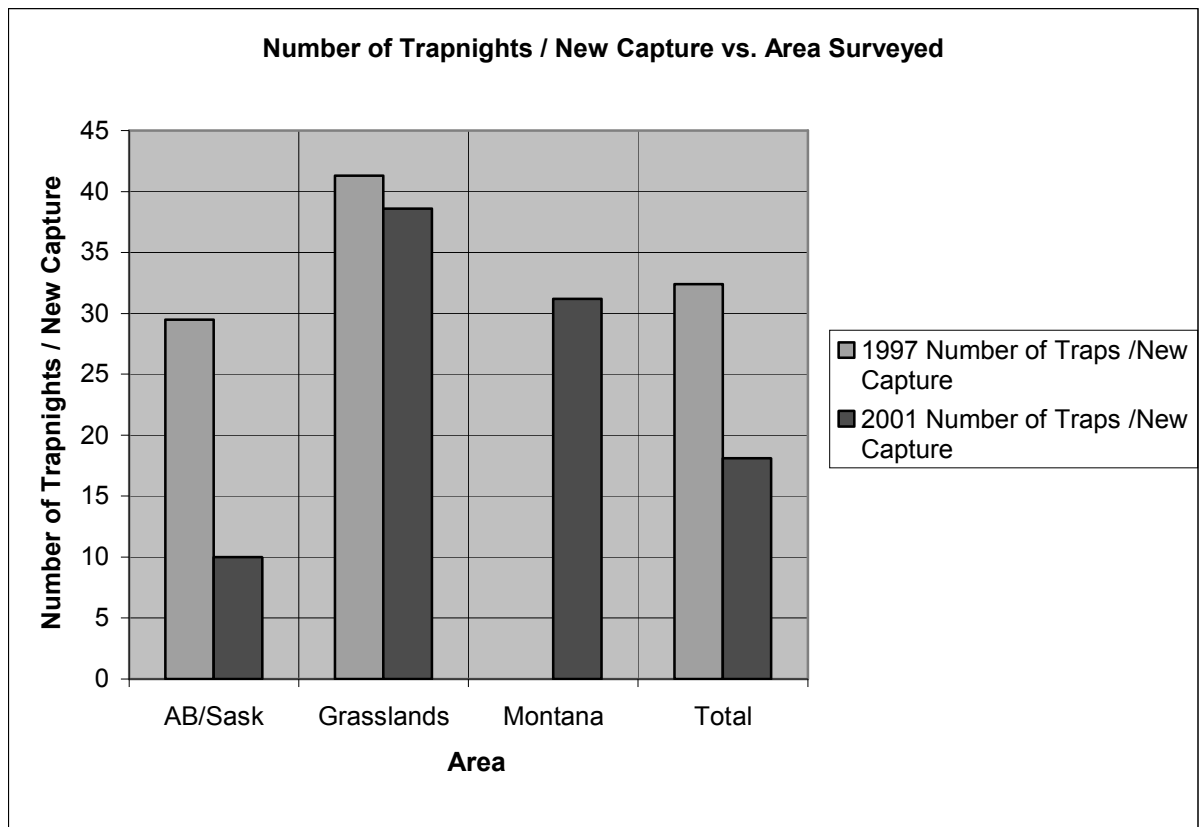**CHAPTER 3**

ANSWERS

Challenge Analysis: Swift Fox Survey Answers

BLM 3.3.8A

1. a) (4 marks)
   - You should prepare a bar graph with the locations on the *x*-axis, the number of trap nights/new capture on the *y*-axis, and bars of a different colour or pattern for each year of the study. A descriptive caption should appear below the graph. The axes should be clearly labelled and the scale should be indicated. The graph can be neatly drawn or computer generated. A legend describing the colour or pattern used for each year of the study must be included.

Number of Trapnights / New Capture vs. Area Surveyed

   b) (2 marks)
   - Since the recapture rate is low, it indicates that the swift fox population is reproducing successfully in the wild and that the population primarily consists of wild-born individuals.

