

# Coyotes, bobcats move into human-inhabited areas to avoid apex predators, only to be killed by people

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A bobcat being released back into the wild in February 2020 after being fitted with a GPS collar as part of the Washington Predator-Prey Project. Credit: Zachary Wardle

Since their protection under the Endangered Species Act, wolf populations have been making a comeback in the continental United States. Conservationists have argued that the presence of wolves and other apex predators, so named because they have no known predators aside from people, can help keep smaller predator species in check.

New research shows that in Washington state, the presence of two [apex predators](#)—wolves and cougars—does indeed help keep populations of two smaller predators in check. But by and large the apex predators were not killing and eating the smaller predators, known as mesopredators. Instead, they drove the two mesopredator species—bobcats and coyotes—into areas with higher levels of human activity. And people were finishing the job.

The study, published May 18 in the journal *Science* by researchers at the University of Washington, the Washington Department of Fish and Wildlife and the Spokane Tribe of Indians, reports that bobcats and coyotes were more than three times likely to die from human activity, like hunting or trapping, than from the claws and jaws of cougars and wolves.

The findings illustrate how humankind's growing footprint is changing interactions among other species.

"When cougars and wolves moved into an area, coyotes and bobcats employed a specific strategy to avoid apex predators by moving into more human-impacted regions," said lead author Laura Prugh, a wildlife ecologist and UW associate professor in the School of Environmental & Forest Sciences. "That indicated to us that coyotes and bobcats likely perceived these large carnivores as a greater threat to them than people. But when we looked at causes of mortality for the mesopredators, humans were by far the largest cause of death."

For the study, researchers used GPS collars to track the activity of 22 wolves (*Canis lupus*), 60 cougars (*Puma concolor*), 35 coyotes (*Canis latrans*) and 37 bobcats (*Lynx rufus*) across two study areas in north central and northeastern Washington from winter 2017 to summer 2022 as part of the [Washington Predator-Prey Project](#). The study areas—which included portions of Okanagan, Stevens, Spokane, Pend Oreille and Lincoln counties—consisted of national forests; recreational areas for camping, hunting and fishing; and lands dedicated to agriculture, timber harvesting, ranching and residential use.

Tracking data indicated that, when wolves or cougars moved into their region, bobcats and coyotes would shift their movements accordingly.

"Coyotes and bobcats started using areas that had twice as much human influence compared to where they were before the large carnivores moved in," said Prugh.

Researchers also attempted to determine the cause of death for any tracked animals that died during the study period. They discovered that areas with high human activity were far more deadly to mesopredators than those without a large human presence.



This image taken by a game camera at night shows a coyote wearing a GPS collar in September 2018 as part of the Washington Predator-Prey Project. Credit: Savannah Walker

More than half of the 24 coyotes that died over the course of the study were killed by people. Some were shot after preying on livestock. Humans also killed half of the 22 bobcats that died during the study, including several that were attacking chickens.

In general, humans killed between three and four times more mesopredators in this study than wolves or cougars, both of which typically avoid areas with high levels of human activity.

In the short term, human activity poses little threat to the overall populations of bobcats and coyotes, which are two of the most widespread mesopredators in North America. Neither are endangered,

and coyotes in particular are highly adaptable to the presence of people.

But not all mesopredator species are as resilient in human areas as coyotes and bobcats, said Prugh. Others reproduce more slowly or may be vulnerable in multiple ways to human activity. Rodent poisons used to keep away pests, for example, can kill fishers, another mesopredator species.

Future studies would need to investigate how mesopredators use space and resources in areas with high human activity, and what the risks of these shifts are to people.

"These are not trivial shifts in territory or space," said Prugh. "There are real consequences."

The findings also add a wrinkle to a working theory of wildlife-human interactions called the human shield hypothesis. Under the hypothesis, the presence of predators in a region causes prey species to move to areas with higher human activity. In Yellowstone National Park, for example, elk have at times moved near hiking trails, which wolves and other large carnivores typically avoid.

But the impact of humans in Yellowstone is typically smaller compared to other types of recreational areas or farms, grazing lands and residential developments—leaving some scientists to wonder if humans would be much of a "shield" in those areas.

"In these areas with higher levels of [human activity](#), it was unknown whether a mesopredator would perceive the apex [predator](#) or humans as the greater threat," said Prugh. "Here, we found that bobcats and coyotes perceived their apex predators as the greater threat, but their strategy of avoiding those [large carnivores](#) backfired by bringing them into contact with a much more effective predator: us."

**More information:** Laura R. Prugh, Fear of large carnivores amplifies human-caused mortality for mesopredators, *Science* (2023). [DOI: 10.1126/science.adf2472](https://doi.org/10.1126/science.adf2472).

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