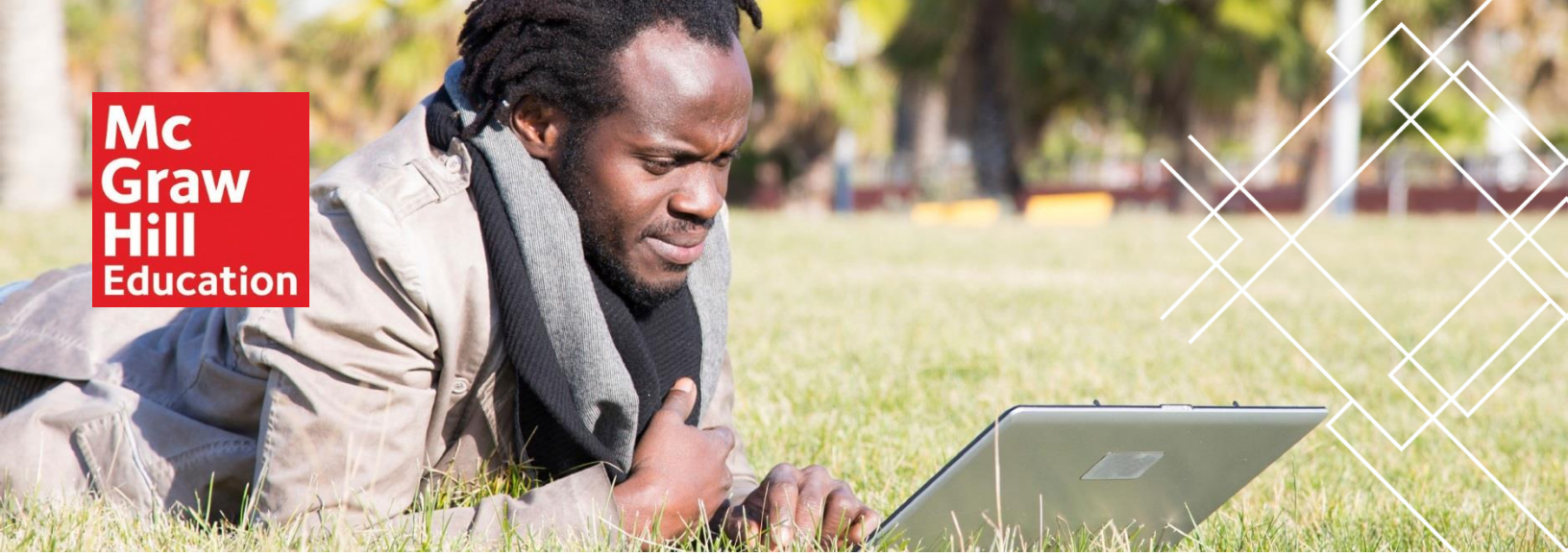

Ecology: Concepts and Applications, 8e

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Detailed List of New Features

Chapters 2 and 3 have been edited to incorporate a more holistic view and to better integrate them with later chapters. We have revised text and provided seven new figures and several revisions of existing figures to address requests by reviewers to expand the explanations of the relationships between abiotic features and biome type. The introductions to these chapters have been rewritten to provide a context for these global concepts, draw comparisons between terrestrial and aquatic systems, and introduce the concept of primary production.

We have increased representation of women and minority researchers in examples. Recognizing the importance of informing students of the diversity of scientists engaged in the sciences, previous editions have attempted to include contributions of women and minority researchers to the development of ecological science. That representation has been expanded in the eighth edition.

This edition increases the emphasis on the role of evolution in ecological science. Increasingly, evolutionary science informs and guides ecological research, not just within the field of evolutionary ecology. In response to reviewers' comments on this point, we have added examples and made additional connections between ecology and evolution in response to reviewer comments throughout the text. We have also expanded chapter 4 to include five new figures and several figure revisions to explain the relationships between genetic diversity, evolution, and ecological consequences, including an expansion of the treatment of non-Mendelian genetics.

The types of interactions among species have been expanded to include the full range recognized by ecologists. Chapter 13 now begins with a general discussion of how ecologists characterize species interactions. New examples are provided that explore amensalism and competition and the evolutionary and ecological consequences of these selective pressures. New figures have been created to illustrate these additions.

Coverage and connections to global-scale processes have been strengthened. Revisions of chapters 21 and 23 are aimed at providing greater clarity to the broad spectrum of global change phenomena. In

addition, these revised chapters help connect coverage in preceding chapters of topics prominent in global change ecology.

The introductions and end-of-chapter review questions have been streamlined. In response to reviewer comments, we have trimmed the introductions to most chapters to move more quickly into the main content. Review questions have also been edited to make them more consistent in length and level of detail to encourage student engagement and to improve their clarity and accessibility.

The Investigating the Evidence boxes have been moved from the body of chapters to Appendix A at the end of the book. While we think that this series of exercises in study design and basic statistics remain a valuable adjunct to an introduction to ecology, many instructors have indicated that their presentation in the body of chapters interrupts the f low of the reading and distracts from the core content. By moving the evidence features to the end of the book, we have addressed these concerns, while making them available to instructors and students who find their content useful.

