

Prairie dogs – an endangered keystone species?

“Keystone (noun): 1. the wedge-shaped piece at the crown of an arch that locks the other pieces in place. 2. something on which associated things depend for support.” – Webster’s Dictionary.

“Keystone Species: A keystone species is a species that exerts great influence on an ecosystem relative to its abundance.” – Wikipedia.

Will the extinction of a single species in a community cause the loss of many others? Can we identify a set of species that are so important in determining the ecological functioning of a community that they warrant special conservation efforts? The answer to these questions hinges on the existence of a limited number of species whose loss would precipitate many further extinctions; these species have often been labeled **keystone species**.

The term keystone species has enjoyed an enduring popularity in the ecological literature since its introduction by Robert T. Paine in 1969, based on his research documenting the effect of *Pisaster* starfish on the intertidal community along the coast of Washington state. Although *Pisaster* are relatively rare predators, they have a disproportionate impact on the diversity of species living along the coast between high tide and low tide. Experimental removal of *Pisaster* leads to a drop in species diversity, as a single common mussel overgrows the rocky shores. Similar kinds of disproportionate impacts have been seen for other species, such as sea otters maintaining diversity of undersea kelp forests, fig wasps promoting production of a key food resource for tropical forest birds and mammals, and grizzly bears transferring nutrients from aquatic to terrestrial habitats in the areas where they live.

Paine's work and the concept of keystone species has been cited by hundreds of researchers over the years, and it has been proposed as a foundation for management efforts to protect the biological diversity of the world's ecosystems. "Its importance," says Paine, "is that it convinced managers and conservationists alike that the ecological impact of single species matters. That is, in order to manage, understand, and restore ecological assemblages, the roles of individual species have to be understood and considered."

Prairie dogs: Public attitudes toward prairie dogs range from cute little critters to nasty varmints. Conservationists suggest that they are keystone species for our western prairies, and should be protected if we are to restore and maintain these grasslands. How can we tell if this is the case?

Group work:

1. Develop a list of ways that prairie dogs could have an impact on the grassland ecosystems in which they are found and on the other species with which they coexist. Based on these interactions, would loss of prairie dogs lead to the extinction of other species?
2. Select one of your potential roles for prairie dogs in the grassland ecosystem and develop an experimental design that would allow you to test for the impacts of prairie dogs.

