

Name: KEY

True/False—30 points; 2 points each. Circle the correct answer.

1. Aldo Leopold wrote “Silent Spring.” T F
  
2. Theodore Roosevelt established the first national wildlife refuge. T F
  
3. “Natality” and “birth rate” are synonymous. T F
  
4. Wildlife managers are more concerned with populations of wildlife rather than individuals. T F
  
5. Density-independent factors are important population regulators. T F
  
6. Carrying capacity is the number of animals that can be supported by the habitat. T F
  
7. If  $b$  = birth rate and  $d$  = death rate and  $\lambda = 0.9$ , then  $b - d = -0.1$ . T F

8. Environmental Impact Statements came into existence as a result of the Endangered Species Act. T F
9. If  $\lambda = 1.09$ , then  $r \approx 0.9$ . T F
10. Mean, median and variance are three measures of central tendency. T F
11. Characteristics of a population are called parameters and are represented in equations by Latin letters ( $s$ ,  $\bar{x}$ , etc.). T F
12. Bias is a consistent deviation from truth. T F
13. Limiting factors determine carrying capacity. T F
14. One of the advantages of using instantaneous rates of increase is that  $r$  is symmetric around zero whereas  $\lambda$  is not symmetric around 1. T F
15.  $\lambda = r^e$  T F

Multiple choice—40 points; 2 points each. In the space provided write the letter corresponding to the single best answer.

\_\_\_ a \_\_\_ 1. This measures the closeness of an estimate to truth.

- a. accuracy
- b. precision
- c. randomness
- d. replication
- e. all of the above
- f. none of the above

\_\_\_ d \_\_\_ 2. Federal law supplants state law as long as which of the following conditions is/are met

- a. to achieve limited objectives
- b. only as far as necessary to achieve objectives
- c. federal law is more restrictive
- d. all of the above
- e. a and b
- f. a and c
- g. b and c
- h. none of the above

\_\_\_ b \_\_\_ 3. All else being equal, an increase in variance equals \_\_\_\_\_ in the confidence of an estimate.

- a. an increase
- b. a decrease
- c. a change
- d. Theodore Roosevelt
- e. all of the above
- f. none of the above

\_\_\_ c \_\_\_ 4. The term  $(K-N)/K$  has what effect on a population growth model

- a. causes an increase in population growth rate
- b. causes a decrease in population growth rate
- c. causes population growth rate to vary with density
- d. has no effect
- e. all of the above
- f. none of the above

\_\_\_ b \_\_\_ 5. Which of the following is a density-dependent factor?

- a. snow depth
- b. food
- c. flood
- d. temperature
- e. all of the above
- f. none of the above

\_\_\_ d \_\_\_ 6. Which of the following methods for protecting or enhancing wildlife is/are available to the federal government but not to states?

- a. Restricting take of wildlife
- b. Acquisition and management of land
- c. Restricting sale of wildlife products
- d. Require federal agencies to consider impacts of their actions on wildlife
- e. all of the above
- f. none of the above

\_\_\_ d \_\_\_ 7. Aldo Leopold was

- a. The father of wildlife management in the US
- b. Author of "Game Management"
- c. Author of "A Sand County Almanac"
- d. All of the above
- e. none of the above

\_\_\_ a \_\_\_ 8. National Parks are known for

- a. preservation
- b. active management
- c. animal husbandry
- d. sustained wildlife harvests
- e. all of the above
- f. none of the above

\_\_\_ c \_\_\_ 9. The difference between nominal and ordinal data is

- a. ordinal data have no true zero
- b. nominal data have no true zero
- c. Nominal categories cannot be placed in a hierarchical order
- d. Ordinal data cannot be placed in a hierarchical order
- e. all of the above
- f. none of the above

- \_\_\_ c \_\_\_ 10. The difference between interval and ratio data is
- Interval data are unordered
  - ratio data have no true zero
  - interval data have no true zero
  - differences in interval data are relative
  - all of the above
  - none of the above
- \_\_\_ c \_\_\_ 11. The standard error of the mean is
- the same as the standard deviation
  - a measure of the central tendency of data
  - a measure of variation associated with estimates of a parameter
  - an indicator of the accuracy of an estimator
  - all of the above
  - none of the above
- \_\_\_ c \_\_\_ 12. Choose the statement that best describes the states' role in wildlife management
- The state owns wildlife within its borders
  - The state manages wildlife for the federal government
  - The state manages wildlife as a public trust
  - The state manages wildlife for private landowners
  - all of the above
  - none of the above
- \_\_\_ b \_\_\_ 13. The most prominent factor contributing to the dramatic decline of wildlife species such as waterfowl and bison in the US in the 1800s was
- habitat loss
  - market hunting
  - pollution
  - excessive sport hunting\
  - all of the above
  - none of the above
- \_\_\_ c \_\_\_ 14. The primary funding instrument for state wildlife management is
- the Lacey Act
  - The Endangered Species Act
  - The Pittman-Robertson Act
  - The National Environmental Policy Act
  - all of the above
  - none of the above

