NAME:_____DATE:_____PER:_____

Populations and Carrying Capacity

READ RETRIEVE CONNECT & USE

Next Generation Sunshine State Standard
SC.912.L.17.5: Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.

Common Core Scientific Literacy Standard
Analyze the structure of relationships among concepts in a text, including relationships among key terms..

Presence Of Wolves Allows Aspen Recovery In Yellowstone

ScienceDaily (July 26, 2007) — The wolves are back, and for the first time in more than 50 years, young aspen trees are growing again in the northern range of Yellowstone National Park.

The findings of a new study, just published in Biological Conservation, show that a process called "the ecology of fear" is at work, a balance has been restored to an important natural ecosystem, and aspen trees are surviving elk browsing for the first time in decades.

The research, done by forestry researchers at Oregon State University, supports theories about "trophic cascades" of ecological damage that can be caused when key predators -- in this case, wolves -- are removed from an ecosystem, and show that recovery is possible when the predators are returned. The results are especially encouraging for the health of America's first national park, but may also have implications for other areas of the West and other important predators.

After an absence of 70 years, wolves were re-introduced to Yellowstone Park in 1995, and elk populations began a steady decline, cut in half over the past decade. Also, the presence of a natural predator appears to have altered the behavior of the remaining elk, which in their fear of wolves tend to avoid browsing in certain areas where they feel most vulnerable. The two factors together have caused a significant reduction in elk browsing on young aspen shoots, allowing them to survive to heights where some are now above the animal browsing level.

The OSU researchers say they believe there are two forces at work -- both the lower populations of elk, and their changed behavior due to fear of wolves -- but it's difficult to determine exactly which force is the most significant.

"In riparian zones, where wolves can most easily sneak up on elk, and gullies or other features make it more difficult for elk to escape, we've seen the most aspen recovery," Ripple said. "We did not document nearly as much recovery in upland areas, at least so far, where elk apparently feel safer. But even there, aspen are growing better in areas with logs or debris that would make it more difficult for elk to move quickly."

This element of fear, the OSU scientists said, is a concept that is now getting more attention in ecology -- it factors in not just the numbers or species of animals, but also their behavior and the reasons for that behavior. Predators such as wolves or cougars, OSU researchers have shown, have the ability to strike fear into their prey and significantly change their behavior as a result.

Oregon State University (2007, July 26). Presence Of Wolves Allows Aspen Recovery In Yellowstone. *ScienceDaily*.

NAME:_____DATE:_____PER:_____

1. Read the article, "Presence Of Wolves Allows Aspen Recovery In Yellowstone." After reading the article (5-10 minutes), write down everything you can remember in the box below. The process of recalling the information is important, so do not return to the article at this point.

2. Return to the article if necessary and answer the following questions. You may also need to draw from your knowledge of biology and you should feel free to use your text or other resource.

a) Identify at least two biotic factors that influence elk population size.

b) How did the removal of wolves from Yellowstone result in a decreased population of aspen trees?

c) Why are elk grazing less on young aspen trees in riparian (near streams and rivers) zones?

d) How does the "ecology of fear" act as a limiting factor on the elk population?