U.S.
FISH & WILDLIFE
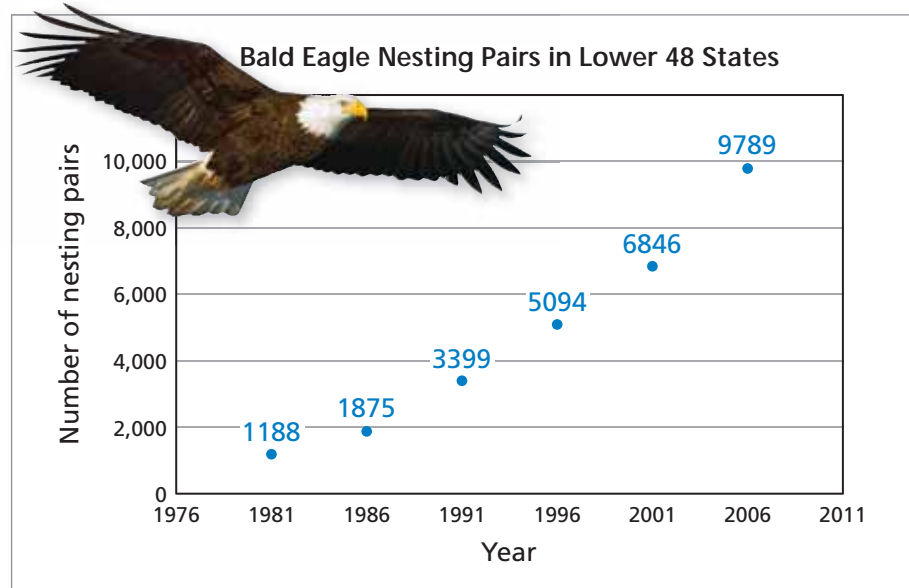**SERVICE**

DEPARTMENT OF THE INTERIOR

The mission of the U.S. Fish and Wildlife Service is "to work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."

Using an Exponential Pattern to Predict a Future Event

EXAMPLE 3   **Predicting a Future Event**

It is estimated that in 1782 there were about 100,000 nesting bald eagles in the United States. By the 1960s, this number had dropped to about 500 nesting pairs. This decline was attributed to loss of habitat, loss of prey, hunting, and the use of the pesticide DDT.

The 1940 Bald Eagle Protection Act prohibited the trapping and killing of the birds. In 1967, the bald eagle was declared an endangered species in the United States. With protection, the nesting pair population began to increase, as shown in the graph. Finally, in 2007, the bald eagle was removed from the list of endangered and threatened species.

Bald Eagle Nesting Pairs in Lower 48 States

Number of nesting pairs vs. Year

- 1188 (1981)
- 1875 (1986)
- 3399 (1991)
- 5094 (1996)
- 6846 (2001)
- 9789 (2006)

Assume that this recovery pattern continued. Estimate the number of nesting pairs of bald eagles in the lower 48 states in 2011.

SOLUTION

Begin by finding the ratios of consecutive populations.

$$\frac{1875}{1188} \approx 1.58 \qquad \frac{3399}{1875} \approx 1.81 \qquad \frac{5094}{3399} \approx 1.50$$

$$\frac{6846}{5094} \approx 1.34 \qquad \frac{9789}{6846} \approx 1.43$$

From the data, it appears that the population increased by about 50% every 5 years. So, from 2006 to 2011, you can estimate that the population increased to 1.5(9789), or about 14,700 nesting pairs.

Study Tip

Using a computer and an exponential regression program, you can find that the best estimate for the increase (every 5 years) for the data in Example 3 is 52.8%.

✓ **Checkpoint**   Help at *Math.andYOU.com*

Suppose the recovery pattern continued for another 5 years. Predict the number of nesting pairs in 2016.