- \_\_\_ b \_\_\_ 15. Most funding for wildlife conservation in the US is generated by
- a. excise taxes on recreational equipment such as binoculars and GPS units
  - b. excise taxes on sporting arms and ammunition
  - c. sales of hunting licenses
  - d. fines associated with hunting violations
  - e. all of the above
  - f. none of the above

**Will also accept 'e'**

- \_\_\_ a \_\_\_ 16. Many of the areas withdrawn from development in Alaska by President Carter are known as “d2 lands” because they were withdrawn under the auspices of section 17(d)(2) of
- a. ANCSA
  - b. ANILCA
  - c. NEPA
  - d. CITES
  - e. all of the above
  - f. none of the above

- \_\_\_ b \_\_\_ 17. The federal government found Alaska to be in violation of the subsistence provisions of
- a. ANCSA
  - b. ANILCA
  - c. NEPA
  - d. CITES
  - e. all of the above
  - f. none of the above

- \_\_\_ b \_\_\_ 18. The first great surge of conservation awareness in the US occurred immediately before and during the presidency of
- a. Abraham Lincoln
  - b. Theodore Roosevelt
  - c. Franklin Delano Roosevelt
  - d. Jimmy Carter
  - e. all of the above
  - f. none of the above

- \_\_\_ c \_\_\_ 19. Which is not a characteristic of populations?
- a. birth rate
  - b. death rate
  - c. age
  - d. sex ratio
  - e. all of the above
  - f. none of the above

**Will also accept 'e'**

- \_\_\_ c \_\_\_ 20. A difference between finite and instantaneous rates of increase is
- a. one can be estimated whereas the other cannot
  - b. finite rates only apply to logistic models
  - c. instantaneous rates convert more easily to different time scales
  - d. instantaneous rates are easier to estimate
  - e. all of the above
  - f. none of the above

Short answer—30 points (point values for each question are in parentheses). Give brief but complete answers. I will deduct points for extra material that is wrong.

1. (4) Where does funding originate for State Wildlife Grants and are there any restrictions as to how state wildlife agencies can spend that money?

**Funding comes from oil and gas leases on the outer continental shelf. Funds can only be spent on species identified in a state's Action Plan.**

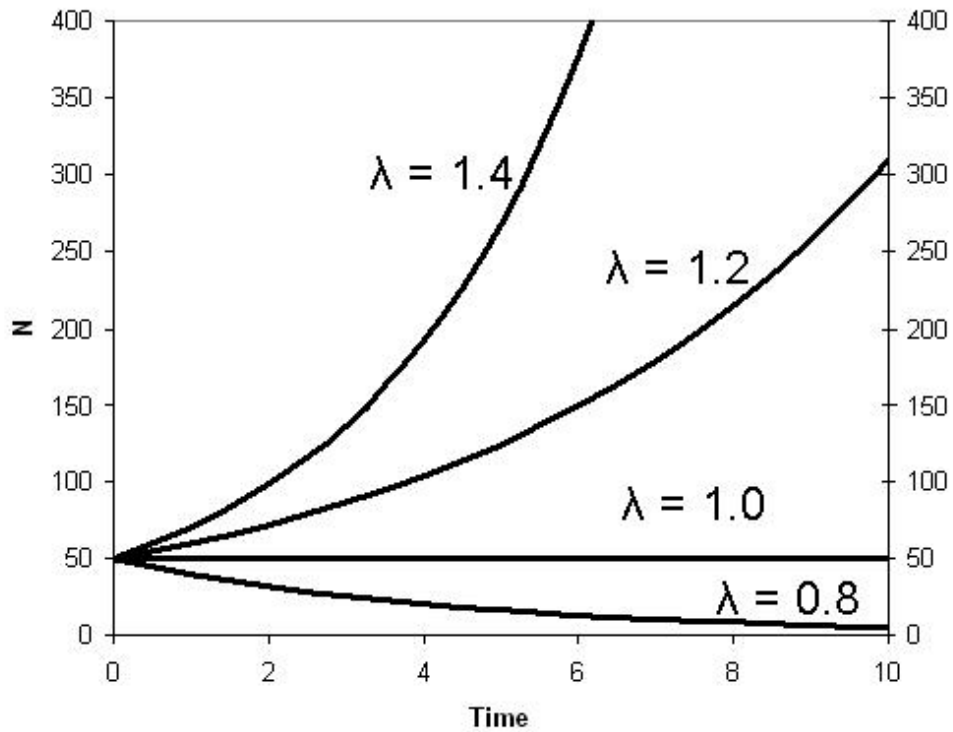
2. (4) Write two different equations that describe population change from year to year.

