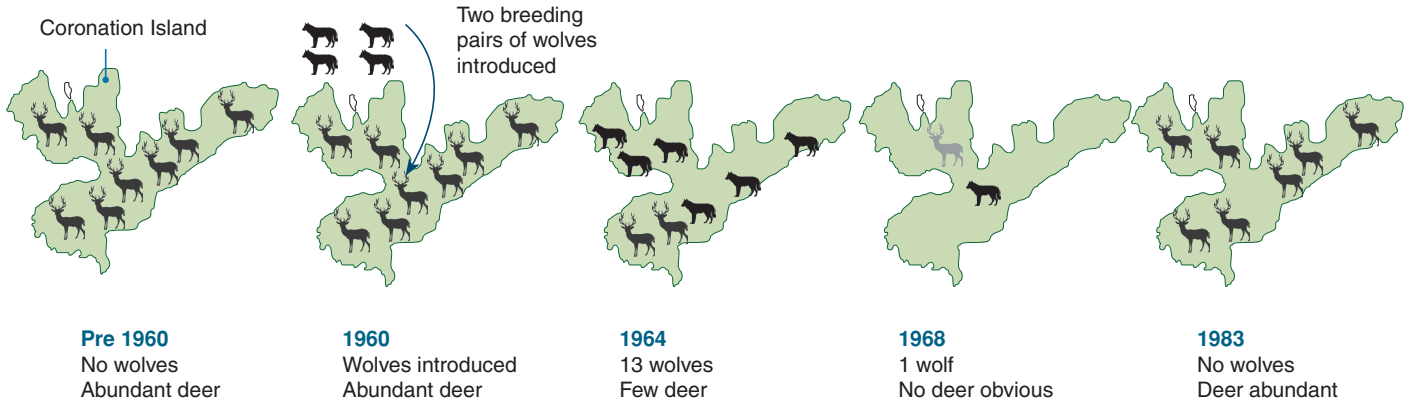


A Case Study in Carrying Capacity

Key Question: What evidence do we have for the carrying capacity of ecosystems?

The introduction of wolves to Coronation Island, Alaska, was a classic example of an experiment that failed in its aims but revealed a lot about the carrying capacity of ecosystems. Coronation Island is a small island and includes 78 km² of

wilderness area. In 1960, the Alaska Department of Fish and Game released two breeding pairs of wolves onto the island. Their aim was to control the sitka black-tailed deer, which had been overgrazing the land. They had expected the wolves would control the deer and the ecosystem would recover. What happened was entirely different.



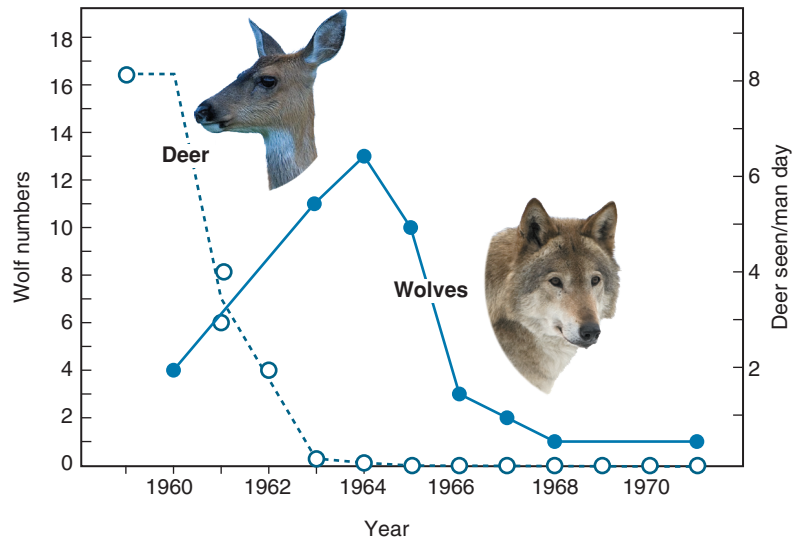
The experiment and its results

Introduction of the wolves in 1960 initially appeared to have the desired effect. The wolves preyed on the abundant deer and bred successfully. Deer numbers fell dramatically (right). However, within a few years the deer numbers completely crashed. The wolves ran out of food (deer) and began eating each other. Within 8 years of the wolves being introduced, only one wolf remained on the island. By 1983, wolves were absent and the deer were once again abundant.

What went wrong?

- ▶ The study showed Coronation Island was too small to sustain both wolf and deer populations.
- ▶ The deer could not easily find refuge from the wolves, so their numbers were quickly reduced.
- ▶ Reproductive rates in the deer may have been low because of poor forage following years of overgrazing. When wolves were introduced, predation and low reproductive rates, caused deer to decline.
- ▶ The deer were the only food source for the wolves. When deer became scarce the wolves lacked other prey and resorted to cannibalism.

Number of wolves and relative deer density on Coronation Is.



Above: Following the introduction of wolves to Coronation Island, deer numbers were reduced to the point they were rarely seen.

Data: The introduction, increase, and demise of wolves on Coronation Island, Alaska, David F. Klein (chapter in "The Ecology and Conservation of Wolves in a Changing World, Canadian Circumpolar Institute).

1. Why was the introduction of wolves to Coronation island considered a failure in terms of its aims? _____

2. What factors contributed to the observed results? _____

3. What did the results tell ecologists about the carrying capacity of this ecosystem? _____

