

# Ecological traps: Implications for the conservation of animal populations

**ACCORDING TO THE ECOLOGICAL THEORY** of source-sink dynamics, animals first fill up “sources”—habitat that allows good survival and reproduction—then move into “sinks,” less productive habitat. Movement from sources to sinks results in stable populations over time. However, an “ecological trap” can attract animals to lower-quality habitat first, causing the population to decline, even to the point of extinction. Habitats modified by human activities are the most likely to contain ecological traps, but pristine areas may also house them. Many case studies, mostly on birds, have proposed that traps include linear habitat corridors, artificial wetlands, and the entire prairie pothole region of the U.S. Midwest. A specific example is Cooper’s hawks (*Accipiter cooperii*) selecting Tucson, Arizona, as a nesting site even though the hawks contract the fatal disease trichomoniasis from eating pigeons there. The inability of organisms to adapt, either behaviorally or evolutionarily, seems to be the most important characteristic leading to their vulnerability to ecological traps. Because of this, ecological traps present a substantial management challenge. Managers are unlikely to be certain of the location, size, and implications of a suspected trap.

If traps do exist, then several questions confront managers: Where are the traps? Which species are most vulnerable? What measures can be used to identify a trap? How can managers incorporate this information into conservation planning? Often traps are found where rapid human-caused changes have occurred. More subtle changes include the expansion of invasive plants that provide poor habitat. Vulnerable species include those that must make quick assessments of habitat quality such as birds arriving on nesting grounds. Species that show little variation in habitat preferences are also at risk. Additionally, gene flow among some populations prevents local adaptation.

Because human-caused landscape changes are now commonplace, managers must take into account the possibility of ecological traps when managing animal population or planning conservation strategies. Any attempt to conserve animal populations, particularly in changing landscapes, may be severely complicated by the presence of ecological traps. Managers might consider solutions that improve habitat quality or discourage animals from settling in poor patches.

## Reference

Battin, J. 2004. When good animals love bad habitats: Ecological traps and the conservation of animal populations. *Conservation Biology* 18:1482–1491.

**James Battin** was a 2000 Canon Scholar from Northern Arizona University. He works for the National Marine Fisheries Service in a postdoctoral research position at the Northwest Fisheries Science Center in Washington.

