

Population Dynamics, Carrying Capacity, and Conservation Biology: Chapter 9

1. Explain how populations are dynamic, as opposed to static.
2. What are the four major variables which determine, or limit, population growth:
Write this basic equation for population change:
3. Define each of the following: A. Biotic Potential B. Intrinsic Rate of Increase C. Environmental Resistance
4. Describe four common characteristics of organisms/individuals in populations with a high intrinsic rate of increase.
5. What two fundamental factors determine carrying capacity (K)?
6. Define K:
7. What does the minimum viable population (MVP) refer to?
8. What is the difference between exponential growth and logistic population growth?
9. What occurs if/when a population exceeds the K?
10. Explain why there is a delay(lag time) between the overshoot of K and dieback or crash of a population; provide one example of such an overshoot and dieback situation.
11. In what way(s) is K not a fixed quantity?
12. Contrast density-dependent and density-independent population controls and name two examples of each:
13. Identify and illustrate graphically the four general types of population fluctuations:
Clearly label the graph and each of the four general fluctuation types; use one graph to display all 4 types:
14. Contrast the “top-down control” hypothesis with the “bottom-up control” hypothesis;
15. Are these two hypotheses (from #14 above) mutually exclusive?
16. Describe the major advantages and disadvantages of asexual reproduction:
17. Describe the major advantages and disadvantages of sexual reproduction:
18. The majority of organisms on earth utilize which method of reproduction?
19. Describe eight characteristics of r-selected species:
20. Describe eight characteristics of K-selected species:
21. Be familiar with the moose and wolves of Isle Royale case study:
22. Graphically display each of the three general types of survivorship curves (use one graph and label each):
23. What are the major goals of conservation biology and how might this field be used to help prevent the premature extinction of species
24. How does conservation biology differ from wildlife management?
25. How might the relatively new field of bioinformatics be used by conservation biologists in an effort to preserve habitat areas/ecosystems?
26. Briefly describe five ways humans have modified natural ecosystems:
27. Identify the six key features possessed by living systems as identified by scientific research looking at sustainable systems:
28. Be familiar with the “Parachuting Cats” in North Borneo/Sabah case study:
Mosquitoes/Malaria --> dieltrin --> death of many insects --> death of lizards + --> Cats died after eating lizards -->Rats party! --> Rat fleas party! --> Sylvatic Plague --> Look out below --> Paracuting Kitties!
29. Be familiar with the effects of environmental stress on the: A. Organismic Level B. Population Level C. Community or Ecosystem Level
30. What are the major principles of sustainability?

Important Terminology & Concepts: Chapter 9

1. Dispersion Patterns
2. Age distribution

3. Population dynamics
4. $(B+I) - (D+E) = \text{Pop. Change}$
5. Zero Population Growth
6. Biotic Potential
7. Intrinsic Rate of Increase
8. Environmental Resistance
9. Carrying Capacity (K)
10. Minimum Viable Population (MVP)
11. Exponential Growth
12. Logistic Growth
13. Reproductive Time Lag
14. Overshoot, Dieback/Crash
15. Density-dependent population controls
16. Density-independent population controls
17. Population fluctuations: Stable, Irruptive, Irregular, Cyclic
18. Predator-Prey Cycles
19. Top-down Controls
20. Bottom-up Controls
21. Asexual & Sexual Reproduction
22. K-selected and r-selected species
23. Life expectancies
24. Survivorship Curves: Early Loss, Constant Loss, Late Loss
25. Conservation Biology
26. Wildlife Management
27. Bioinformatics