The Kaibab Deer Story

Class Copy

**Purpose**

To analyze the unforeseen and disastrous consequences which accompanied the interference in a stably balanced prey-predator relationship on the Kaibab Plateau in Arizona during the early 1900s.

**Background**

Even though predation destroys members of a prey population, it can often be beneficial to the prey population as a group. This and the fact that human beings are capable of “unenlightened interference” in natural communities is illustrated by the Kaibab deer study.

A stable predator-prey relationship among the deer, coyote, mountain lion, and wolf populations existed on the Kaibab Plateau before 1907. The deer herd was healthy, as was the range which normally had the capacity to support 30,000 deer. In an effort to benefit the deer population, a massive campaign to exterminate the deer’s predators was waged beginning in 1907. During the next 16 years, 3000 coyotes, 600 mountain lions, and 11 wolves were killed. The deer population exploded, its peak population greatly exceeding the capacity of the range to support such a large number of individuals. Consequently, during the next two years, more than half the deer starved to death. Thereafter the deer populations declined more slowly until, in 1979, it reached 10,000. Unfortunately, the range had so deteriorated that its carrying capacity had declined to about 8000 deer. As the range continued to be overgrazed, starvation continued to kill more deer that the predators ever had.

**Procedures**

Glue the graph, which depicts the history of the Kaibab deer populations, into your journal. Use it to answer the following questions:

1. In what year did the park rangers begin to reduce the deer’s predator populations?
2. Estimate the size of the stable deer population prior to the date of interference.
3. Estimate the size of the deer population at its peak.
4. Set up the following ratio: size of peak population to size normal carrying capacity population. By what factor or ratio had the deer population grown?
5. By what factor had the normal carrying capacity of the range been stretched?
6. What happened to the deep population in 1924?
7. What caused the carrying capacity of the Plateau do drop from normal (30,000 deer) to about 8,000?
8. The normal carrying capacity of the range was 30,000 deer, yet the stable population was only a small fraction of 30,000. Why?
9. Between 1907 and 1923 the populations density of deer (i.e. the number of individuals concentrated in a given space) increased by factor of 25. Usually, density affects a population by restricting the amount of available food. List another reason why heavy densities often react unfavorably on populations.
10. Estimate the dates of the following occurrences:
    1. First warning that range damage was occurring.
    2. First fawn died.
    3. Seven successive warnings given in one year.
11. During the sixteen years following the population maximum, 132 additional mountain lions and 4388 more coyotes were removed from the range. Give possible reasons for the continued extermination of deer predators.

**Conclusion**

1. Write a paragraph which links the Kaibab deer story to the growth of the human population on Earth. Be sure to include the following terms in your paragraph:
   1. predators (include disease organisms)
   2. carrying capacity
   3. population density
   4. humankind’s awareness of the situation

**References:** Adapted from a worksheet activity developed by Mr. Andrew Gassmann, Aurora Central High School, Aurora Colorado. *Principles of Animal Ecology.* W.C. Alice, et.al., W.B. Saunders Co., Philadelphia, 1955. pp.706-707.

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