

Big cats in urban jungle: LA mountain lions, Mumbai leopards

June 30 2022, By CHRISTINA LARSON and ANIRUDDHA GHOSAL



A leopard is seen walking across a ridge in Aarey colony near Sanjay Gandhi National Park overlooking Mumbai city, India, May, 12, 2018. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: Nikit Surve, Wildlife Conservation Society – India/ Sanjay Gandhi National Park via AP

Los Angeles and Mumbai, India, share many superlatives as pinnacles of cinema, fashion, and traffic congestion. But another similarity lurks in the shadows, most often seen at night walking silently on four paws.

These metropolises are the world's only megacities of 10 million-plus where large felines—mountain lions in one, leopards in the other—thrive by breeding, hunting and maintaining territory within urban boundaries.

Long-term studies in both cities have examined how the [big cats](#) prowl through their urban jungles, and how people can best live alongside them—lessons that may be applicable to more places in coming decades.

"In the future, there's going to be more cities like this, as [urban areas](#) further encroach on [natural habitats](#)," said biologist Audra Huffmeyer, who studies mountain lions at the University of California, Los Angeles. "If we want to keep these large carnivores around on the planet, we have to learn to live with them."

FREEWAYS AND FRAGMENTED HABITAT

Twenty years ago, scientists in Los Angeles placed a tracking collar on their first cat, a large male mountain lion dubbed P1, that defended a wide swath of the Santa Monica Mountains, a coastal range that lies within and adjacent to the city.

"P1 was as big as they get in southern California, about 150 pounds," said Seth Riley, a National Park Service ecologist who was part of the effort. "These dominant males are the ones that breed—they won't tolerate other [adult males](#) in their territory."



A warning signboard stands in Sanjay Gandhi National Park, which prohibits visitors and daily walkers from walking in the forest after 6 PM, a time considered most active for leopards, in Mumbai, India, Wednesday, April 6, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool

With GPS tracking and camera traps, the scientists followed the rise and fall of P1's dynasty for seven years, through multiple mates and litters of kittens. "2009 was the last time we knew anything about P1," said Riley. "There must have been a fight. We found his collar, blood on a rock. And never saw him again. He was reasonably old."

Since then, Riley has helped collar around 100 more mountain lions in Los Angeles, building a vast database of lion behavior that's contributed to understanding how much territory the cats need, what they eat (mostly deer), how often they cross paths with people and what may imperil their future.

As with medieval European kings, the biggest threat turned out to be inbreeding. Living in small territories separated by highways has caused some males to mate with daughters and granddaughters, who weren't able to naturally disperse farther away. That's led to genetic problems such as fertility issues and kinked tails.



A paw mark of a cub is seen on a brick at Aarey Colony, which borders the south end of Sanjay Gandhi National Park, in Mumbai, India, Saturday, March 12, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10

million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rajanish Kakade

"Based on genetic analysis, we know that P1 mated with P6, his daughter—that was the first case we documented of this very close inbreeding," said Riley.

LEOPARDS IN URBAN LANDSCAPE

In Mumbai, one of the world's most densely populated cities, the leopards are packed in, too: about 50 have adapted to a space ideally suited for 20. And yet the nocturnal cats also keep mostly out of sight.

"Because these animals are so secretive, you don't know much about them. You can't just observe them," said Vidya Athreya, director of Wildlife Conservation Society in India and part of a research team that recently fitted five leopards with tracking collars.

The leopards' core range is centered around Sanjay Gandhi National Park, a protected area boxed on three sides by an urbanized landscape, including a neighborhood that's home to 100,000 people and nearly a dozen leopards.



A leopard cub sits on a tree in Aarey colony, which borders the south end of Sanjay Gandhi National Park, in Mumbai, India, Thursday, April 7, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool

Researchers tackled specific questions from park managers, such as how the cats cross busy roads near the park.

