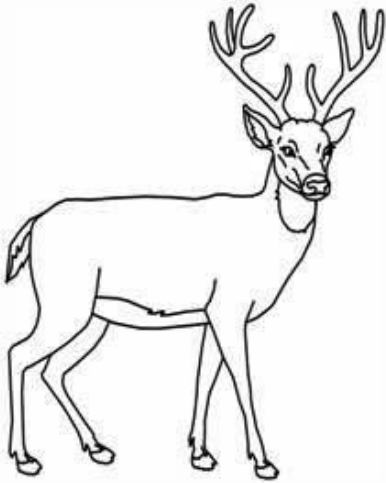


# Lesson of the Kaibab

## Introduction



The environment may be altered by forces within the biotic community, as well as by relationships between organisms and the physical environment. The **carrying capacity** of an ecosystem is the maximum number of organisms that an area can support on a sustained basis. The density of a population may produce such profound changes in the environment that the environment becomes unsuitable for the survival of that species. For instance, overgrazing of land may make the land unable to support the grazing of animals that lived there.

## Objectives

- Graph data on the Kaibab deer population of Arizona from 1905 to 1939
- Determine factors responsible for the changing populations
- Determine the carrying capacity of the Kaibab Plateau

## Background

Before 1905, the deer on the Kaibab Plateau were estimated to number about 4000. The average carrying capacity of the range was then estimated to be about 30,000 deer. On November 28th, 1906, President Theodore Roosevelt created the Grand Canyon National Game Preserve to protect the "finest deer herd in America."

Unfortunately, by this time the Kaibab forest area had already been overgrazed by sheep, cattle, and horses. Most of the tall grasses had been eliminated. The first step to protect the deer was to ban all hunting. In addition, in 1907, The Forest Service tried to exterminate the predators of the deer. Between 1907 and 1939, 816 mountain lions, 20 wolves, 7388 coyotes and more than 500 bobcats were killed.

Signs that the deer population was out of control began to appear as early as 1920 - the range was beginning to deteriorate rapidly. The Forest Service reduced the number of livestock grazing permits. By 1923, the deer were reported to be on the verge of starvation and the range conditions were described as "deplorable."

The Kaibab Deer Investigating Committee recommended that all livestock not owned by local residents be removed immediately from the range and that the number of deer be cut in half as quickly as possible. Hunting was reopened, and during the fall of 1924, 675 deer were killed by hunters. However, these deer represented only one-tenth the number of deer that had been born that spring. Over the next two winters, it is estimated that 60,000 deer starved to death.

