Part 1 – Exponential Growth

1. What is the instantaneous rate of increase for the hypothetical population of nutria?

2. What is the predicted population size for nutria in year 10 based on your projection of

continuous exponential growth?

3. What is the geometric rate of population increase (lambda) for the nutria population? What does this tell us about the annual rate of change for this population? What is the cumulative rate of change predicted to be during the first 3 years post-release?

4. What was your predicted population size for nutria in year 10 based on the discrete

exponential projection?

5. For the managed population of nutrias, what was cumulative rate of population growth during the entire 10 year period? What was the annual population growth rate?

6. Is there any reason to suspect that management effectiveness changed during the 10-year period? Briefly describe how do arrived at your answer?

7. Given the rate of growth experienced during the last 3 years (Years 8, 9, 10), what do

you predict the size of the population will be in year 15?

Part 2 – Logistic Growth.

8. At what abundance (N) do we expect this population to exhibit the greatest rate of

growth? What value of dN/dt do we find at this abundance, and what is the biological

interpretation of this number?

9. When (approximately) does this population reach carrying capacity? In what year

(approximately) is the population growing at the fastest rate?

Part 3 – Stochasticity.

10. What was the projected population size in year 15 based on the deterministic projection model? What is the approximate range of ending population sizes you obtained for the 20 stochastic simulations?

11. In a few sentences, describe why you might find such significant variation in the ending population size after 15 years, even though the same mean growth rate governed all the hypothetical populations?

12. Is there a major risk that a population of turkeys could extinct during a 15-year time

period, given the same mean and SD for the growth rate? Support your answer with

evidence from the simulation.