

Based on available evidence, non-lethal predator control is more effective than lethal means

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A new study published in the journal [Frontiers in Ecology and the Environment](#) finds that there is very little evidence demonstrating the effectiveness of lethal methods for controlling carnivores that prey on livestock.



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- *Lethal methods for controlling predators include hunting, destroying litters of young, poisoning, live-trapping followed by killing, and the use of kill traps.*
- *Non-lethal methods include livestock-guarding animals, a visual deterrent known as “fladry” in addition to other types of deterrents and repellents, enclosures, diversionary feeding, and sterilization.*
- *But, the authors of the study say, these methods are often selected and deployed without first taking into consideration the experimental evidence of those methods’ effectiveness at curbing predation-related threats or avoiding ecological degradation.*

In 2014, the U.S. Department of Agriculture’s Wildlife Services program [reportedly](#) exterminated 2.7 million animals, including 580 black bears, 796 bobcats, 305 cougars, 61,702 coyotes, 1,186 red foxes, and 322 wolves, at a cost of about \$127 million.

The culling of wolves, in particular, has been a [hot button issue in the U.S.](#) Outcry over the government giving license to hunters to shoot the animals down in an effort to control their population and keep them from preying on livestock has led to heightened scrutiny of the methods the U.S. government uses to control populations of predators.

Sure to further fuel the debate, a new study published in the journal [Frontiers in Ecology and the Environment](#) finds that there is very little evidence demonstrating the effectiveness of such lethal methods for controlling carnivores that prey on livestock. In fact, based on their review of the existing literature, the researchers who conducted the analysis say that non-lethal methods have been demonstrated to be more effective.

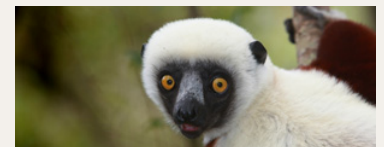
Livestock owners traditionally employ a variety of lethal and non-lethal methods to protect their domestic animals from wild predators. Lethal methods include hunting, destroying litters of young, poisoning, live-trapping followed by killing, and the use of kill traps. Non-lethal methods include livestock-guarding animals, various types of deterrents and repellents, enclosures, diversionary feeding, and sterilization.

But, the authors of the study say, these methods are often selected and deployed without first taking into consideration the experimental evidence of those methods’ effectiveness at curbing predation-related threats or avoiding ecological degradation.

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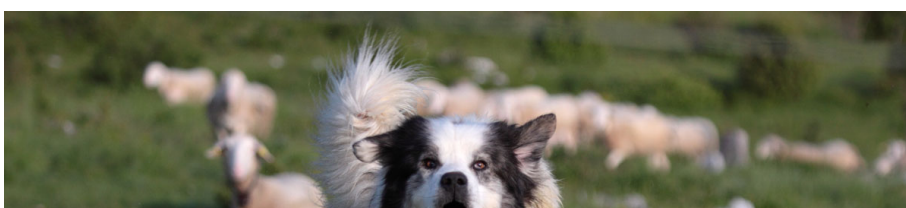
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A dog guarding sheep in the Dinaric Mountains in Slovenia. Photo by Miha Krofel.

There's probably a simple reason why the research is largely ignored: Predator control methods for preventing livestock loss have rarely been the subject of rigorous scientific studies, according to the authors.

In order to inform future policy and research on predators, the authors — a team of scientists from the U.S., Slovenia, and South Africa — systematically evaluated past studies of efforts to combat livestock predation by canine, feline, and ursid carnivores in North America and Europe.

"Our findings address the quality of scientific evidence collected as well as the duties of scientists to communicate their findings to the broad public," Adrian Treves of the Nelson Institute for Environmental Studies at the University of Wisconsin, Madison said in a statement.

"Because predators are a public trust asset, their destruction cannot be undertaken lightly without evidence of effectiveness, nor for the sole benefit of a narrow minority of private interests such as livestock owners."

