

Chapter 4

Population Biology

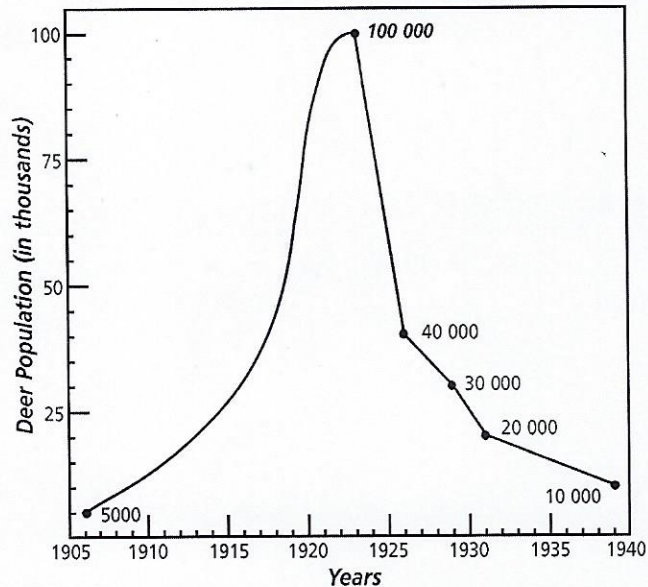
Critical Thinking

Use with Chapter 4, Section 4.1

The Effect of Predators on Prey Populations

Carrying capacity—the number of individuals of a species an area can support—is usually determined during the least favorable time of year, when cold weather or other factors reduce the availability of food and shelter. Field studies have shown that predators also help keep the size of a prey population within the carrying capacity of an area.

Dwindling Populations Early in the twentieth century, biologists and nature enthusiasts became concerned about dwindling populations of game animals in North America. In 1906, the 750 000-acre Kaibab Plateau in northern Arizona was set aside as a wildlife refuge. Deer hunting was forbidden. Predators—wolves, pumas, and coyotes—were trapped, hunted, and poisoned to reduce their numbers. Use data from the graph to answer the following questions.



1. Between the years 1907 and 1923, 11 wolves, 674 pumas, and 3000 coyotes were removed from the Kaibab Plateau. **a.** What was the increase in the deer population during that period? **b.** What factors may have contributed to the increase?

2. What was the percentage decrease in deer population **a.** between the years 1923 and 1926? **b.** between 1923 and 1931? **c.** between 1923 and 1939?

3. By 1926, there were no more wolves on the Kaibab Plateau. Between 1923 and 1939, hunters continued to remove pumas and coyotes from the area. The rapid decline in the deer population during the 1920s was due to massive starvation during winter. The plateau had supplied enough food to support the growth of the deer population to 100 000. Why, then, did so many deer suddenly starve?

4. Biologists estimated that a deer population of about 30 000 would not have exceeded the carrying capacity of the Kaibab Plateau. Assuming the estimate is correct, why did the actual deer population decline below 30 000 during the 1930s?
