

Endangered Biomes

The debate is on! With so many ecosystems threatened by expanding human populations and relatively limited funds to save them, conservation biologists are trying to determine the best way to maintain the world's biodiversity.

For years, the leading strategy has been to focus on saving *biodiversity hotspots*. Basically, these are areas of the world that have lost at least 70% of their original vegetation, but have high concentrations of species found nowhere else in the world. Thirty-four hotspots have been identified. Most of them are found in the tropical rainforests. These locations make up only 2.3% of the Earth's total land area, but account for more than 50% of its plant species and 42% of its terrestrial vertebrate species.¹

For many scientists, this is not an adequate solution. They believe that such an intense effort to save such a small amount of land, most of which is limited to a single biome, threatens the rest of the Earth's ecosystems that are so valuable to other species (like the large carnivores that need vast areas to roam) as well as to humans.

As a result, these scientists have suggested we focus our resources (i.e., time, money, and energy) on conserving endangered biomes instead of individual hotspots. They believe that this strategy will save a larger representation of the Earth's species and will be of greater benefit to biodiversity in the long run.

To determine how endangered a biome is, scientists compare the percent of habitat that humans have converted within a biome to the percent of habitat that has been protected. These percentages are represented in the table below. Use them to answer the questions that follow.

Table 1: Biome land converted and protected²

Biome	Habitat Converted	Habitat Protected	Conversion:Protection Ratio
Tropical Rainforest	32.2	16	
Tropical Savanna	23.6	11.9	
Desert	6.8	9.9	
Chaparral	41.4	5	
Grassland	45.8	4.6	
Temperate Deciduous Forest	46.6	9.8	
Temperate Boreal Forest	2.4	8.9	
Tundra	0.4	16	
Total	2	1	

¹ "Biodiversity Hotspots." Conservation International.
<http://www.biodiversityhotspots.org>.

² Hoekstra, J.M., Boucher, T.M., Ricketts, T.H. and Roberts, C. (2005). Confronting a biome crisis: Global disparities of habitat loss and protection. *Ecology Letters*, 8, 23-29.



Exploring Biomes

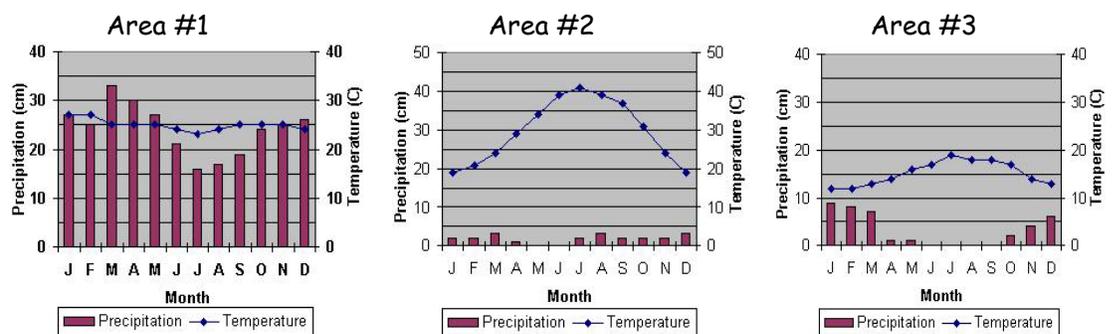
1. In the empty column in Table 1, express the percentages as a ratio of habitat converted to habitat protected.
2. According to proponents of the endangered biome conservation strategy, the larger the ratio between habitat converted to habitat protected, the more endangered that biome is. List the biomes in order from most endangered to least endangered, along with their ratios, in the table below.

Table 2: Rankings of endangered biomes according to Conversion:Protection ratio

Rank	Biome	C:P Ratio
1		
2		
3		
4		
5		
6		
7		
8		

3. According to the Biodiversity Hotspot idea described in the reading, in which biome should we be focusing our efforts?
4. Why do you believe these two conservation strategies do not agree?
5. Based on the information presented here, which strategy do you think is best? Why?

Below are the climographs for three areas that are being considered for immediate conservation. Use your knowledge of biomes to answer questions #6 - 8.



6. According to the Biodiversity Hotspot idea, which area should be conserved? Explain.
7. According to the Endangered Biomes idea, which area should be conserved? Explain.
8. According to the Endangered Biomes idea, which area is least in need of conservation? Explain.