$$N_{t+1} = N_t + B + I - D - E$$

$$N_{t+1} = N_t \lambda \text{ or } N_t = N_0 \lambda^t$$

$$N_{t+1} = N_t e^r \text{ or } N_t = N_0 e^{rt}$$

1. (8) In the space below, draw three different growth curves for geometric growth using the following values of  $\lambda$ : 0.8, 1.0, 1.4. All curves should start at 50 on the Y-axis and 0 on the X-axis. Label each curve with the appropriate value of  $\lambda$  and label each axis. Note: you don't need to calculate actual points for each curve, just draw them to illustrate their relative differences in shape or position and their differences relative to the curve already drawn.

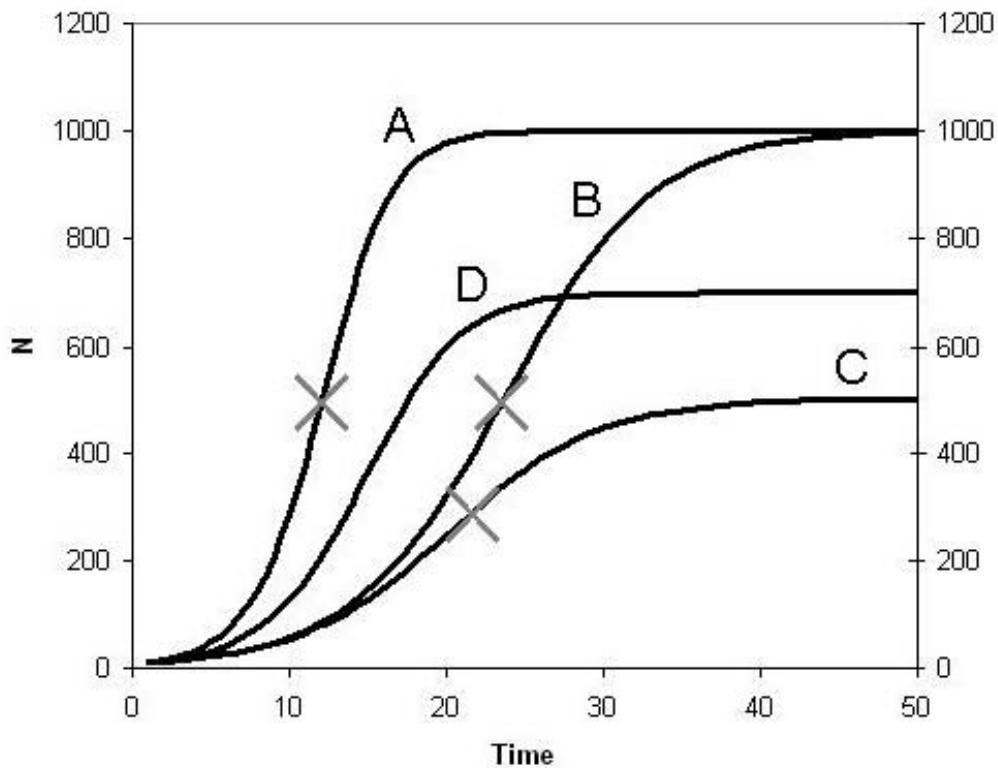


2. (4) What are the four possible management objectives for wildlife populations?

- Make them increase**
- Make them decrease**
- Keep them at the same level**
- Leave them alone**

3. (6) In the space below are 3 logistic curves. The values of  $r$  and  $K$  used to draw those curves are included in the table. Write the appropriate curve identifier (A, B, or C) in the “Curve” column of the table so that it is on the same row as the correct values of  $r$  and  $K$ .

Curve	$r$	$K$
<b>C</b>	0.2	500
<b>B</b>	0.2	1000
<b>A</b>	0.4	1000



4. (2) Place an “X” at the point on each curve where recruitment is maximized.

5. (2) Draw another curve on the graph above with  $r = 0.3$  and  $K = 700$ . Label it “D”. Again, you don’t need to calculate actual points for the curve, just draw it to illustrate the relative differences in shape or position and the differences relative to the curves already drawn.

Bonus (5) In one sentence, summarize the Central Limit Theorem.

**As sample size increases, the sampling distribution (distribution of means) approaches a normal distribution, no matter what the underlying distribution of data is.**