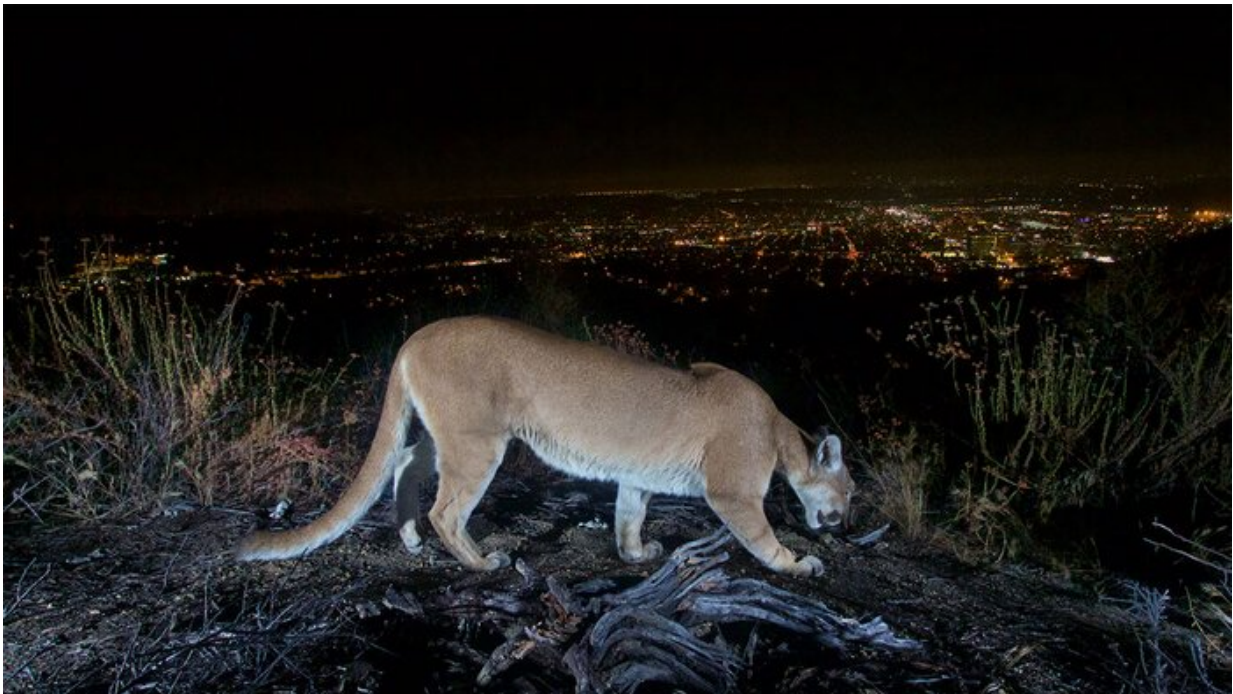


Mountain lions moved less, downsized territory during LA's pandemic shutdown

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A mountain lion on a bluff overlooking Los Angeles. By tracking the whereabouts of 12 mountain lions before and during the COVID-19 pandemic, ecologists have found that the reclusive species, briefly freed of the need to avoid people, adopted an energy-efficient economy of movement during LA's shutdown in spring 2020. Credit: National Park Service

As people sheltered in place at the onset of the COVID-19 pandemic, sightings of wildlife in urban areas helped spawn a meme, "Nature is

healing," that reflected an intuitive belief: Carnivores were stretching their legs, and their ranges, by expanding into long-lost territory.

But new research from the University of Nebraska–Lincoln and National Park Service shows that mountain lions in Greater Los Angeles, when briefly spared the proximity of people, instead responded with an economy of movement that also reveals the costs of living near them.

"We saw a potential silver lining with COVID, which obviously has been generally a negative thing for everyone," said John Benson, the study's lead author and assistant professor of vertebrate ecology at Nebraska.

"We saw an opportunity to get a better sense of how human disturbance and human activities influence animal behavior."

Over a 43-day span that stretched from late March to early May of 2020, GPS-collared mountain lions in and around Los Angeles actually occupied smaller territories, and generally moved less, than they did before the pandemic. That span coincided with a statewide stay-at-home order and the closing of most parks around LA, including those favored by the famously reclusive species.

"There was this popular perception that animals were going to start running free, expanding their [home ranges](#), moving greater distances, colonizing cities, coming into areas where they didn't used to be," Benson said. "But that goes against theory—the theory that animals should move as efficiently as possible.

"It actually makes sense that when you don't have to dodge around as many humans, you could use the landscape more efficiently. Without humans, you don't have to take a circuitous route to get from one place to another."

