Wild KIDS

Unlocking the Mysteries of Wolf Territories

By Aaron and K.C. Morris

Intended for youth from upper-elementary to middle school

Vocabulary

Territory The area of an animal's home range that it defends from other animals

Territoriality The behavior of an animal or group of animals defending the area where they live

Simulation A computer model, or program, that imitates something that happens in real life so it can be studied

Benefit A positive or helpful result

Cost A negative or unhelpful result

Conservation The planned protection or care of an animal or natural place

A wolf pauses and raises her nose into the wind. She is scouting near the edge of her pack's **territory** to defend the area from other wolves. While stopped, she flexes her hind leg to urinate and leaves her scent to tell other wolves to keep away. She then moves on, but she will soon scent mark again along the boundary of her pack's territory—the space that has the resources her pack needs to survive and feed their young.

Scientists are interested in **territoriality**, also called territorial behavior, in wolves and other animals. They want to know if the size of an animal's territory is mostly affected by the amount of food available or by competition with other animals. An important idea in territoriality is that there should be more advantages, or good things, about defending a territory than disadvantages, or not-so-great things. Another way to think about this is to say that holding on to their territory must not be too hard for an animal to do. Recently, Dr. Sarah N. Sells and Michael S. Mitchell, scientists with the Montana Cooperative Wildlife Research Unit at the University of Montana, conducted a study to better understand how wild animals choose their territory.

International Wolf Center

How did they do the study?

Studying territorial behavior is challenging to do in the wild, so sometimes researchers use computer-based **simulations**. For this study about choosing a territory, the scientists used a computer to simulate (create a computer version of) different landscapes with different amounts of food and numbers of predators. The computer also placed "agents," or pretend animals, in the varying landscapes. These agents were programmed to act like territorial animals. In other words, each agent in the simulation was supposed to make choices about its territory that would give it more **benefits** (like plenty of food or fewer competing predators) and fewer **costs** (like not enough food or danger from many predators). The researchers did 8,100 simulations, and the agents in these simulations formed more than 458,000 territories in the simulated landscapes! The results from each simulation were recorded and studied for patterns.

What did they discover?

This study revealed the way an animal might choose its territory. Three important findings are:

1. Territories are smaller when there is lots of food available and when that food is clumped together in a small space. Territories like this are good because having lots of

food in a smaller area means the animal doesn't have to use up energy travelling around to find food. The researchers do say that the food available in a territory may change from one season to the next, which may influence the size of a territory, or an animal may need to shift its territory with the changing seasons.

2. Competition between animals of the same species can squeeze those animals into smaller territories. This is because competition between animals living near the edge of a territory may make defending it more difficult. This can mean that the advantages of keeping that part of the territory are not great enough to make the effort required to defend it worthwhile. In fact, sometimes too much competition means that an animal can't even get enough food to survive, so defending the territory just isn't practical.
3. An animal's ability to compete for resources like food affects its territory size. While one might think that more dominant, or powerful, animals would have bigger territories, this isn't always true. Dominant animals may be better at getting and defending smaller territories with lots of resources close together, meaning they don't have to travel as far to find what they need. Then, less dominant animals may be pushed into areas where resources are spread out. There, they can survive without being dominant, but it takes more work.

Both photos: Sarah Sells

Michael S. Mitchell, left, and Dr. Sarah N. Sells, below.

Why does it matter?

Computer-based simulations like the one created by scientists in this study can be used when making **conservation** decisions that protect animals or their habitats. For example, if conservationists wanted to decide whether an area where wolves previously lived would be a good place to establish new wolf packs by transferring animals from another location (a process called "reintroduction"), a computer simulation could help them think about how this decision might turn out. By including in their simulation the information about prey in the area, researchers could predict locations and sizes of future wolf territories. This important information would help them decide whether an area is a good match for their reintroduction goals. It could also be used to measure the success of a reintroduction program after it was started. ■

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A deeper look at territory defense in wolves

Wolves have three main ways to defend their territories from other wolves: scent marking, howling and direct attacks. These defenses work well together because they make wolves aware of other wolves' territory in different ways and leave violence as a last resort.

Scent marking occurs when a wolf leaves its scent, or smell, in an area through urine, scat (feces) or ground scrapes. Scent marks are one way for a wolf pack to say, "Hey! This is our territory!" Scent marks work at short distances and may last up to two to three weeks.

When pack members want to send the message over long distances that their territory belongs to them, **howling** is a better defense. Other wolves hear the howling from far away and know that it is telling them to stay away.

If scent marking and howling do not turn away other wolves, a **direct attack** by one wolf pack on another is possible. These attacks often lead to wolves killing each other. Most wolf deaths from other wolves happen near the boundary of territories.

Top left: Wendi Watson
Middle and bottom: International Wolf Center