Of the controlled experiments Treves and team examined, higher evidentiary standards tended to be applied to tests of non-lethal methods than tests of lethal methods. All the same, the team found that non-lethal methods were generally more effective than lethal methods in preventing carnivore predation on livestock. At least two lethal methods, government culling and regulated public hunting, were actually found to have been followed by increases in predation on livestock in some cases, whereas none of the tests of non-lethal methods found such counterproductive impacts.

"Lethal methods generally appeared riskier for livestock producers because counter-productive results occurred in numerous tests," Miha Krofel, of the University of Ljubljana in Slovenia, said in a statement.

"Non-lethal controls were more effective than lethal methods in preventing carnivore predation on livestock. Two tests of non-lethal methods (fladry [a type of visual deterrent] against wolves and livestock guarding dogs against several species of predators) used the highest standard of evidence without bias and are therefore the most reliable methods of predator control known to date."

These findings would appear to be consistent with past research that found government-sanctioned killing of predators — in this case, the culling of wolves in the U.S. — to have backfired. "When the government kills a protected species, the perceived value of each individual of that species may decline; so liberalizing wolf culling may have sent a negative message about the value of wolves or acceptability of poaching," a [study](#) released earlier this year found.

Based on their review of the best available scientific evidence, the team suggests in the study that the effectiveness of preventing livestock losses could be considerably increased if non-lethal methods are implemented more regularly and decision-makers follow a simple process for choosing which method to employ:

“When two or more interventions to control predators are lawful, we recommend that farmers, managers, policy makers, and courts first consider functional effectiveness (will the intervention prevent future threats to human interests?) and the strength of inference for that effect. If two candidate interventions perform equally by those criteria, then we recommend that two additional criteria be considered before implementing predator control: public acceptance (will the intervention be supported by both the complainants and the general public?) and ecological consequences (will the intervention deplete biodiversity or ecosystem services?).

The researchers also recommend continuing education for wildlife managers in order to keep them up-to-date with the latest science, as well as a suspension of predator control programs that do not have strong evidence to support their effectiveness, especially when there are legal, ethical, or ecological risks involved.

"The burden of proof should rest heaviest on the interventions that have the most serious negative effects on biodiversity, people, and livestock," the team notes.

In the end, the researchers argue, sound policy should be consistent with law, scientific evidence, and ethical standards of society. As they note in the study, the EU Habitats Directive and various US federal policies and laws, including the Endangered Species Act, already require the use of evidence-based decision-making and in some cases even specify the best available science.

"For government trustees, rethinking predator control based on the evidence we have presented and with the broadest public interest in mind should lead trustees to reconsider lethal methods given more effective non-lethal methods that preserve the public assets of wildlife," Treves said. "Effective non-lethal methods preserve the public asset while protecting private livestock."

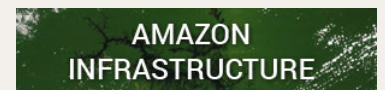
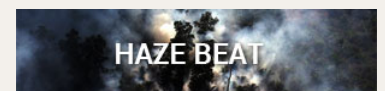
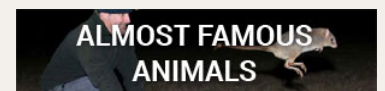
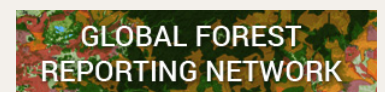
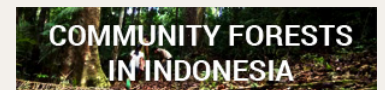
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The paw of a dead wolf (*Canis lupus*) shot as part of the regular wolf culling program in Kocevka, Slovenia that was aimed to reduce livestock depredations. After a [study](#) in 2011 showed that this program was ineffective for reducing livestock loss, the Slovenian government responded by stopping culling wolves for the purpose of preventing livestock depredations. Photo by Miha Krofel.

CITATION

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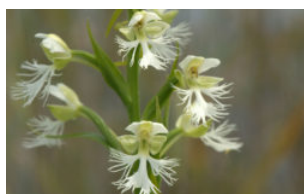
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