Endangered Biomes - Teacher Version

The debate is on! With so many ecosystems threatened by human population and relatively limited funds to save them, conservation biologists are trying to determine the best way to maintain the world's biodiversity.

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For many scientists, this is not an adequate solution. They believe that such an intense effort to save such a small amount of land, most of which is limited to a single biome, threatens the rest of the Earth's ecosystems that are so valuable to other species (like the large carnivores that need vast areas to roam) as well as to humans.

As a result, these scientists have suggested we focus our resources (i.e., time, money, and energy) on conserving endangered biomes instead of individual hotspots. They believe that this will save a larger representation of the Earth's species and will be of greater benefit to biodiversity in the long run.

To determine how endangered a biome is, scientists compare the percent of habitat that humans have converted within a biome to the percent of habitat that has been protected. These percentages are represented in the table below. Use them to answer the questions that follow.

Table 1: Biome land converted and preserved²

Biome	Habitat Converted	Habitat Protected	Conversion:Protection Ratio
Tropical Rainforest	32.2	16	2:1
Savanna	23.6	11.9	2:1
Desert	6.8	9.9	2:3
Chaparral	41.4	5	8:1
Grassland	45.8	4.6	10:1
Temperate Deciduous Forest	46.6	9.8	5:1
Boreal Forest	2.4	8.9	1:4
Tundra	0.4	16	1:40
Total	2	1	2:1

¹ "Biodiversity Hotspots." Conservation International.

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

² Hoekstra, J.M., Boucher, T.M., Ricketts, T.H. and Roberts, C. (2005). Confronting a biome crisis: Global disparities of habitat loss and protection. *Ecology Letters*, 8, 23-29.



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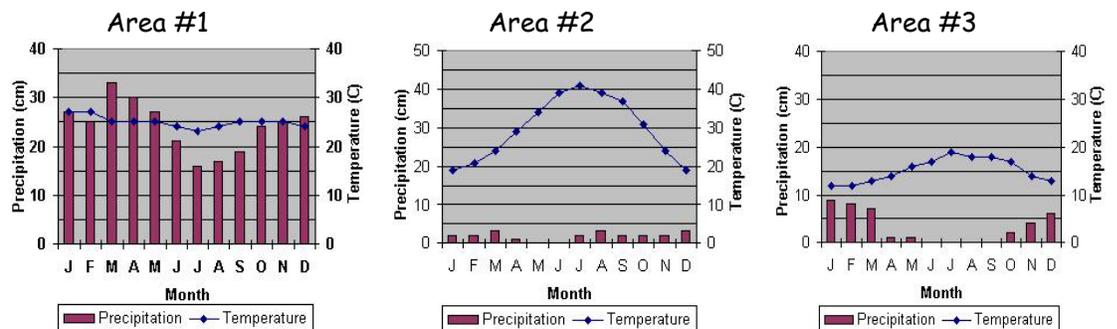
- In the empty column in Table 1, express the percentages as a ratio of habitat converted to habitat protected.
- According to proponents of the endangered biome conservation strategy, the larger the ratio between habitat converted to habitat protected, the more endangered that biome is. List the biomes in order from most endangered to least endangered, along with their ratios, in the table below.

Table 2: Rankings of endangered biomes according to Conversion:Protection ratio

Rank	Biome	C:P Ratio
1	Grassland	10:1
2	Chaparral	8:1
3	Temperate Deciduous Forest	5:1
4	Tropical Rainforest	2:1
5	Savanna	2:1
6	Desert	2:3
7	Boreal Forest	1:4
8	Tundra	1:40

- According to the Biodiversity Hotspot idea described in the reading, in which biome should we be focusing our efforts? *Rainforests*
- Why do you believe these two conservation strategies do not agree?
Answers will vary.
- Based on the information presented here, which strategy do you think is best? Why?
Answers will vary.

Below are the climographs for three areas that are being considered for immediate conservation. Use your knowledge of biomes to answer questions #6 - 8.



- According to the Biodiversity Hotspot idea, which area should be conserved? Explain.
Area 1. Climograph clearly shows a rainforest.
- According to the Endangered Biomes idea, which area should be conserved? Explain.
Area 3. Climograph clearly shows a chaparral.
- According to the Endangered Biomes idea, which area is least in need of conservation? Explain.
Area 2. Climograph shows a desert, which is the lowest of the three.

