Wilderness corridors may not benefit all

In the 1970s, a new idea began catching on among conservation ecologists: Leave strips of natural habitat between developed areas, such as farms and shopping malls, so that animals can travel undisturbed among otherwise isolated clumps of surrounding wilderness.

Researchers reasoned that such corridors, often called greenways, would allow wildlife and human populations to live intertwined without cloistering wild creatures into islands where they would eventually run out of resources and become dangerously inbred.

Greenways have become a cornerstone of conservation management in the past two decades. Now, however, a new study questions the efficacy of the corridor concept in preserving wild populations.

In one of the first controlled studies of wild animals' propensity to travel through corridors, researchers led by Daniel K. Rosenberg have found that 30 percent of an experimental group of salamanders failed to use corridors while journeying between clumps of moist, woodland habitat. Instead, these salamanders wandered into bare, inhospitable tracts where many died, the researchers found.

Rosenberg – a wildlife ecologist with the U.S. Forest Service's Redwood Sciences Laboratory in Arcata, Calif., and a doctoral student at Oregon State University in Corvallis – presented the findings in Honolulu this month at the joint annual meeting of the American Institute of Biological Sciences and the Ecological Society of America.

His group evaluated corridor use by placing 50 salamanders into each of two test plots shaped like plus signs. The first plot, which served as a control, consisted of five small clumps of shady, damp forest connected by narrow corridors of bare, scraped earth. The researchers left two corridors in the second, experimental plot filled with natural vegetation. They enclosed both plots with aluminum sheets pounded 10 inches into the ground to keep the salamanders from escaping.

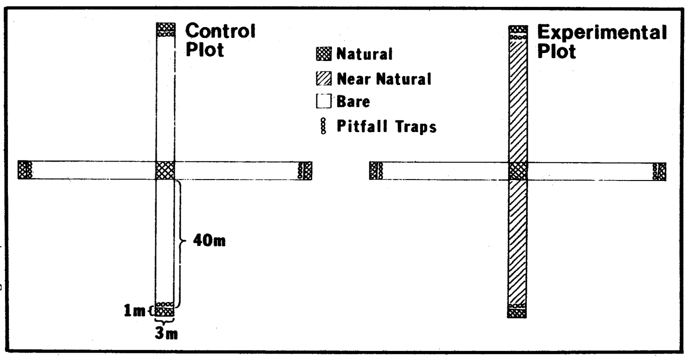
After two weeks, they found that nearly twice as many salamanders in the experimental plot used natural rather than bare corridors to travel to neighboring forest clumps. However, roughly one-third of the animals in the experimental plot strayed instead into the bare, dry tracts, where they either died of desiccation or fell into pitfall traps consisting of buried coffee cans. In contrast, in the control plot roughly equal numbers of salamanders traveled down each of the bare corridors, ruling out the possibility that the animals simply prefer to migrate in a given direction.

Rosenberg says the study, though preliminary, demonstrates the importance of the environment surrounding corridors, because many animals won't find their way into greenways. "Corridors may be a very good thing in some landscapes, but our study cautions against using corridors as a panacea in a poor landscape," he concludes.

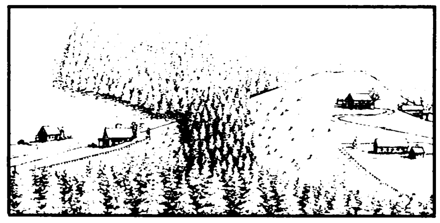
Thomas C. Edwards Jr. of the Utah Cooperative Fish and Wildlife Research Unit at Utah State University in Logan calls the new study "very intriguing." "There are tons of anecdotes about animals moving through corridors," he says, "but there have been few experimental studies to prove that animals consistently use them."

Larry D. Harris, a conservation biologist at the University of Florida in Gainesville, argues that "it doesn't matter" what proportion of wildlife uses a corridor. "Even if only 1 percent makes it through," he says, "that's 1 percent that wouldn't have made it otherwise." *– C. Ezzell*

John Megahan/U.S. Forest Service



Schematic drawings (left) depicting the two plots used to study corridor travel among salamanders. Below, a corridor winds between two human settlements.



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Colliding positrons, polarized electrons

The Stanford Linear Collider (SLC) is back in business. Since June, researchers at the facility have been collecting data generated by high-energy collisions between beams of polarized electrons and unpolarized positrons (the antimatter counterparts of electrons).

So far, the international team of more than 150 physicists working with the Stanford Large Detector has observed and recorded more than 10,000 collisions that produced Z particles. These elementary particles are among those carrying the so-called weak force, which is responsible for radioactive decay.

Earlier this month, at the International Conference on High-Energy Physics, held in Dallas, the researchers reported the results of analyses based on data from roughly 5,000 of these events. Their findings yielded a new measurement of a key parameter in the standard model of particle physics, which describes how the fundamental particles of matter interact with one another.

This achievement represents a belated victory for the innovative but trouble-plagued SLC, whose technical glitches cost it the race in 1989 with the 17-mile Large Electron-Positron ring at the European Center for Particle Physics in Geneva, Switzerland, to generate large numbers of Z particles (SN: 9/10/88, p.167; 9/2/89, p.159).

Upgraded in April to produce polarized electrons, whose spins are aligned in the direction of the beam, the SLC now allows researchers to probe more precisely certain kinds of interactions between elementary particles. No other high-energy accelerator in the world has this capability.

Polarized electrons are created by shining a powerful beam of polarized laser light on a specially prepared gallium arsenide surface. The ejected electrons gather into compact bunches and reach an energy of 46 billion electron-volts as they race down the SLC's 2-mile track to crash head-on into high-energy, unpolarized positrons traveling at the same speed.

Researchers can switch the electrons' direction of polarization back and forth between clockwise and anticlockwise by changing the polarization of the laser light. By comparing what happens when electrons "rotate" clockwise versus anticlockwise along the beam axis, Charles Baltay of Yale University, Martin Breidenbach of the Stanford Linear Accelerator Center, and their collaborators could for the first time study how this difference affects the production rate of Z particles.

From these data, they obtained a new measurement of the so-called Weinberg angle. In the standard model, this quantity determines the degree of "mixing" between the electromagnetic and weak forces. *– I. Peterson*