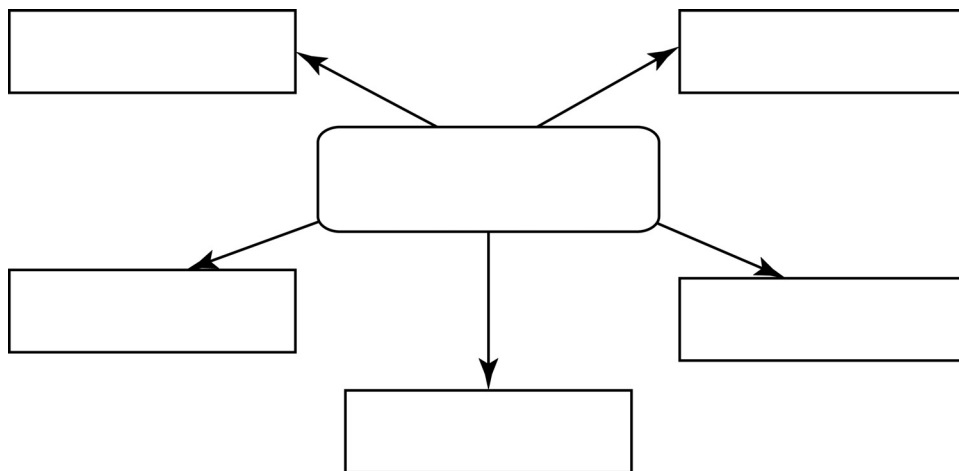


Chapter 56: Conservation Biology and Global Change

- 56.1** *Identify three kinds of biodiversity and the major threats to them.*
- 56.2** *Describe the different ways that population size and genetic diversity influence the health of populations.*
- 56.3** *Explain the major approaches of habitat conservation that help sustain biodiversity.*
- 56.4** *Describe types of environmental change arising from human activities.*
- 56.5** *Define sustainability and its relevance for maintaining biodiversity and human well-being.*

This chapter looks at the importance of biodiversity and how it can be maintained in populations, as well as human threats to environmental stability. You will find scientific discussions of many of the important topics of ecology that are in the news today: ozone depletion, carbon emissions, invasive species, and habitat loss.

Study Tip: Figure 56.1 in your text gives a roadmap to how scientists could approach protecting the psychedelic rock gecko. Make your own simplified figure with Protecting Diversity in the center and the five ways listed to protect the diversity of life on Earth radiating around the central idea.



Concept 56.1 *Human activities threaten Earth's biodiversity*

LO 56.1: *Identify three kinds of biodiversity and the major threats to them.*

1. Ecologists are particularly concerned about the impact of human activities on which four processes of the biosphere?

2. What is *conservation biology*?

3. Ecologists organize biodiversity on three levels. In the following table, explain the impact of decreasing diversity in each division.

Level of Biodiversity	Impact
Genetic diversity	
Species diversity	
Ecosystem diversity	

4. *Extinction* is a natural phenomenon that has been occurring since life first evolved. What aspect of extinction is of concern to scientists today? Cite data to support this concern.

5. Explain the difference between an *endangered species* and a *threatened species*.

6. Make a list of five ways healthy ecosystems and biodiversity benefit humans.

7. Use this table to organize your thoughts on how the following four activities affect biodiversity.

Threat to Biodiversity	How It Reduces Biodiversity
Habitat loss	
Introduced species	
Overharvesting	
Global change	

8. List five *introduced species* that present a serious threat to their new communities. Explain the damage done by each introduced species. Include two introduced species that are a threat in your own region of the country. Indicate these with an asterisk (*).

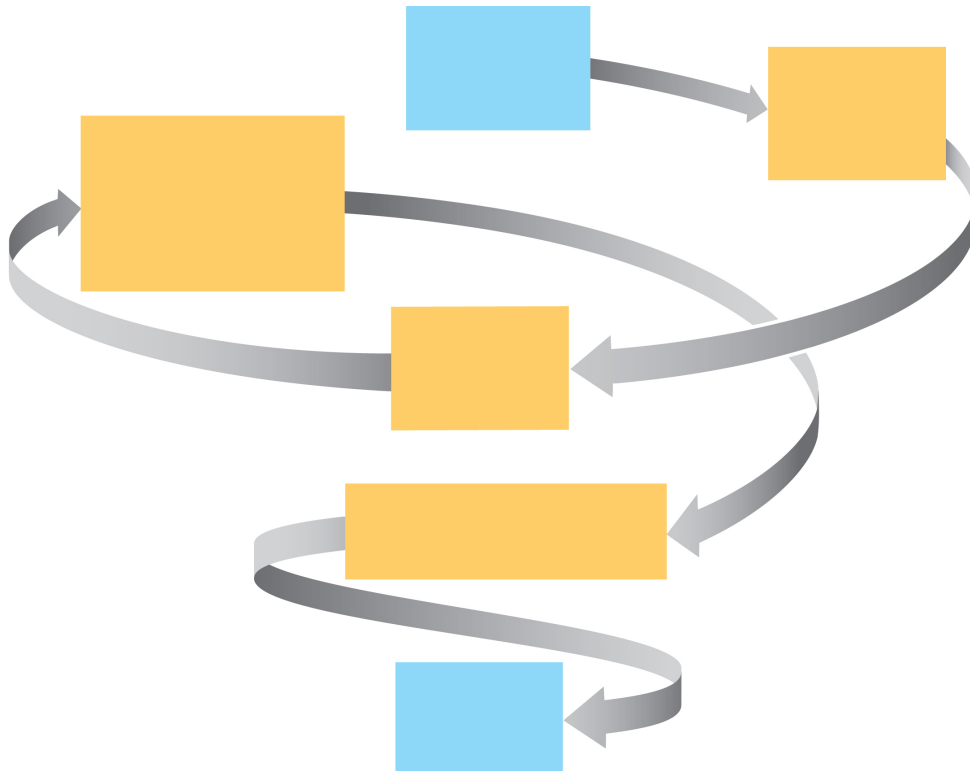
Introduced Species	Damage
1.	
2.	
3.	
4.	
5.	