The team tracked 12 mountain lions that had previously been collared

with GPS locators by Jeff Sikich and Seth Riley of the National Park Service. Depending on the individual animal, those collars had already yielded between one and eight years of pre-pandemic data. That allowed the team to compile a distribution of past 43-day windows against which to compare the mountain lions' space use and movement in the 43 days of spring 2020.

The researchers discovered that the home ranges of four resident mountain lions shrank considerably during the early days of the pandemic. After recording the locations of three mountain lions every two hours, the team also found that they were generally traveling shorter distances—in some cases, half or even a third as much as they did prior to the pandemic.

That matters, Benson said, because it helps quantify just how much energy mountain lions in Greater Los Angeles are expending to avoid people—energy they need to hunt for prey and search for mates. Though LA ranks as the largest metropolitan area in North America to house a wild felid of the mountain [lion](#)'s size, the 12 animals tagged by the research team probably represent a relatively sizable proportion of those still remaining there. A population that small is in danger of going locally extinct, he said, with any stressors taking ever-greater tolls as the population declines.

"Any additional stressor—like needing to modify your movement patterns, which could come with a cost of finding prey, getting enough to eat, mating, whatever it is—could be the stressor that tilts the balance toward the extinction process," Benson said.



With the ability to climb trees and an evolutionarily honed ability to hide, mountain lions are adept at avoiding humans. By tracking the whereabouts of 12 mountain lions before and during the COVID-19 pandemic, ecologists have found that the reclusive species, briefly freed of the need to avoid people, adopted an energy-efficient economy of movement during LA's shutdown in spring 2020. Credit: National Park Service

The beginning of the pandemic also presented a unique opportunity to tease apart whether wildlife is still motivated to avoid human infrastructure even when its builders have largely abandoned it, at least for a short while.

"People call it the 'human footprint,'" Benson said. "We thought, 'Here's a chance to take the foot out of the footprint and see what animals are responding to.'"

So the team, which included Virginia Tech's Heather Abernathy, decided to investigate how frequently mountain lions crossed park trails and major roads, including freeways, before versus early in the pandemic. As expected, a sample of seven mountain lions did crisscross the park trails more often in spring 2020, signaling that the presence of humans was, in fact, the main deterrent.

But a sample of 10 mountain lions continued avoiding primary and even intermediate-sized roads, despite a documented drop in traffic. Why the disparity? For starters, Benson said, the potential penalty for encountering foot traffic is much lower than it is for vehicle traffic. The team also suspects that the latter, though lower than usual, remained daunting enough to keep the mountain lions at bay. That was especially likely on Interstate 405, one of the busiest U.S. freeways and one that has historically acted as a hard border on the home ranges of neighboring mountain lions.

"The fact is that the roads in Southern California, especially big roads like freeways, are major barriers to movement for all kinds of wildlife, including mountain lions," said Riley, also an adjunct faculty member at the University of California, Los Angeles. "The traffic was reduced, certainly, but there was still plenty of use occurring, and the barrier effect doesn't just disappear."

One of the tracked mountain lions, surrounded by busy freeways on three sides, occupies what may be the smallest home range ever recorded for an adult male: about 8 square miles, a fraction of the roughly 150 square miles enjoyed by a typical counterpart. Benson said the case study illustrates a paradox that makes sense in the light of theory: a carnivore, already confined to an artificially small range by human disturbance, choosing to occupy an even smaller range when that disturbance abates.

Human-created boundaries, and the effort that [mountain](#) lions exert to

avoid the people dwelling within them, might be exacerbating human-wildlife conflicts in equally paradoxical ways. Avoiding people is necessary and good to some extent, Benson said, given that "bad things usually happen when we get annoyed by [mountain lions](#)." Yet the energy they expend to do so might ironically increase human-wildlife conflict, he said, if high energy demands are leading them to seek additional food sources.

"This idea of coexistence—that if they stay out of our way, everyone's happy—maybe it's not that rosy," he said, "if it causes them to burn more energy and then potentially makes them more likely to actually attack livestock or pets. This is not something we documented or investigated with our current study, but it would be an interesting hypothesis to test with future research.

"Does it have unintended consequences that we can't control? I think that may be a good thing to look at and re-evaluate."

The researchers reported their findings in the journal *Ecological Solutions and Evidence*.

More information: Mountain Lions Reduce Movement, Increase Efficiency During the Covid-19 Shutdown, *Ecological Solutions and Evidence*, 2021.

Provided by University of Nebraska-Lincoln

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