

# The Value of Predators

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Photos by Michael Forsberg

The relationship between humans and large predators has always been an uneasy one. Admittedly, it's hard to feel collegial toward animals that can kill and eat you. However, our complicated relationship goes beyond simply being afraid of dangerous animals; we also see predators as competitors for game, threats to livestock and general pests.

Long ago, humans competed with predators for food in a very direct way. Our ancestors had to hunt to survive, and any competition could spell the difference between life and death. Today, competition with predators is mostly a perceived nuisance; we hunt for recreation instead of for

survival, and we like our game to be conveniently abundant. Predators make an easy scapegoat when we don't come home with our limit; it's easier than blaming ourselves for not providing adequate habitat. Occasionally, a rancher's calf is taken by a coyote, especially when calving season corresponds with the tail end of a difficult winter. Livestock losses to coyotes are minimal, however, and usually not high enough to significantly impact a rancher's bottom line, let alone affect our global food supply.

Although predators influence our lives today less than they used to, we have largely held on to our ancient contentious relationship with them.



One of the largest predators in North America, a male mountain lion walks through a camera trap along a game trail in the Black Hills of South Dakota.

Unfortunately, seeing predators as threats or nuisances ignores their much deeper value. In reality, predators play a vital role in Nebraska's ecosystems. They help maintain biological diversity by preventing any single species from becoming too dominant, and can have strong, though indirect, effects on habitat quality. In fact, their presence in a landscape tends to ensure, rather than

threaten, healthy wildlife populations.

Around the world, there are striking examples of how important predators are to the ecosystems they live in. Classic research on the topic includes an experiment in which the removal of starfish from tidal pools resulted in the crash of a diverse community of mussels, as one mussel species quickly dominated others in the absence of its

major predator. Studies have shown that when sea otters are not around to eat sea urchins, entire kelp forests are devoured by rampant urchin herbivory, destroying habitat for fish, sponges, mussels, barnacles and other species. Researchers found that grasshoppers eat less and live shorter lives when spiders are around, even if those spiders aren't actually hunting them.

In Australia, numerous small animal species have disappeared or become exceedingly rare because of flourishing red fox and domestic cat predation – except where dingo populations are still strong. In fact, dingoes are so effective at reducing the impact of those smaller predators that one of the most effective strategies for conservation of rare Australian animals is the reintroduction



At sunset a dragonfly comes to roost in a tallgrass prairie wetland after a day's hunting on the wing. Dragonflies are voracious predators both as larvae and adults.



Nearly full grown swift fox pups play outside their den while the adults are away hunting on a mid-summer evening in Morrill County. While foxes are important predators, their behavior (and survival) can be strongly influenced by larger predators.

of dingoes.

Closer to home, North American coyotes play a similar role to that of the Australian dingo, terrorizing foxes and bobcats. While hunting or patrolling their territories, coyotes will often aggressively attack smaller predators on sight. Under the influence of that kind of bullying, smaller predators retreat to much different habitats and food sources than they would otherwise use. This change of behavior ripples across ecosystems, affecting not only the competitive balance between predators, but also between predators and their prey.

It might seem counterintuitive that the diversity and abundance of prey species is highest when large predators such as coyotes are abundant, but in fact it has been documented countless times. For example, multiple studies have shown that when coyote populations are low, both game and nongame bird populations decline because of high populations of foxes and cats. A wide range of bird species, including songbirds, ducks and sage grouse, suffer from higher mortality and lower nesting success. The increase in predation by smaller predators in the absence of larger ones has been coined “mesopredator release.”

That “release” of smaller predators

from bullying by larger animals can have striking, and often unpredictable, results. In west Texas grasslands, researchers used repeated aerial gunning to halve the number of coyotes in one part of a large study area but left the population alone elsewhere. Within a year of coyote control, the area with fewer coyotes had higher populations of skunks, bobcats, badgers and gray foxes. Not only were there more bird-killing predators around, there were dramatic impacts on a number of prey types. For example, 11 out of 12 rodent species disappeared from the coyote control area, leaving only kangaroo rats, which skyrocketed in abundance.

While it might not seem like a big deal to lose a few rodent species because coyote populations are low, it’s important to consider the impacts those small mammals can have on their surroundings. Rodents are important food sources for many other species, from hawks to snakes, so their disappearance leaves those predators searching for new prey. Rodents can also create drastic changes in plant species composition through feeding on both plants and seeds. Finally, rodents can influence insect communities both by feeding on them and by creating important habitat through their burrowing activity. Cumulatively,

the number of species and functional processes that can be affected simply because the abundance of a single predator was reduced can be very significant.

While the story of coyotes and their effects on wildlife species is complicated, the story of coyotes and livestock damage is no less complex. In the aforementioned west Texas study, not only did controlling coyotes decrease the diversity of rodents and increase the population size of bird-hunting predators, it also led to a three-fold increase in jackrabbits, which compete directly with livestock for forage. That is probably not an outcome that would make a rancher happy.

