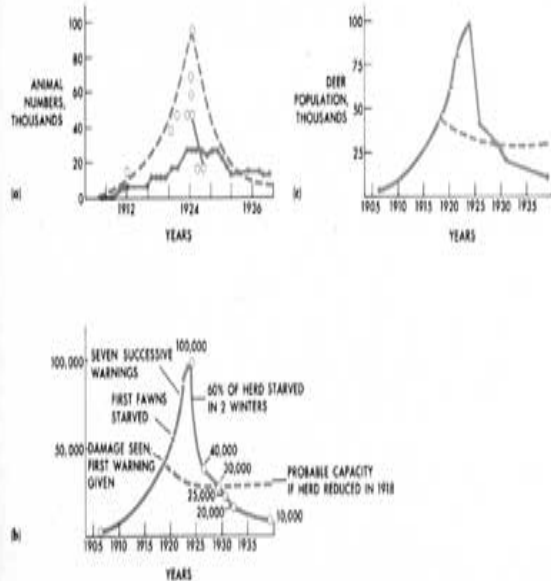


The Kaibab Deer Case: Myth or Reality?

For many years ecologists have repeated an account of how predators control their prey populations, using as an example the history of the deer on the Kaibab Plateau, a wilderness area near the Grand Canyon. Shortly after 1907, when a national park was created in this area, conservationists attempted to protect the wild deer by prohibiting hunting and simultaneously eliminating natural predators.

In the period from 1920 to 1930 it was reported that the deer herd had undergone a population "explosion" (Diagram A, graph a). No detailed census data were obtained, but various visitors and game wardens estimated that the population tripled or perhaps quadrupled over a period of 20 years. Although it seemed

Diagram A Population changes in the Kaibab deer herd. (a) Population estimate of the Kaibab deer herd, from Rasmussen (1941). Linked solid circles are the forest supervisor's estimates, circles give other people's estimates, and the dashed line is Rasmussen's own estimate of a trend. (b) Interpretation of the trend by the ecologist Leopold in 1943. (c) The trend represented by Davis and Colley (1963). (After Caughley, 1970.)



obvious at the time that the population had increased, it was far from clear what mechanisms produced the increase.

It was first assumed that the increase resulted from people's shooting most of the predators and thereby allowing the prey, the deer herd, to increase. Other variables may have been equally important, however. For example, before the land became a national park, parts of it had been used by ranchers for grazing cattle. Furthermore, natural and accidental fires had often caused much burning of the grasslands on the plateau. Prior to 1907, fire and grazing kept the vegetation available to the deer at a minimum. The "explosion" in the deer population by 1930 could as plausibly have been explained by patterns of land use, as by a "release" from predation. The important point to emphasize is that it was simply assumed that a lack of predators caused the rise in deer population. The hypothesis was never carefully tested. As more ecologists and textbooks (including earlier editions of this one!) repeated the hypothesis, it became accepted as a fact.

Even more unfortunate is the way in which the original "estimates" were continually reinterpreted to produce the appearance of stronger "evidence," as indicated by Diagram A, graphs b and c. This process of "smoothing" data to provide more "convenient" diagrams occurs all

too frequently in both biological and social sciences. You will recall the earlier discussion of how the number of chromosomes in human cells had long been incorrectly observed because people "knew" what to expect. It is only through renewed study by other investigators who provided critical reexamination of previous reports that these myths are identified. The 1970 reexamination of the Kaibab deer case by G. Caughley is an example of the importance of studying original data, rather than accepting it at face value from textbooks. Textbooks (the present not excepted) are often notorious for perpetuating accepted dogma in a field without reexamining the original data.

In ecology, because of the long periods of time over which natural events occur, it is extremely difficult to repeat some studies. Thus it becomes much more crucial that field experiments be extremely well designed from the beginning. Field ecologists cannot usually assume great potential reproducibility of their experiments by other investigators if their studies require decades to complete and if the natural communities are undergoing large-scale responses to changes in climate, successional development, or human interference. Likewise, students must be especially critical of ecological reports that "overinterpret" limited sets of data.