

Research dog helps scientists save endangered carnivores

September 6 2017, by Gerry Everding



Washington University researcher Karen DeMatteo and her scat-sniffing dog Train are on a mission to preserve jaguars, pumas, bush dogs and other carnivores in the forests of Northeastern Argentina. Credit: Karen DeMatteo/Washington University

Scat-sniffing research dogs are helping scientists map out a plan to save

reclusive jaguars, pumas, bush dogs and other endangered carnivores in the increasingly fragmented forests of northeastern Argentina, according to a new study from Washington University in St. Louis.

Published Aug. 25 in the online journal *PLoS ONE*, the study explores options for mitigating the impact of human encroachment on five predators who cling to survival in isolated pockets of protected forest surrounded by a mosaic of roadways, unprotected forest, plantations and pastures.

"The study details a least-cost plan for the development of a multispecies biological corridor that connects protected areas in the Upper Parana Atlantic Forest Region of Misiones, Argentina," said co-author Karen DeMatteo, a biology research scientist and lecturer in environmental studies in Arts & Sciences.

DeMatteo, who has spent 10 years working on the project, said completion of the corridor model will allow researchers and community leaders to begin working with property owners to establish the [habitat](#) corridors.

"This plan is exciting not only for the future of the local biodiversity, but also because it involved a lot of collaboration from the local government and universities to make it happen," she said.

Recent studies have argued that establishing small, protected reserves for endangered [species](#), even in the best of habitats, is not enough to ensure long-term survival because species must move across their range to breed with other scattered populations and maintain genetic diversity.



Train, a Chesapeake Bay Retriever, was trained to sniff out animal scat after being rescued from the Humane Society. Credit: Courtesy of Karen DeMatteo

Using dogs trained to detect the scat of specific species, DeMatteo's team searched for evidence of the carnivores' presence across a broad swath of northeastern Argentina, including public and private wildlife reserves, privately owned plantations, farms and pastures, and along roads and pathways leading to scattered communities.

DNA analysis of more than 900 scat samples collected over several summers allowed researchers to develop detailed maps of the species frequenting these habitats, including a sense of how their movements were influenced by habitat quality, topography, roadways and other human disturbances.

For species such as the jaguar, which rarely crosses into territory disturbed by humans, survival may hinge on the creation of habitat corridors linking isolated population pockets. Because the jaguar is so averse to human interaction, some studies have suggested that habitat

corridors designed for it also would cover the needs of other predators.



Karen DeMatteo and a provincial park guard at the Reserva de Biosfera Yabotí in Misiones, Argentina, collecting a sample of carnivore scat for DNA testing and analysis. Credit: Karen DeMatteo

DeMatteo's study, which examined the habitat needs of jaguars, pumas, ocelots, oncillas and bush dogs, offers a more nuanced approach, suggesting that the optimal footprint for habitat corridors should be drawn with the overlapping needs of many species in mind.

While some species were less intimidated by the presence of humans, each had its own unique requirements in terms of what constitutes a suitable habitat and the length and width of possible corridor connections.

"Despite variation in body size, the jaguar, puma, ocelot, oncilla and bush dog overlap in their ecological requirements," the study said.

"However, this is not without variation in the degree of habitat flexibility. Puma, oncilla, and bush dog have comparatively higher levels of modified habitats in their potential distributions compared to the jaguar and ocelot."



Jaguar. Credit: Washington University in St. Louis

By combining data on all five of these species, researchers developed a model that provides maximum habitat connectivity for all species while minimizing the cost of establishing these corridors through privately owned lands and communities.

