Deer: Predation or Starvation?

Science Film Festival — Knowledge Through Entertainment

Answer Sheet

Introduction: In 1970 the deer population of an island forest reserve was about 2000 animals. Although the island had excellent vegetation for feeding, the food supply obviously had limits. Thus, the forest management personnel feared that overgrazing might lead to mass starvation. Since the area was too remote for hunters, the wildlife service decided to bring in natural predators to control the deer population. It was hoped that natural predation would keep the deer population from becoming too large and also increase the deer quality (or health), as predators often eliminate the weaker members of the herd. In 1971, ten wolves were flown into the island.

The results of this program are shown in the following table. The population change is the number of deer born minus the number of deer that died during that year. The herd population started at 2000 when this study began.

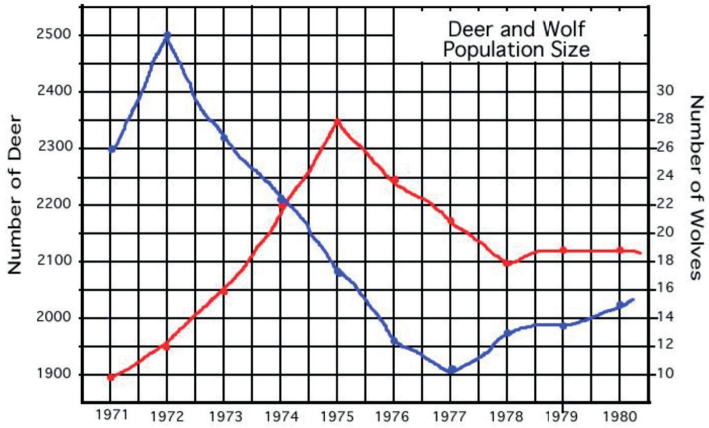
- Calculate the number of deaths (predation + starvation).
- To determine the deer population change, subtract the number of deaths from births (births - deaths), this can be a positive number, indicating growth, or a negative number which indicates a population decline.
- Calculate the deer population by adding/subtracting the population change from the population the year before
- The first row (1971) has been completed for you as an example.
- Graph the deer and wolf populations as two lines (color and label). Use one color to show deer populations and another color to show wolf populations.

Year	Wolf Population	Deer Births	Predation	Starvation	Number of deaths	Deer Population Change	Deer Population
1970	starting population, data unknown for prior year						2000
1971	10	800	400	100	500	+300	2300
1972	12	920	480	240	720	+200	2500
1973	16	1,000	640	500	1140	-140	2360
1974	22	944	880	180	1060	-116	2244
1975	28	996	1,120	26	1146	-150	2094
1976	24	836	960	2	962	-126	1968
1977	21	788	840	0	840	-52	1916
1978	18	766	720	0	720	+46	1962
1979	19	780	760	0	760	+20	1982
1980	19	790	760	0	760	+30	2012

The overall trend that is seen is that as the deer populations began to decline, so did the wolf populations, what is knowns as a predator-prey cycle.

Deer: Predation or Starvation?

Science Film Festival
Knowledge Through Entertainment



Graph similar to above, students will have difficulty placing two lines on the graph because the left axis scale (deer) is different from the right axis (wolf), plus many of the numbers need to be estimated on the lines for the deer populations.

Analysis

1. Describe what happened to the deer population between 1971 and 1980.
Deep populations went up, then went down and then started to increase.

2. When was the wolf population the highest? What is the relationship between the number of wolves and the number of deer?
The wolf population was highest in 1975, after that, the population started to decline. As the number of deer increased, so did the number of wolves. As the number of deer decreased (presumably being eaten by wolves) then so did the number of wolves. This is a typical predator prey cycle, though the graph only shows part of the cycle. Around 1978 the deer population starts to recover.

3. What do you think would have happened to the deer on the island had wolves NOT been introduced?
Deer populations would have continued to increase and not had the sharp decline. It is also possible that the decline of deer was also due to starvation and not just predation. Without wolves, the deer would have eventually used all the resources and starved. This is a good discussion point to talk about the impact on OTHER animals when resources are depleted. Animals, like rabbits and birds may be affected if deer eat all the plants.

4. Zero population growth occurs when a population has the same number of individuals entering the population (births) as those leaving the population (deaths). This results in very little change in the overall population numbers. In which year, was the deer population closest to ZPG? How do you know?
In 1979, the change was +20, though it wasn't exactly ZPG is was the year where the lowest amount of change occurred in the deer numbers.