Challenge Analysis: Swift Fox Survey Answers

c) (4 marks)

Possible answers could include the following:

- Based on the number of foxes caught, you can infer that the population of swift foxes in the Alberta/Saskatchewan border is increasing. In this area, it is likely that natality (birth rate) is greater than mortality (death rate).
- Biotic factors leading to the increasing population could include: more food (Richardson's ground squirrels, small mammals, birds, insects, grasses, herbaceous plants) available, and therefore more energy for reproduction; less predation by coyotes, or golden eagles; lack of intraspecific competition.
- Abiotic factors: mild winters reducing stress on the swift fox, sufficient precipitation to sustain food sources and maintain water supply for the swift fox; any factor that makes conditions more favourable for the survival of the swift fox.

d) (2 marks)

Possible Answer:

- There could be higher mortality, lower reproduction, or higher dispersal in the Grasslands National Park Area than in the border area. Lack of food or increased number of predators may be limiting factors in the Grasslands National Park area.

e) (1 mark)

Possible Answer:

- The population size estimate was derived by taking the density of the foxes (e.g., for the border area: 9.3 foxes /100 m^2) and multiplying it by the total area (not just the area sampled).

f) (2 marks)

- These townships were selected because they have the habitat requirements for the swift foxes.
- Lack of access or time, or equipment restrictions likely limited the researchers to the selected townships.

CHAPTER 3	Challenge Analysis: Swift Fox Survey Answers	BLM 3.3.8A
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g) (2 marks)
   Possible responses include the following:
   - Research sustainable agricultural practices that maintain habitat for swift foxes
   - Research habitat needs of the swift fox to enable protection of critical swift fox areas
   - Research to determine if the population size is large enough to be stable on its own or if further reintroductions need to happen
   - Research into effective education programs for industry, landowners, and the public to increase awareness of swift foxes
   - Continue to monitor the swift fox populations
   - Possible technologies to use: radio tracking

Marking Guide

Question	Marks	Assessment Guidelines
1. a)	4	• Graph type is appropriate • Axes are appropriately labelled • Scales of both axes are correct • Title of graph is clear, accurately represents the data
b)	2	• The student explains that a low recapture rate means the population is reproducing successfully in the wild. • The student indicates that the population primarily consists of wild-born individuals.
c)	4	• The student indicates that the overall population appears to have tripled in these areas over four years. The increase is primarily due to a surge in swift fox numbers in the Alberta/Saskatchewan border area. (1 mark) • Student should identify any TWO of the following biotic factors: burrowing owls, Richardson's ground squirrels, small mammals, birds, insects, grasses, herbaceous plants, coyotes, golden eagles. (2 marks) • Student should identify ONE of the following abiotic factors: temperature, wind, lack of moisture, snowfall, intense sunlight. (1 mark)
d)	2	• Students should indicate that there could be higher mortality, lower reproduction, or higher dispersal from the Grasslands National Park Area than from the border area. (1 mark) • Students should also identify a limiting factor such as lack of food or increased number of predators that may be affecting the population in the Grassland National Park area. (1 mark)

Challenge Analysis: Swift Fox Survey Answers

e)	1	• Student response should include the population size estimate was derived by taking the density of the foxes (e.g., for the border area 9.3 foxes /100 m^2) and multiplying it by the total area (not just the area sampled)
f)	2	• Student response should suggest these townships have the habitat requirements for the swift foxes (1 mark) • Student response should include ONE of the following: lack of access or time, or equipment restrictions (1 mark)
g)	2	Student responses should include ONE of the following: • Research sustainable agricultural practices that maintain habitat for swift foxes, OR • Further research into habitat needs of the swift fox so that protection of critical swift fox areas occurs, OR • Research to determine if the population size is large enough to be stable on its own or if further reintroductions need to happen, OR • Research into effective education programs for industry, landowners, and the public to increase awareness of swift foxes, OR • Continue to monitor the swift fox populations. (1 mark) • Possible technological development: any one of the following: radio tracking, GPS, or other reasonable technology (1 mark)