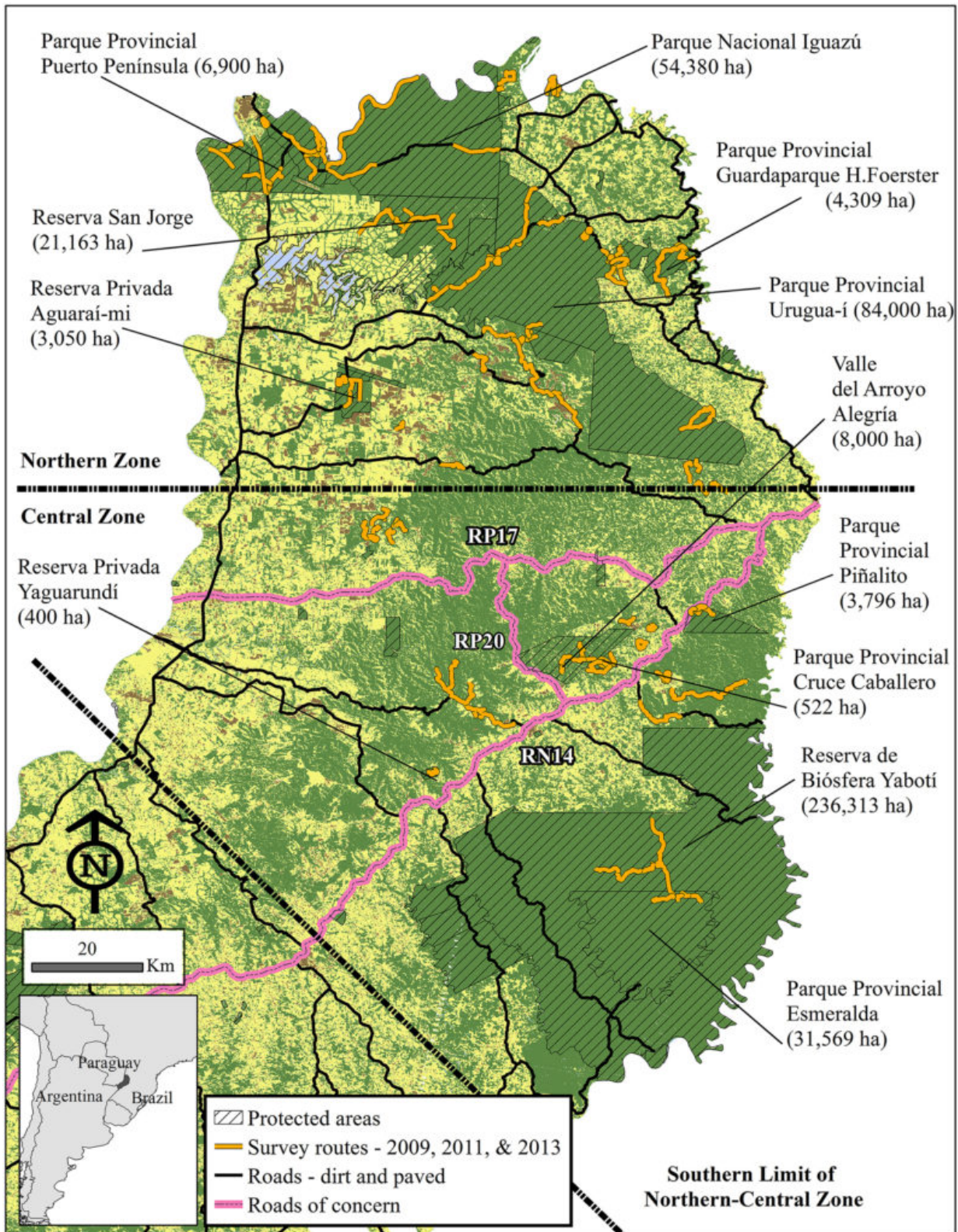
"The findings illustrate the benefit of using multiple species versus a single species to develop corridors, because using only the highly restricted jaguar to develop the corridor would mean that the potential distributions of the other four carnivores would be restricted and decreased by as much as 30 percent," DeMatteo said. "So, it appears that, at least in the Misiones province, the [jaguar](#) should not be modeled as an umbrella species because the results fail to capture the varied requirements of coexisting species across the breadth of potential habitats."



Credit: Washington University in St. Louis

DeMatteo and colleagues hope the study provides a methodology for identifying the optimal footprint for proposed habitat connection corridors, while incorporating enough flexibility to ensure that the needs and desires of private landholders can be incorporated into the process.