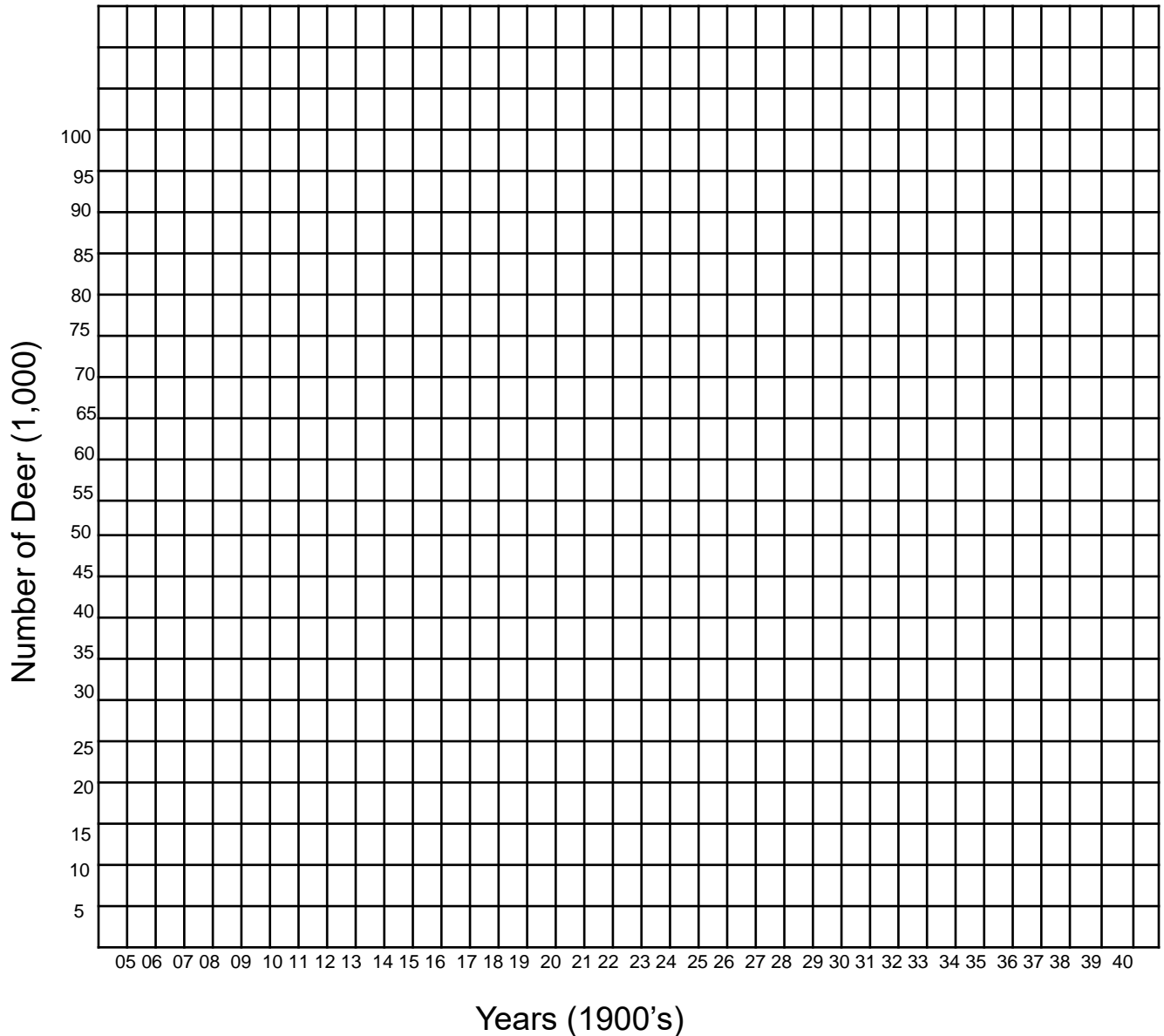
Today, the Arizona Game Commission carefully manages the Kaibab area with regulations geared to specific local needs. Hunting permits are issued to keep the deer in balance with their range. Predators are protected to help keep herds in balance with food supplies. Tragic winter losses can be checked by keeping the number of deer near the carrying capacity of the range.

## Data

1. Graph the deer population data. Place time on the X axis and "number of deer" on the Y axis
2. Use a red colored pencil and draw a horizontal line representing the estimated carrying capacity

DATA TABLE					
Year	Deer Population	Year	Deer Population	Year	Deer Population
1905	4,000	1925	60,000	1930	25,000
1910	9,000	1926	40,000	1931	20,000
1915	25,000	1927	37,000	1935	18,000
1920	65,000	1928	35,000	1939	10,000
1924	100,000	1929	30,000	1940	20,000

Deer Population in the Kaibab



## **Analysis**

1. What effect did removing the predators have on the deer population?
2. What effect did removing the competing species have on the deer population?
3. What happened to the deer population, once all the predators and competition had been removed?
4. What happened to the deer population, once its population went below the carrying capacity?
5. Do you agree that 30,000 deer is the carrying capacity for the Kaibab? Explain your answer:
6. How is the deer population managed today?
7. What were the lessons the wildlife managers learned through this experience in the Kaibab?