In the Boyce Lab, Mark and his team develop mathematical models to investigate how wildlife populations will respond to different management strategies. © Mark Boyce

Conservation ecology and wildlife management

with Professor Mark Boyce, Kathryn Vaughan and Gillian Power

Talking *points*

Knowledge & Comprehension

1. Why are populations of wild animals managed, and what methods are used to manage them?
2. What is a winter severity index, and why is it important for wildlife management?

Application

3. How could a wildlife manager apply the Hydra Effect and Volterra Principle to increase moose populations?
4. What practical measures could farmers and conservationists take to prevent bighorn sheep and domestic livestock from coming into contact?

Analysis

5. Why do you think public opinion about wildlife management strategies does not always align with scientific advice? What challenges do you think wildlife managers face in these situations?
6. Predator population sizes are almost always smaller than prey population sizes. Why do you think this is? To what extent do you think this affects predators' vulnerability to population crashes?

Evaluation

7. To what extent do you think the principles of population ecology could be used to make predictions about human population changes? What are the similarities and differences between human and wildlife populations, and how would this affect population models?

Creativity

8. Think of three wild animal species in your country that interact (e.g., predators and prey, living in the same habitat, competing for the same food). If humans disappeared overnight, what do you think would happen to these animal populations over the following few years, and why? Draw on the article to justify your predictions.

Activity

For each of the scenarios below, use the following empty graph as your base. Make predictions about what you think would happen to the populations over time given the conditions indicated. Copy the graph for each scenario and add a line showing your predicted population size over time. Use the information in the article and your own thoughts to inform your graphs. Remember to add units to the axes.

1. 50 deer are introduced to a large non-seasonal island with abundant food (i.e., vegetation) and no predators.
2. 50 deer are introduced to a small non-seasonal island with no predators. Vegetation grows at a rate to support a maximum of 70 deer per year.
3. 50 deer are introduced to a large temperate island that has summers with abundant vegetation and very harsh winters with high snowfall and scarce food. There are no predators.
4. 50 deer currently live on a large non-seasonal island with abundant vegetation and no predators. A deer disease arrives that has a mortality rate of 80%.
5. 50 deer currently live on a large non-seasonal island with abundant vegetation. 5 wolves are introduced. *Draw lines for both wolves and deer.*
6. 100 deer and 10 wolves currently live on a large non-seasonal island. Hunters kill 3 wolves every year. *Draw lines for both wolves and deer.*
7. 100 deer and 10 wolves currently live on a large non-seasonal island. Hunters kill 3 wolves and 30 deer every year. *Draw lines for both wolves and deer.*

Once complete, compare your graphs with a classmate. How similar were your predictions? Discuss how you arrived at your different population predictions.

Then, create your own predator-prey population scenario. This should include initial predator and prey population sizes, island size, island seasonality, availability of vegetation, presence/absence of disease, presence/absence of hunters, and any other factors that could impact populations. Challenge your classmate to draw a graph to predict how the populations will change.