CaseDrill

CANADIAN WILDLIFE FEDERATION

Strategy
Non-Profit

Medium difficulty
Interviewer-led case

This case discusses the decline of an animal population. It all elements of the case interview scorecard except creativity. It involves an unusual question to structure.

A video of this case is available in the Interview Prep Course.

Problem definition

Your client is the Canadian Wildlife Federation (CWF). This government affiliated non-profit organization aims to educate Canadians about wildlife and promote responsible human actions and conservation. One particular endangered species population, the swift fox, has been declining dramatically.

CWF has contacted your firm to help them figure out what is causing this population decline and what they can do to stop it from declining any further.

Additional information

If asked, please share that:

- Swift fox populations were historically stable until this past year
- No specific targets for the population recovery
- The swift fox is an omnivore
- Environmental factors have remained relatively unchanged over time
- CWF is particularly concerned with a new outbreak of a deadly gastrointestinal disease that has affected several forests of Canada, including the habitat of the swift fox
- There are no hunting licenses for swift foxes

Question 1 (Structuring)

What factors would you consider to answer the client's questions?

Possible answer

1. *Fewer births*
   a. *Deterioration in health factors*
   b. *Increase in gender imbalance*

2. *More deaths*
   a. *Increase in hunting*
   b. *Shortage of food, water or shelters*
   c. *Increase in occurrence of diseases*

3. *Increased net migration (departures – arrivals)*
   a. *Destruction or change of habitat*
   b. *Increase in human interference*

Question 2 (Judgement and insights)

The swift fox population was separated into four groups (clouds) by the construction of new interprovincial highways five years ago. We have gathered the following data about the swift fox population habitat and demographics, for each of these four groups [share Exhibit 1 and Exhibit 2].

What can you conclude from these exhibits?

Possible answer

Exhibit 1 illustrates how the four groups are organized around the new interprovincial highways, and Exhibit 2 compares the populations of each group in terms of population size, gender and disease spread.

Several key insights can be drawn from these:

- *The gender distribution is unbalanced. Only one group has a 50-50 distribution. Groups A, B and D have more females than males.*
- *The highway has disproportionately split the population, which may have impacted the gender imbalance and in turn, the birth rate*
- *The rate of disease is inconsistent and seemingly high for three of the four groups. This could be related to the environment on either side of the highway*
- *There is no correlation between the rate of disease and the size of population or gender balance*
- *It is not clear what has caused the gender imbalance – maybe males travel further away and are more likely to be killed crossing the highways?*

The population decline seems to be due to the spread of the disease and gender imbalance within groups. Additional analysis would be required to investigate the nature of the disease, methods for disease reduction, and ways to rebalance the gender mix.