Chapter by Chapter Changes

Chapter 1 An Applications discussion focused on how eco- logical science can inform environmental law and policy now concludes chapter 1. Citing the fact that, since ecological science concerns relationships between organisms and the environment, it is natural to turn to ecology when environmental concerns arise. This new feature addresses what is perhaps the most practical contribution that ecological science can make and provides a conceptual umbrella for Applications discussions in later chapters.

Chapter 2 The new introduction uses a desert ecology example to introduce the biome concept within the context of evolutionary pressure from both the physical and biological environments, in alignment with requests by reviewers. We now introduce the concept of primary production and the trophic cascade in this chapter to set the stage for in-depth treatment later. The global biomes are now presented with a new Whittaker diagram to explain the relationship between temperature, precipitation, and dominant vegetation. This is paired with, and corresponds to, the biomes as defined in previous editions, moving the figure of the world biomes from the back of the book to this chapter. In response to reviewer requests, we have also added a discussion and figures of the rain shadow effect and microclimates. The latter uses a new figure of the western United States to show the complexity of the biome concept at a finer geologic scale than is typically represented. Revisions have been made to the soil horizon figure to make it more representative and to the orbit of the earth figure to include the oo point.

Chapter 3 The introduction has been revised in response to reviewers' comments to directly compare terrestrial and aquatic systems, with a new table for students to consider particular physical features and their implications for the evolution of life in these distinctive environments. The structure of this chapter now better mirrors that of chapter 2. In response to reviewer requests, we have added a discussion and figure to explain thermohaline circulation and associated upwelling and their importance for aquatic life. Both the figure on streams and the one on lake turnover have been improved from the previous edition, with the latter revised to be simpler and more intuitive and show where fish primarily reside during different seasons. The figure on ocean currents now includes eight more seas, including Antarctic seas not shown in previous editions.

Chapter 4 In response to reviewer requests, the introduction now emphasizes why evolution belongs in an ecology textbook, and includes a new figure that shows how genetic diversity is expressed in phenotypic diversity and how this affects ecological interactions. We have included a new case study of research on crickets that illustrates the concepts of mutation, genetic drift, and natural selection, with corresponding figures. There is also a new figure to explain different mechanisms of genetic drift. Another new figure illustrates where alleles

are in a population, and how this translates to quantifying allele frequencies and resulting investigation of deviations from Hardy-Weinberg equilibrium. Explanations of the latter and why it is important for ecology are made clearer. In response to reviewer requests, the figures on plasticity and on different types of selection have been revised to be easier to read. The discussion and explanation of quantitative genetics is strengthened in this edition. The relationships between evolution and ecological processes are strengthened throughout.

Chapter 13 The introduction has been rewritten to set the stage for the three chapters (13, 14, and 15) on species interactions and includes a summary table to explain the different classifications, based on impact to each organism. We have added explanations of both amensalism and commensalism, using new research examples, as well as describing how these categories overlap with other types of interactions such as competition. We also added an exciting, new research example for niche partitioning to replace the previous one on salt marsh grasses, illustrated by corresponding new figures.

Chapter 16 The community concept has been expanded to include a full range of interacting species, and presentation of the Shannon-Wiener index of species diversity has been edited to ease students into the mathematical expressions of the index. In addition, the discussion of the lognormal distribution has been updated to include recent analyses showing that it is one of several possible distributions of species abundance patterns. Finally, lower algal and plant diversity in response to nutrient enrichment is explained as a result of decreased environmental complexity, as competition for limiting nutrients and light is replaced by competition dominated by a single resource: light.

Chapter 20 Details of the successional sequence at Glacier Bay, Alaska, have been trimmed to make room for a broader historical perspective on ecological succession by introducing the views of two major contributors to the subject, Frederic E. Clements and Henry A. Gleason. Introducing the ideas of these pioneering researchers provides a basis for a more refined perspective on the process of succession and the nature of "climax" communities. The chronosequence at Glacier has been visualized by a series of photos of key points along the sequence. In addition, the concept of a chronosequence is introduced early in the chapter and a contrast is made between the use of chronosequences versus direct observations to study successional change.

Chapter 21 The new Applications feature, which concerns using landscape approaches to mitigating urban heat islands, is intended to focus landscape ecology on the environment where most people, including students, now live. This new feature also connects the landscape ecology chapter to earlier discussions of urban ecology as a research frontier (chapter 1), urban heat islands (chapter 5), biodiversity in urban landscapes (chapter 16), and nutrient fluxes across the urban landscape (chapter 19). This discussion also foreshadows a detailed review of global climate warming in chapter 23.

Chapter 23 In response to reviewers' comments, we have revised the introduction to emphasize the multidisciplinary nature of global ecology and that there are many components of global change in addition to climate. Connections between previous chapters and these fields have also been strengthened. A research example that reflects the more recent explorations into the ecological importance of La Niña events has been added with a corresponding figure. Figure revisions incorporate more current data that emphasize the connections between carbon and temperature increases, including both the modern-age relationships with anthropogenic carbon and patterns at the millennial scale.