Another factor that makes protecting

livestock from coyotes problematic is that most coyotes are not livestock killers. Packs of coyotes are typically led by a dominant breeding pair (the alpha pair). Those alpha coyotes are usually the only pack members canny enough to kill livestock. Unfortunately for ranchers, the same cleverness that helps alpha coyotes successfully steal lambs or calves also saves them from traps and bullets. Attempts to kill coyotes to prevent livestock damage almost always fail because they don’t succeed at removing only the animals that actually cause damage. In addition, studies consistently report that coyote

A female prairie rattlesnake and her young lay at the entrance of their prairie hillside den.



Along a remote prairie stream where wintering waterfowl gather, a coyote moves across the landscape at twilight in the Sandhills. In much of Nebraska, coyotes are the largest and most influential predator in the landscape.



Morning dew hangs on a spider's web where an orb weaver has captured a pond damselfly at Audubon's Spring Creek Prairie in eastern Nebraska.

populations rebound to where they were before control started within about three months – mostly due to colonization from nearby areas.

While coyotes play a very significant role as the top canine predator in Nebraska, they haven't always been in that position. Wolves have been absent

from Nebraska's landscapes for 100 years, but when they were around, they had much the same impact on coyotes as coyotes have on foxes and bobcats today. In other parts of the country, wolves are entering their former territories through both reintroductions and range expansion. As wolves return, scientists are realizing how much of an ecological impact their absence caused, and are documenting dramatic changes far beyond what researchers had predicted.

Before wolf reintroduction, the landscape in and around Yellowstone National Park was suffering. Aspen, cottonwood and willow weren't reproducing, stream banks were barren and eroding and beaver colonies were conspicuously absent. The combination of those factors reduced habitat quality for a myriad of other species. The impacts could all be traced directly to abundant elk populations, which were congregating and stomping around in streams and other low-lying areas, and devouring all the tender saplings of aspen, cottonwood and willow they wanted.

Everything changed when wolves reappeared, but not because wolves drastically reduced the number of elk. Instead, the mere presence of a few

wolves in the landscape completely altered the behavior of their prey through a phenomenon that has been called "the ecology of fear." A herd of elk in flat, open country can give wolves a run for their money, both because they can spot the wolves in time to run, and because there is nothing to inhibit their speed in the open. In wet, steep or shrubby habitats, however, elk are at a distinct disadvantage and know it. Because of that psychological reality, elk stopped feeding in places such as streams and valleys where they felt unsafe, which led to the return of aspen, cottonwood and willow stands. As the woodlands recovered, stream banks healed and beavers recolonized as well, increasing the health of the entire ecosystem.

It's not likely that wolves will make a comeback in Nebraska anytime soon, but we are seeing the return of another top predator as mountain lion populations continue to grow. Just like wolves, mountain lions also have profound impacts on prey, as well as larger ripple effects on ecosystems. Decreases in lion populations within western National Parks have allowed deer populations to mushroom,

severely impacting the regeneration of oak trees. What's even more striking is that places where lions are still common have higher abundances of wildflowers, butterflies, amphibians, lizards, fish and aquatic plants. That's an impressive list of benefits from a predator that is rarely seen yet relatively abundant.

Our rocky relationship with large predators is likely to persist, and probably will become even more complicated as more large predators repopulate Nebraska's ecosystems. Unfortunately, there are no easy answers for dealing with that relationship. Predators will continue to threaten both livestock and humans. They will compete with us for some game species, though not nearly as much as some hunters think. In light of those conflicts, some will continue to see predators as pests that need to be wiped out, while others will decry any efforts to kill them. As with most complex issues, the appropriate strategy is somewhere between those extremes. Making decisions about how to deal with predators will be a difficult and ongoing process, but as we proceed, it will be important that we keep in

mind the important, wide-reaching and often unpredictable impacts predators have on the ecosystems in which they live. Ignoring that reality may be more perilous than predators themselves. ■

## Recommended Readings

- *Where The Wild Things Were: life, death, and ecological wreckage in a land of vanishing predators.* Written by William Stolzenburg, 2008.
- *Ecosystem Impacts of Predators: to control or not to control, that is the question.* Written by Scott Henke. [Texnat.tamu.edu/files/2010/09/006.pdf](http://Texnat.tamu.edu/files/2010/09/006.pdf)
- *Predator Interactions, Mesopredator Release and Biodiversity Conservation.* Written by Euan G. Ritchie and Christopher N. Johnson. September, 2009. *Ecology Letters*, Volume 12, Issue 9, pages 982-998. [onlinelibrary.wiley.com/doi/10.1111/j.1461-0248.2009.01347.x/full](http://onlinelibrary.wiley.com/doi/10.1111/j.1461-0248.2009.01347.x/full)



A ferruginous hawk delivers a thirteen-lined ground squirrel to hungry chicks at a ridge-top nest in western Nebraska.



A gray wolf pauses along a two-track road where prairie meets oak woodland in northwestern Minnesota. The presence of large predators such as wolves and mountain lions can create a cascade of impacts across ecosystems.