Exhibit 1: Current swift fox population habitat

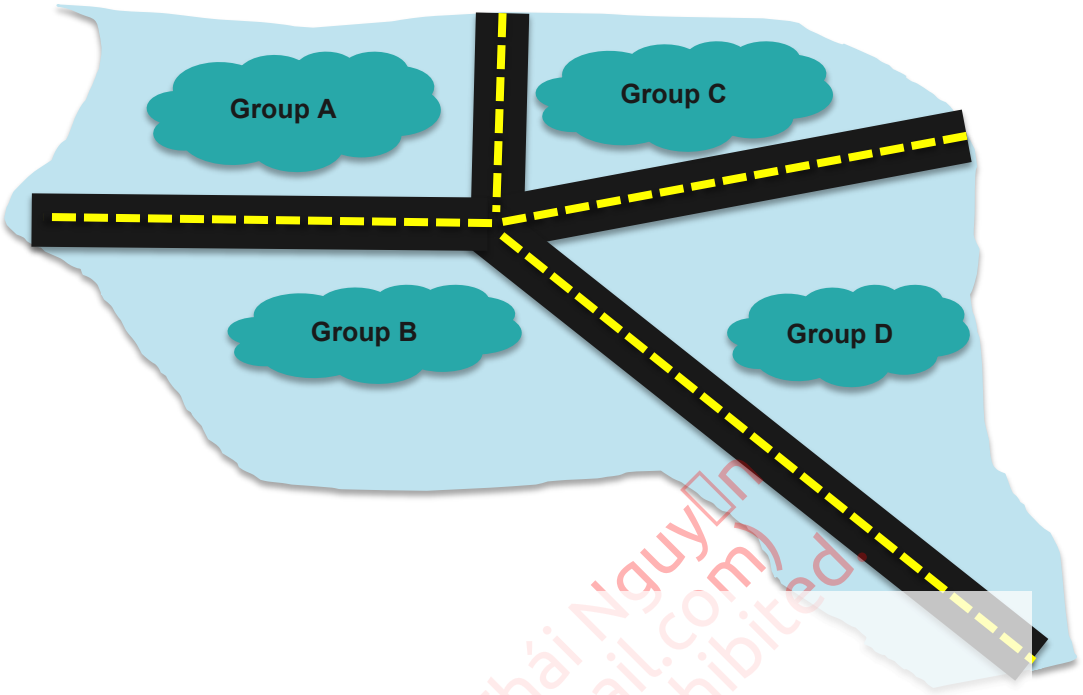

Exhibit 2: Swift fox demographics for the four groups

Group	Fraction of population	Percent male	Percent female	Population affected by disease (%)
A	1/4	10%	90%	25%
B	1/8	30%	70%	40%
C	3/8	50%	50%	10%
D	1/4	40%	60%	5%

Question 3 (Numeracy)

The client is intrigued by what you found in the exhibits and is really curious to understand how impactful the disease and gender disparity are on the overall population.

By how much would you expect the population to decline next year, based on these two issues?

Additional information

Share this information if asked by the candidate:

- There are 5000 swift foxes
- Swift foxes choose only one mate for life
- Mating season occurs once per year (1 litter is born), but pairs mate once every five years
- Diseased foxes can give birth
- The average fox litter yields 1.5 foxes
- All deaths not caused by disease are natural
- Life expectancy is 10 years, but fox with the disease only live one year
- Net migration is zero

Possible answer

∆ population = New births next year – Deaths next year

*New births next year = Number of pairs possible * Average birth per pair per year*

*Average birth per pair per year = Number of births per litter * Total litters per life / Life expectancy*
*= 1.5 * 2 / 10 = 0.3*
The number of possible pairs is constrained by the lower sex percentage (i.e., if there are only 10 males and 90 females, there can only be 10 pairs)

Group	Fraction of population	Total population	Lower sex percentage	Number of pairs possible
A	1/4	1250	10%	125
B	1/8	625	30%	~190
C	3/8	1875	50%	~940
D	1/4	1250	40%	500
Total				~1750

New births next year = 1750 x 0.3 = 525

Deaths next year = Deaths by disease next year + Natural deaths next year

Natural deaths next year = Healthy population / Life expectancy

Group	Total population	% diseased	Deaths by disease	Healthy population
A	1250	25%	~310	940
B	625	40%	250	375
C	1875	10%	~190	1685
D	1250	5%	~60	1190
Total			~810	~4190

Natural deaths next year = (940 + 375 + 1865 + 1190) / 10 = ~420

∆ population = 525 – 810 – 420 = - 705 = ~ 14% of the current population

14% decline next year is a highly concerning rate
number of births. Without the disease, the population would be essentially stable, growing by 0.5% (525 – 500 = 25)/5000, which seems acceptable.
The decline in fox population can be overcome by reducing the disease-related deaths and increasing births. To reduce disease-related deaths, CWF should identify cures to the gastrointestinal disease, separate diseased foxes from the rest to avoid contamination, and identify and eliminate the source of the disease. To increase births, CWF should look into the causes of the gender imbalance, and address them so that male population can be restored in groups A, B and D.

Question 4 (Synthesis)

The chairman of the Canadian Wildlife Federation has an upcoming public statement and would love to include a few pieces of insight to update the local community on plans to save the swift fox. She has asked you to provide a thirty second synopsis of key findings, so that she can share them in her public statement.

What would you tell her?

Possible answer

You have asked us to investigate what is causing the dramatic decline in the swift fox population, and investigate potential solutions.

We have found that fox population is declining at a rate of 14% each year mostly due to a gastrointestinal disease that is reducing life expectancy from 10 years to 1 year and of gender imbalance.

In the next couple weeks, we will run several additional analyses to refine our recommendations. First, we will create a cure and eradicate plan and identify the capital and time that would be required. Second, we will analyze the root cause of the gender imbalance to establish a rebalancing strategy.