To get the answer, they collared a big male dubbed Maharaja. They found that it walked mostly at night and traversed over 60 kilometers (37 miles) in about a week, from the park in Mumbai to another nearby. The

leopard crossed a busy state highway, using the same spot to pass, on three occasions. It also crossed a [railway track](#).

The path chosen by Maharaja is nearby a new highway and a freight corridor under construction. Researchers said that knowing the big cats' highway crossing habits can help policy makers make informed decisions about where to build animal underpasses to reduce accidents.

LIVING ALONGSIDE BIG CATS

In Los Angeles, long-term mountain lion research showing the harm of fragmented habitat helped fuel a successful campaign to build a wildlife crossing bridge over U.S. Route 101, one of the city's busiest freeways. Construction [began](#) on April 22.



A mountain lion eats a kill at Santa Monica Mountains National Recreation Area near Malibu Creek State Park on March 24, 2014. Los Angeles and Mumbai,

India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: National Park Service via AP

When it's finished in three years, the bridge will be covered in native plants and include special sound walls to minimize light and noise disturbances for nocturnal animals. It will [connect](#) Santa Monica Mountains and Simi Hills, enlarging the dating pool for resident mountain lions.

But learning to live alongside cats is not only a matter of infrastructure decisions, but also human choices and education.

When Athreya first started advocating for co-existence with Mumbai's leopards, she was met with skepticism and pushback from other biologists and policy makers. They thought it would be impossible for big cats to live alongside people without significant friction, or worse.

"The dominant narrative was about conflict," she said. But she helped push the conversation to be about "negotiations, improving the situation for both wildlife and people."



A leopard is seen walking away with its kill a dog from Aarey colony near Sanjay Gandhi National Park over looking Mumbai city, India, May, 26, 2017. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: Nikit Surve, Wildlife Conservation Society – India/ Sanjay Gandhi National Park via AP

That is not to say living alongside a big predator is without perils. In Mumbai, Purvi Lote saw her first leopard when she was 5, on the porch of a relative's home. Terrified, she ran back inside to her mother. But

now the 9-year-old says she isn't as afraid of the big cats.

Like other children, she doesn't step outdoors alone after dark. Children and even adults travel in groups at night, while blaring music from their telephones to ensure that leopards aren't surprised. But the most fundamental rule, according to the youngster: "When you see a leopard, don't bother it."

AVOIDING DEADLY CONFLICTS

Leopards in Mumbai adapted to mainly hunt feral dogs that frequent garbage dumps outside the forest and mostly attacked people when cornered or attacked. But in 2010, 20 people in Mumbai died in leopard attacks, said Jagannath Kamble, an official at Mumbai's protected forest.



The Mumbai skyline is seen from Aarey Colony, which borders the south end of Sanjay Gandhi National Park, in Mumbai, India, Tuesday, April 5, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool

The turning point was the realization that the understaffed forest department couldn't just keep reacting to individual attacks by capturing and transporting leopards to forests since they returned. Instead, it decided to focus on trying to get people to coexist with the predators.

Officials roped in volunteers, nongovernmental groups and the media for a public education program in 2011. Since then, fatalities have dropped steadily and no one has been killed in an attack since 2017.

The last known victim was Muttu Veli's 4-year-old daughter Darshini. Veli, an office worker who came to Mumbai in 1996, said Darshini was playing outside their home in a slum at the edge of the forest and she just didn't return home. Eventually, her mauled body was recovered.

"My daughter is gone. She won't come back," he said.



Adult male mountain lion P-64 walks out of a tunnel at Santa Monica Mountains National Recreation Area on May 22, 2018. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: National Park Service via AP



A mountain lion sits in an outhouse at the Chatsworth Reservoir at Santa Monica Mountains National Recreation Area on Dec. 4, 2013. After clearing the area and making space, the biologist was able to flush the lion into the adjoining open space without incident. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: National Park Service via AP



Santa Monica Mountains National Recreation Area National Park Service biologists Joanne Moriarty and Jeff Sikich measure P-22's incisors during his capture on March 27, 2014. He was treated for mange, a parasitic disease of the hair and skin. Blood tests later showed exposure to anti-coagulant rodenticides, commonly known as rat poison. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: National Park Service via AP