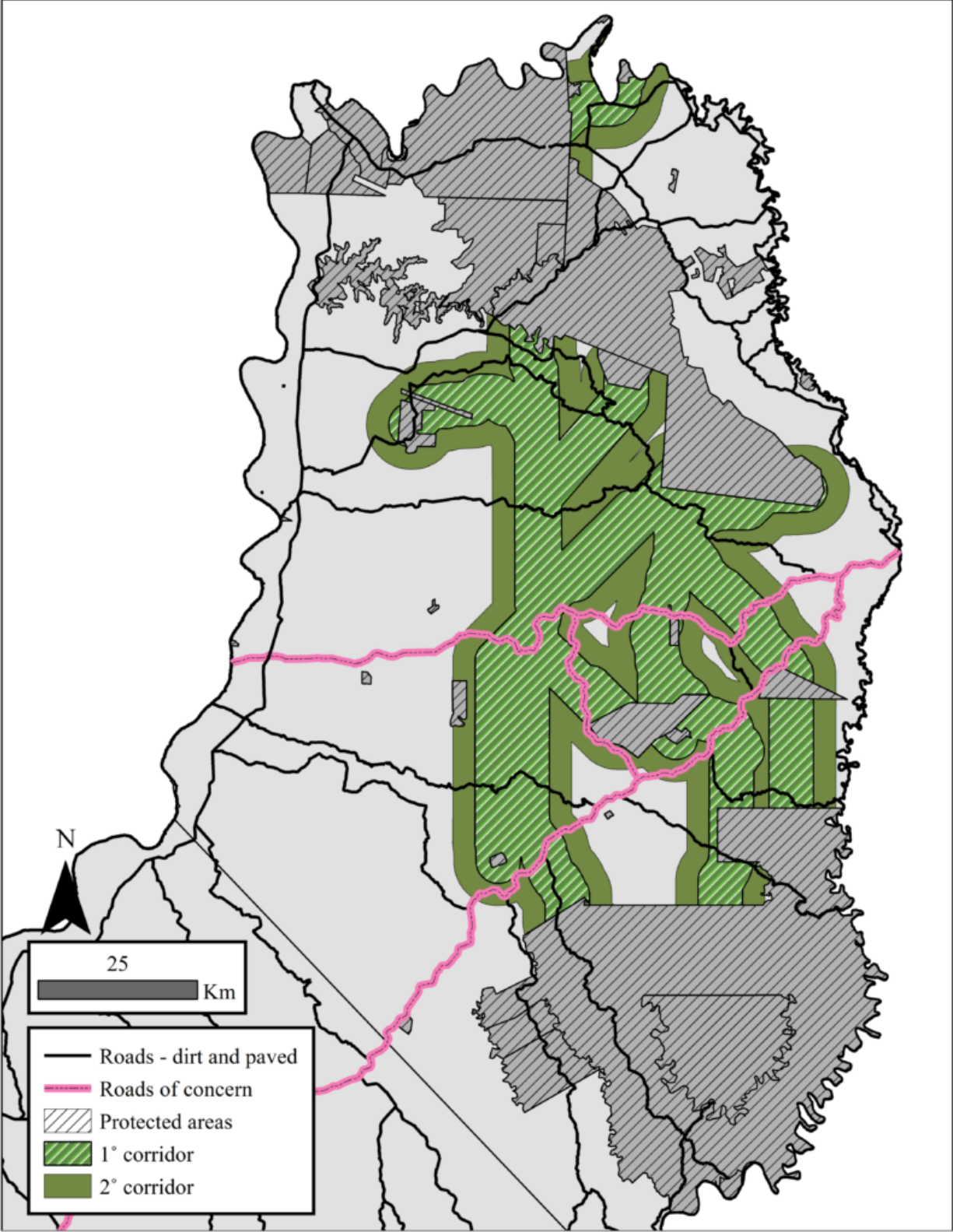
"The approach in making a corridor a reality is multi-pronged and involves a strong investment from the local community, especially when developing corridors that use existing protected areas as 'stepping stones,' as private land will inevitably be involved to varying degrees in and around the corridor," the study concludes.



Map of the study area in northeastern Argentina shows survey routes (yellow)

relative to protected areas, roads, and the land-use pattern existing in Misiones in 2009. Existing protected areas (shown in dark green with diagonal cross lines) in the northern and southern regions of the area are separated by three roads of concern (purple) and privately-held land areas (labeled RP17, RP20, and RN14) where habitat conversion is ongoing, rural populations are expanding, and the roads themselves are being widened and converted from dirt to paved asphalt.

Credit: Washington University in St. Louis



The habitat study's proposed multispecies habitat corridors would link protected

areas in the northern-central zones of Misiones, Argentina. The corridor was narrowed and divided into two levels that could be used to set conservation priorities: a 1° (7 km width) and a 2° (14 km width) corridor. Credit: PLoS One.

More information: Karen E. DeMatteo et al. Using niche-modelling and species-specific cost analyses to determine a multispecies corridor in a fragmented landscape, *PLOS ONE* (2017). [DOI: 10.1371/journal.pone.0183648](https://doi.org/10.1371/journal.pone.0183648)

Provided by Washington University in St. Louis

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