

The fear factor: Animals feeling safer, throwing nature off-balance

By Washington Post, 03.07.16



This raccoon is not afraid of predators — and that's a bad thing, says scientist Justin Suraci. Because the largest predators are dying out and no longer a threat, smaller animals feel more secure and nature is thrown off-balance. Photo: Michael Clinchy

Picture a peaceful northern Pacific archipelago, with blue-gray water lapping against a rocky shore. A raccoon ambles around, clambering over slippery rocks in search of something to eat.

Now inject terror into the scene: the sound of a hungry dog barking. Suddenly, the landscape is transformed.

This is what Justin Suraci, an ecologist at the University of Victoria, found after conducting an experiment on the Gulf Islands in British Columbia, Canada.

Terror turned out to play a critical role in balancing the ecosystem, Suraci said. It is the driving force of an emotional drama that plays out on the Gulf Islands and every other landscape in the world.

Fear of large predators — not just the predators themselves but fear of their presence — keeps smaller predators in check. It means those animals spend less time eating and more time worrying about getting eaten, which in turn allows their even smaller prey to flourish.

No "Landscape Of Fear"

All over the world, however, dread is vanishing. Humans have killed off large predators in staggering numbers, bringing wolves, sharks, tigers, bears, lions and others to the brink of extinction. In doing so, we have destroyed not just individual species but an entire "landscape of fear," Suraci says, changing the natural world for the worse.

The importance of large carnivores — known as "apex predators" — has long been understood. A famous study in Yellowstone National Park, where gray wolves had been missing for decades before being reintroduced in the 1990s, showed that their return set off a series of cascading positive effects. The elk that had been preventing willows and aspen from taking root on the riverbanks were brought into check. Migratory birds started roosting in the recovered trees, and trout began swimming in the shady waters beneath their branches. Beaver colonies boomed, fed by the low-hanging willow branches. Their dams created marshes where otters, mink, muskrats and ducks could nest.

Places where apex predators were eliminated and never reintroduced have not been so lucky. A 2011 report cataloged instances in which the absence of predators has led to a die-off of trees and birds, fueled wildfires and spread disease.

The explanation for apex predators' outsized influence on their environment has mostly focused on one thing: their role in keeping the populations of other kinds of animals in check.

Dread Plays A Role Too

Suraci thinks there is more to it than that. He believes fear of apex predators also plays a vital role.

"Any predator is only ever going to eat some of its prey," Suraci said. "But it's potentially going to scare all of its prey and cause all of its prey to change its behavior all of the time."

In other words, a predator has an influence that extends far beyond the animals it eats. It also has the power to change the behavior of any creature that fears it. Wary animals spend less time eating, because they are too busy hiding or scurrying, or keeping their

heads up and their ears attuned to the approach of danger. Such behavior can have the same cascading effects as if the animals really had been eaten. Being fearful may change a creature's impact on the landscape as much as being dead.

Suraci decided to test this theory by manufacturing fear.

Rampaging Raccoons And Pretend Predators

His victims were the rampaging raccoons of the Gulf Islands. The audacious animals had flourished basically unchecked since their natural predators — cougars, bears — were killed off by humans. They flocked to the shoreline's exposed rocks in search of tasty meals of fish and crab, and showed none of the cautious behavior one might expect of a medium-sized mammal.

Suraci and his team reminded them of how easily they could be eaten, by setting up speakers in the trees near the tidal zone and programming them to play sounds of dogs barking. Then they filmed the raccoons' response.

The results were striking. The raccoons spent far less time in exposed areas than before. When they did appear in the open, they spent much more time scanning their surroundings than before. All told, the raccoons spent 66 percent less time looking for food than when they were unafraid of being eaten.

The effects of that shift were apparent across the landscape. The populations of two types of raccoon prey — crabs and fish — nearly doubled. Meanwhile, the number of periwinkle snails, which crabs prey on, fell significantly. So too did the number of staghorn sculpin, competitors of crabs that had thrived when more crabs were being eaten.

By restoring fear, Suraci transformed the ecosystem.

No Fear, No Balance

Fear is a very important element of balanced ecosystems, Suraci said. "When you remove the top level of the food chain as humans have done across the globe ... you don't just remove the actual predation but you remove the behavioral effects as well."

Bringing fear back, he continued, "restored a balance to the food chain that had been lost when the top level was taken away."

Of course, recordings of barking dogs or roaring lions is not the answer. It would not take long for animals to figure out that the danger was not real. The only answer is to reintroduce the apex predators themselves. For that to happen, humans may have to overcome some of their own fear of these mighty hunters.

We will have to get over that fear, Suraci says, if we ever want to return landscapes to the healthier, richer — and scarier — places they once were.