ANSWER KEY.

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Limiting Factors

Biology | ANSWER KEY

Answer in complete sentences. Show your work for calculations. Use the graphs and tables as evidence.

1. Is each limiting factor density-dependent or density-independent?

Limiting factor	Density-dependent or density-independent?
(a) A disease spreads quickly through a crowded herd.	**Density-dependent**
(b) A wildfire burns a large part of a forest.	**Density-independent**
(c) Birds compete for a limited number of nesting sites.	**Density-dependent**

2. A lake produces 6,000 kg of algae each year. Each fish needs 30 kg of algae per year, and food is the only limiting factor.

(a) Estimate the carrying capacity for the fish. Show the setup with units.

(b) A drought reduces the algae supply by 25%. Find the new carrying capacity.

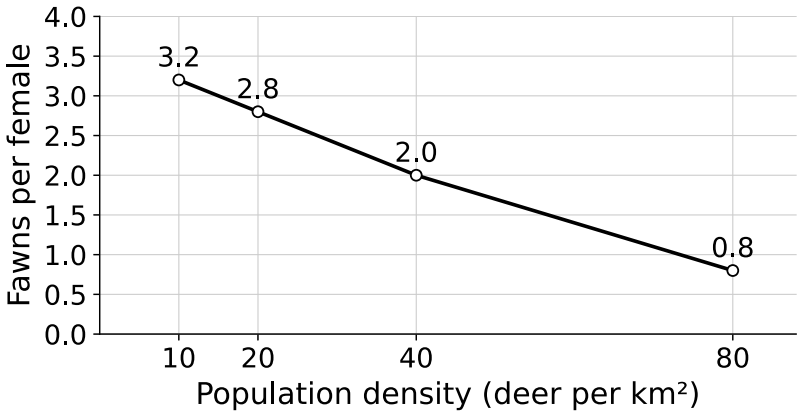
(c) Explain why the carrying capacity changed.

(a) 6,000 kg ÷ 30 kg per fish = **200 fish**

(b) 6,000 kg × 0.75 = 4,500 kg; 4,500 kg ÷ 30 kg per fish = **150 fish**

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3. Researchers counted fawns per female in deer populations of different densities.



(a) Describe the pattern in the data.

(b) Find the percent decrease in fawns per female from 10 to 80 deer per km².

(c) Is crowding a density-dependent factor here? Explain.

(a) **As density increases, fawns per female decrease.**

(b) (3.2 − 0.8) ÷ 3.2 × 100 = **75%**

(c) **Yes. The effect on reproduction gets stronger as the population gets more crowded, so it depends on density.**

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