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1. (a) A drought decreasing the water level of a lake is density-independent. Natural events affect the population regardless of population density.

(b) An increase in the snowshoe hare population causing an increase in the lynx population is density-dependent. At very high hare densities or at very low lynx densities, an increase in the hare population would not affect the population of lynxes.

(c) A forest fire destroying a large amount of habitat in a provincial park is density-independent. Natural disasters affect populations regardless of population density.

(d) The introduction of a new species of fish in a lake causing some species to not survive is density-dependent. The introduction of an invasive alien species would have a different effect on low-density native populations than it would on high-density native populations.

(e) The use of pesticides is density-independent. Human activities such as this affect all population densities by affecting food webs.

(f) Increased water temperature is density-independent. Water temperatures affect all population densities.

2. Answers will vary. Sample answer: An explanation for the population growth rate being slower than the population growth rate of the previous generation is the Allee effect, that is, that there are not enough individuals present in the population and in close enough proximity for successful reproduction.

4. The birth and death rates of a white-tailed deer population in the Carolinian forest of southern Ontario might be a density-dependent factor because large populations would have limited resources. This could lead to starvation and/or limited reproductive capacity for the females. Also, overcrowding could lead to more rapid disease transmission.

5. Both density-dependent and density-independent factors limit or regulate populations. Density-dependent factors, for example, competition, crowding, predation, and parasitism, have a greater impact as populations increase or decrease. Density-independent factors, for example, natural disasters, climate change, disease, and many human activities, influence populations regardless of their population density,