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Research discovers why Yellowstone wolves stick close to home

Study uses mathematical modelling to determine why wolves slow to recolonize area

by Ryan Smith



Dr. Mark Lewis, director of the U of A Centre for Mathematical Biology, co-authored the study that discovered why wolves brought from Canada to Yellowstone National Park have been slow to disperse.

In 1995, 14 wolves were transferred to Yellowstone National Park in the U.S. from the Canadian Rocky Mountains, with 17 more joining them the following year. More than 1,000 healthy wolves have descended from the original 31, with about 150 of them still residing in the park boundaries. However, wolves have been known to disperse at a rate of 100 km a year, but the Yellowstone wolves have only spread at one-tenth that rate. The slow dispersal rate had stumped researchers across North America until a team of mathematical biologists at the University of Alberta recently solved the puzzle.

"When the wolves travelled far distances in their new environment it was easy for them to lose track of their mates, and the farther they travel the less likely it is for them to find a mate," said Dr. Mark Lewis, director of the U of A Centre for Mathematical Biology and a co-author of the study.

"We've shown that a reduced probability of finding mates at low densities slows the predicted rate of recolonization," added Amy Hurford, a former U of A biological sciences master's student and co-author of the study.

By the 1970s, wolves had been systematically hunted to extinction in the lower 48 states in order to protect livestock. But wolves were a keystone species in the area (i.e. they are predators and nobody preys upon them), and, after 30 years of extinction, researchers felt a reintroduction of the species would balance the burgeoning population of other animals in the area, such as elk and cougars.

The wolves have been doing well in their new environment, and researchers had considered the wolves' slow dispersal to be more puzzling than problematic, which is good news, because Lewis believes the slower-than-expected recolonization rate will continue.

"As long as they are dispersing into uncharted territory, we expect the population to continue spreading at the slow rate - about 10 km per year," said Lewis, the Canada Research Chair in Mathematical Biology.

The U of A researchers used radio tracking of wolves and computer simulation models to reach their conclusions. The research was published recently in the journal *Theoretical Population Biology*. "Who would have thought that you could use mathematical equations to understand the behaviour of wolves," Lewis said. "But that's what you can do in the field of mathematical biology. It's a newer field, but it's expanding rapidly."
