

ANNEXURE E
SCIENTIFIC PHENOMENA
The Vacuum Effect

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Scientific phenomena

Why not just relocate or eliminate the cats?

According to Alley Cat Allies, cats play a complex role in local ecosystems and cannot simply be removed from any environment without consequences. The scientific phenomena—“compensatory predation”, the “mesopredator release effect”, and the “vacuum effect”— illustrate why removing cats is harmful to the entire habitat, and why Trap-Neuter-Return is truly the best approach.

Compensatory Predation

Evidence suggests that cat predation is often “compensatory predation”—preying on animals that would likely have died anyway from disease or hunger. Studies show that the animals caught by predators are generally weaker and more diseased than those killed by manmade sources. These studies indicate that cats are catching what some biologists refer to as the “doomed surplus” — animals who would not have lived, and so whose death does not affect overall population levels.

Meso-predator Release Effect

Maintaining ecological balance is far more complicated than cats versus birds, predator versus prey. While cats sometimes might be the top predators in their environments, some of the animals they prey on are also predators, like rats. The predators who fall lower on the food chain are called “mesopredators”. They prey on certain species—in the case of rats, small or fledgling birds and bird eggs—while being prey to larger predators themselves.

Removing cats from the ecosystem can destabilize the relationships between the different predator and prey species, with dire consequences. On Amsterdam Island in the Indian Ocean, an attempt to eradicate feral cats to protect endangered birds caused a spike in the rat and mouse population. The rats and mice then preyed on the birds—making the cat eradication ineffective at conserving bird populations. Mathematical models in scientific studies project that cats, rats, and birds can find a balance where all three species coexist. But when the cats are removed in these simulations, the rat population surges out of control, wiping out the birds completely. Although the cats in this scenario may occasionally prey on a bird, removing the top predator completely is far worse for the prey species’ survival.

Environmental Impact

When people misguidedly remove cats to protect wildlife, they risk seriously harming both the environment and the species they aim to protect. A real-life study of a coordinated cat eradication effort on an island—intended to protect endangered species from predation—saw the rabbit population on the island spike wildly. Without the cats to keep prey species in check, the rabbits devastated local vegetation, which harmed other animal species, and a wave of more than 130,000 rodents entered the ecosystem. In their report of the eradication effort, the researchers directly linked this damage to the removal of the cats, concluding: “the unintended consequences have been dire”.

The Vacuum Effect

Cats choose to live in an area for two reasons: because there is a food and water source as well as shelter. The availability of these resources determines the number of cats who can live off of these resources. If the cats are removed, other cats will take advantage of these same resources, whether they move in from neighbouring territories or are born from survivors.

This phenomenon, known as **the “vacuum effect”**, is scientifically documented across a variety of species—and corroborated by decades of failed animal control policy.

Scientific research has observed the vacuum effect across many species—herbivores, carnivores, and omnivores.

When studying mountain lions, for example, one researcher noted, “When you remove resident lions that have established home ranges you create a void.” He continues, “Other resident lions that have home ranges that may overlap the individual you removed now find that territory empty. This allows them to expand their range, as well as create openings for transient lions to establish a new home range.” Simply put, when mountain lions are removed from their habitat, other mountain lions move in. This behaviour has also been documented in possums, badgers, and raccoons.

Learn more about the vacuum effect at www.alleycat.org/VacuumEffectScience

Trap-Neuter-Return Benefits Cats and Wildlife. Trap-Neuter-Return is the approach that stabilizes the cat population—no more kittens—while allowing these top predators to remain in the habitat, pre-empting problems like the destabilisation of the ecosystem or attracting new, intact cats. Choosing the survival of either cats or wildlife over the other is a false choice because the best approach for all animals is the same: TNR.