Video: Understanding the ecological role of wolves in Yellowstone National Park

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Wolves and Yellowstone. In the public mind, and in nature, the two are inextricably linked. Now, it turns out, they aren't alone on the ecological dance floor. Elk and willows play a critical role in wolves' success in the Yellowstone National Park ecosystem, willows serving as browse for elk--and elk as food for wolves. But there's another species involved, one that's instrumental to these well-choreographed steps: the beaver. The loss of wolves caused far-reaching changes in the Yellowstone ecosystem: more elk and fewer willows. With no willows to slow stream flow, creeks flowed faster and faster. Beavers prefer slow-moving waters, so they disappeared with the willows. Scientists had thought that the return of the wolf, leading to a cutback on elk numbers and willow browsing, was central to restoring the Yellowstone ecosystem. "But Yellowstone also needs beavers," says ecologist Tom Hobbs of Colorado State University. That's why

bringing back wolves didn't work to quickly restore the ecosystem, Hobbs and other researchers believe. Wolves hunted elk and brought down numbers of these ungulates. But removing elk browsing wasn't enough for the willows. They needed the sluggish streams created by beavers. But the beavers were gone. Restoring an ecologically complete ecosystem in Yellowstone requires the return of willows--and with them, beavers. Credit: NPS

Long loathed as a threat and nuisance, the wolf population in Yellowstone National Park was essentially wiped out by the mid 1920s. That changed in 1995, when the National Park Service reintroduced wolves there, with the goal of restoring a natural predator/prey dynamic to the landscape.

So, 20 years later, how has the park's ecosystem responded to the return of the wolves? That's just what Utah State University wildlife ecologist Dan MacNulty and his team want to find out.

With support from the National Science Foundation (NSF), and working in partnership with the National Park Service, MacNulty and his team are hot on the trail of the wolves' primary prey—elk. The team is following individually marked wolves and elk to determine how and why wolf-elk interactions fluctuate over time, the effects of these fluctuations on wolf traits and vital rates, and how wolves, grizzly bears and cougars interact to influence elk mortality rates. Fuller understanding of what's happening here could translate to better predator management decisions all over the globe.

Once common in much of North America, Europe and parts of Asia, gray wolves now roam a comparatively tiny range. Worldwide, habitat loss and the effects of global warming threaten the long-term future for these icons of the wilderness. In the short-term, wolves must find enough ungulate prey like elk to weather the winter. The bigger the wolf, the better its ability to hunt and take down such prey. Or so it would seem. To find out whether larger body size in fact leads to better predator performance, ecologist Dan MacNulty of Utah State University, along with other scientists, studied whether wolves' size-related ability to handle prey might come at the expense of successfully pursuing that prey. The notion that larger predators are overall better hunters "has been cited to explain why bigger carnivores take bigger prey, and why carnivores have evolved toward larger sizes," the researchers wrote in a study published in the Journal of Animal Ecology. The researchers found that larger size did improve wolves' skill at strength-related tasks, such as subduing elk. It didn't, however, increase performance in what's called locomotor tasks, like the fast footwork involved in culling an elk from a group. If poor locomotor performance narrows the range of potential prey to bigger, slower-moving species, the scientists found, extinction may ultimately prevent carnivores from evolving toward larger sizes. Credit: NPS/Dan Stahler

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