Satish Kumar shows the scars on the neck of his son Darshan Kumar from a leopard attack in Aarey Colony, which borders the south end of Sanjay Gandhi National Park, in Mumbai, India, Monday, April 4, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool



A wall painting of leopards is seen on the wall of a house in Aarey Colony, which borders the south end of Sanjay Gandhi National Park, in Mumbai, India, Monday, April 4, 2022.. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool



A screen with footage from a CCTV camera is seen at a local dairy farm in Aarey Colony, which borders the south end of Sanjay Gandhi National Park, in Mumbai, India, Tuesday, April 5, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool



Women return home after relieving themselves in the open in Aarey Colony, which borders the south end of Sanjay Gandhi National Park, in Mumbai, India, Tuesday, April 5, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool



A team of Sanjay Gandhi National Park forest rangers conduct a demonstration of their rescue and conservation methods to visiting forest officials from across the country in Mumbai, India, Tuesday, April 5, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool



Kiran Lote combs the hair of her daughter Purvi Rohid as she prepares to leave for school in Aarey Colony, which borders the south end of Sanjay Gandhi National Park in Mumbai, India, Thursday, April 7, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool



A Waghoba temple is seen at Sanjay Gandhi National Park in Mumbai, India, Wednesday, April 6, 2022. Tribals worship Waghoba, a deity in the form of leopards and tigers, in the belief that they protect them and their livestock from evil. They also consider them to be the guardian of the forest. Credit: AP Photo/Rafiq Maqbool



A dog barks outside a house in Aarey Colony, which borders the south end of Sanjay Gandhi National Park, in Mumbai, India, Tuesday, April 5, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool



Forest guards patrol Aarey colony, which borders the south end of Sanjay Gandhi National Park, in Mumbai, India, Wednesday, April 6, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool



A view of the slum seen in the Aarey Colony which borders the south end of Sanjay Gandhi National Park in Mumbai, India, Wednesday, April 6, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool



Traffic moves over Corriganville Tunnel, occasionally used by wildlife such as the mountain lion known as P-3, located under the 118 Freeway, near the Rocky Peak exit, on January 12, 2017. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: National Park Service via AP



People try to sight a leopard cub in Aarey colony which borders the south end of Sanjay Gandhi National Park in Mumbai, India, Thursday, April 8, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool



This uncollared adult female mountain lion is seen "cheek-rubbing," leaving her scent on a log in the Verdugo Mountains with Glendale and the skyscrapers of downtown Los Angeles. in the background on March 21, 2016. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: National Park Service via AP



Mountain lion P-23 crosses a road in the Santa Monica Mountains National Recreation Area on July 10, 2013. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. (National Park Service via AP)¹⁰⁹



Satish Lote, a resident of Aarey colony, checks camera trap which borders the south end of Sanjay Gandhi National Park in Mumbai, Thursday, April 7, 2022. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: AP Photo/Rafiq Maqbool



A male mountain lion known as P-21 is captured in Santa Monica Mountains National Recreation Area on June 4, 2011. Los Angeles and Mumbai, India are the world's only megacities of 10 million-plus where large felines breed, hunt and maintain territory within urban boundaries. Long-term studies in both cities have examined how the big cats prowl through their urban jungles, and how people can best live alongside them. Credit: National Park Service via AP

In Los Angeles, there have been no human deaths attributed to [mountain lions](#), but one nonfatal attack on a child occurred in 2021.

Both cities have learned that trying to capture, kill or relocate the cats isn't the answer.

"Relocation and killing makes conflict worse," said Beth Pratt, California regional director at National Wildlife Federation. "It's better to have a stable population, than one where hierarchies and territories are disrupted."

Avoidance is the safest strategy, she said. "These big cats are shy—they tend to avoid human contact as much as they can. They're really extreme introverts of the animal kingdom."

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