Refer to 10.3 #46. Use Excel to multiply the matrix by the initial population of 900 juveniles, 500 subadults and 2600 adults, and continue to project the population out for 21 years.

1. What is the number of owls in each stage at t=20 years?

2. What is the number of owls in each stage at t=21 years?

3. Find the ratio between the numbers in part (b) and the numbers in part (a). What does this number represent, and how can you interpret this result? (Hint: you have seen this number already in this problem.)

4. Find the inverse of the matrix given in the textbook, and verify that your population after 20 years can be calculated by taking the population after 21 years and multiplying it by the inverse of the matrix. Write the matrix inverse here.

5. Print a graph of the three stages population over the 21-year period. Attach the printed graph to your homework.

6. What single number in this model can you change to ensure survival of the spotted owl population? Write down the old and new values of the parameter you changed, and describe its meaning in the model.

7. Print a graph of the three stages population over the 21-year period, using the new value describe in part (e).