Unit 8 FRQ: Conceptual Analysis

1. Read each question carefully. Write your response in the space provided for each part of each question. Answers must be written out in paragraph form. Outlines, bulleted lists, or diagrams alone are not acceptable and will not be scored.

The Tasmanian devil (Sarcophilus harrisii) is a species of mammal whose only wild population is native to the isolated island of Tasmania, off the coast of Australia. Tasmanian devils have a very low level of genetic diversity across the entire species. Researchers hypothesize this lack of diversity is the result of several genetic bottlenecks in the species' history.

In 1996 a new disease called devil facial tumor disease (DFTD) appeared in the wild Tasmanian devil population. DFTD can spread from one animal to another and causes the death of most affected animals. The impact of DFTD on the Tasmanian devil population has resulted in a decrease in the total population of more than 85% over the last two decades.

(a) Describe the process that maintained a stable Tasmanian devil population size before the appearance of DFTD in 1996.

Please respond on separate paper, following directions from your teacher.

(b) Explain how the huge reduction of the Tasmanian devil population since 1996 affects the susceptibility of the current population to new diseases in comparison with the susceptibility of the population before 1996.

Please respond on separate paper, following directions from your teacher.

(c) Tasmanian devils are top predators and are considered a keystone species in their community. Predict the effect of the rapid reduction of the Tasmanian devil population on the rest of the community.

Please respond on separate paper, following directions from your teacher.
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(d) Justify the prediction of part (c).

Please respond on separate paper, following directions from your teacher.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

The response describes that the Tasmanian devil population would have been maintained at a stable population size by density-dependent factors.

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

The response explains that the population underwent a genetic bottleneck and thus has reduced genetic diversity, which makes the current population more likely to be susceptible to a new disease than it would have been in the past.

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.
The response includes one of the following predictions.

- The community will collapse or be destabilized.
- The population sizes of some species will increase and others will decrease.
- Species diversity of the community will decrease.

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

The response includes the justification that the prey species of the Tasmanian devil would have increased in number as the Tasmanian devil population decreased, likely leading to population decreases of the food sources for these prey species.