Concept 56.2 Population conservation focuses on population size, genetic diversity, and critical habitat

LO 56.2: Describe the different ways that population size and genetic diversity influence the health of populations.

9. What do conservation biologists who adopt the *small-population approach* study?

10. What is an *extinction vortex*? Use Figure 56.11 to label the processes driving an extinction vortex.



11. In conservation biology MVP does not stand for Most Valuable Player. What does it stand for and why is it important?

12. Why is the total number of individuals in a small population not a good measure of its reproductive potential?

13. What role can a loss of critical habitat play in threatened and endangered populations? Frame your answer using the case study of the red-cockaded woodpecker.

Concept 56.3 *Landscape and regional conservation help sustain biodiversity*

LO 56.3: *Explain the major approaches of habitat conservation that help sustain biodiversity.*

14. What is *landscape ecology* and why is it important in biodiversity? (You may wish to refer to Figure 52.2, p 1165.)

15. Describe how the increase in cowbirds is related to forest fragmentation and the creation of *edges*.

16. What are potential positive and negative effects of *movement corridors*?

17. Explain the concept behind a *zoned reserve*.
18. Why is *urban ecology* a growing interest among ecologists? Do you know of urban ecology projects in your area?

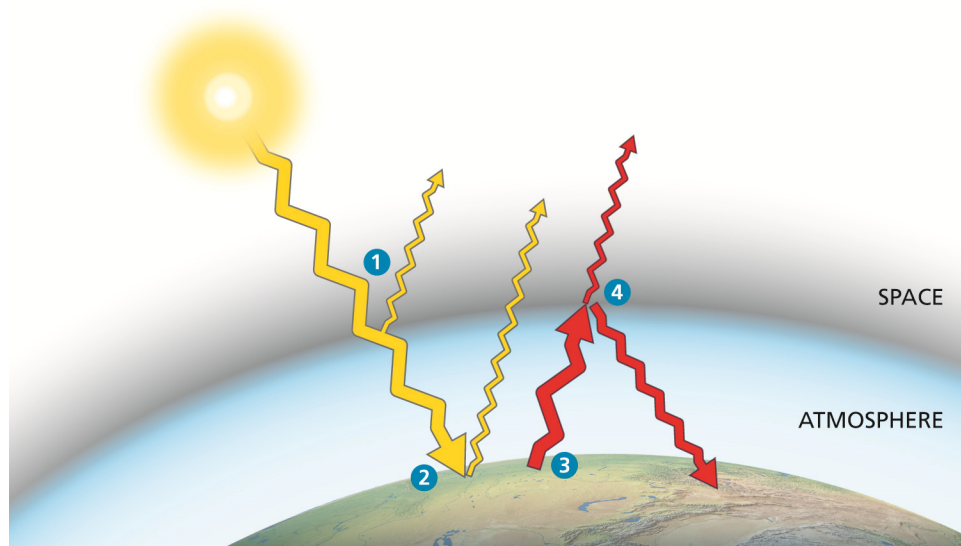
Concept 56.4 *Earth is changing rapidly as a result of human actions*

LO 56.4: *Describe types of environmental change arising from human activities.*

This section looks at the human impact on ecosystems.

19. How has agriculture affected nitrogen cycling? Explain three negative consequences of nutrient enrichment.
20. Explain the process of *biological magnification*. Discuss at least one example.
21. What are *microplastics*? Why is plastic waste a growing concern? (The interview with Chelsea Rochman concerns plastic waste. It is just before Chapter 52 on p 1163 or can be found in *Mastering Biology*.)

22. Use Figure 56.30 to explain the greenhouse effect. At each number on the figure explain what events are occurring.



23. What are the primary sources of the great increase in atmospheric carbon dioxide over the past 170 years?
24. What two trends can be determined from Figure 56.29 in your text?
25. Explain why the ecosystems of the far north, particularly northern coniferous forests and taiga, are experiencing the greatest climate change. Frame your response in the context of a positive feedback loop.
26. How is atmospheric ozone depleted? What are projected effects of this depletion?

Concept 56.5 *Sustainable development can improve human lives while conserving biodiversity*

LO 56.5: *Define sustainability and its relevance for maintaining biodiversity and human well-being.*

27. Explain the concept behind the phrase *sustainable development*.

28. Climate change is having an effect on all levels of biological organization, from cells to ecosystems. The Make Connections Figure 56.31, p 1280 in your text, makes a compelling case for the disruption caused by global climate change. Use the examples in the figure to explain the effects of climate change at each of the following levels of biological organization.
 - a. Effects on cells:

 - b. Effects on individual organisms:

 - c. Effects on populations:

 - d. Effects on communities and ecosystems:

Test Your Understanding Answers, p. 1287

Now you should be ready to test your knowledge. Place your answers here:

1. ____ 2. ____ 3. ____ 4. ____ 5. ____ 6. ____



Kudzu, the wonder vine!