*Trishna Dutta collecting field samples.*

# Husband and Wife Team have Big Ideas for Big Cat Conservation

Not everyone can say that they passed on an offer to study at Oxford University. Trishna Dutta and Sandeep Sharma did just that in 2006, when the husband and wife pair received admission to pursue their graduate degrees in conservation. They chose George Mason University instead and are now close to finishing their doctorates through the environmental science and public policy program in the College of Science. Why Mason? Among the factors are the school's proximity to Washington, D.C., home to public policy's movers and shakers, and its special relationship with the Smithsonian Conservation Biology Institute (SCBI) and the National Zoo, where they both are doctoral fellows.

Dutta's and Sharma's research deals with one of the most pressing issues in conservation policy today: how to ensure the preservation of large cat species in India, the world's second-most populous nation. Specifically, they're studying whether forest corridors that connect five major tiger reserves in the central Indian states of Madhya Pradesh and Maharashtra are functioning for two species, the Indian leopard (*Panthera pardus fusca*) and the Indian tiger (*Panthera tigris tigris*).

In theory, the corridors should provide safe passage for wild cats to move around different reserves to breed with a variety of mates. The reality is that unlike the tiger reserves, these corridors are not legally protected landscapes and often coincide with villages, highways, and other disturbances. Ensuring that these cats have access to numerous and unique partners means there will be proper gene flow, resulting in the kind of genetic diversity necessary to a species' long-term survival, according to Dutta and Sharma.

"You sample across the entire landscape and see if genes from one population are moving across to another," says Dutta. "That's an indication that the animal has not only physically moved from point A to point B, but that it has also bred there and contributed to the gene pool . . . that's absolutely essential."

*Sandeep Sharma measuring tiger claw marks.*

To determine whether genes are flowing within tiger and leopard populations, Dutta and Sharma are using non-invasive genetic sampling, a technique they learned at SCBI, to extract an animal's genetic material without trapping and handling it. The samples are not blood or tissue, but scat, fecal matter containing sloughed-off cells from the intestinal lining, from which DNA can be extracted.

The downside to this approach is that DNA tends to be "highly degraded," says Sharma. "You have small pieces of DNA that are not really good," explains Dutta, "so the whole emphasis on the method is to try to get as much information as you can while maintaining a strict quality control."

Since returning from the field in 2010, the couple has spent countless hours in the lab working on the hundreds of scat samples they collected over two years. While leery of drawing firm conclusions yet, they've identified 217 individual leopards and 273 individual tigers from their samples, and preliminary results suggest that corridors are playing an important role in maintaining genetic diversity in these two species.

Ultimately, they say, sound conservation policy must be rooted in evidence-based science; they're hopeful that their work will help policy makers in India make better decisions regarding animal habitats. "With this large sample size," says Sharma, "we'll have some conclusive results that you can transform into policy or management recommendations."

Partners in both work and life, Dutta and Sharma spend a lot of time together. They met in 2001 and worked on a research project on snow leopards and wolves in the trans-Himalayan region in northern India in 2004. The harsh environment made for a challenging experience, one that seemed to seal their bond. "Once we pulled through that, we thought, if we can deal with this together, then I think we can deal with anything," says Dutta. "Working as a couple makes field work enjoyable and navigating all the hurdles simpler. Whether it's sampling in the field or writing papers, it's a huge support to know that you have each other to fall back on."


*Trishna Dutta and Sandeep Sharma working in India*

> "Ultimately, they say, sound conservation policy must be rooted in evidence-based science; they're hopeful that their work will help policy makers in India make better decisions regarding animal habitats."

## Results by the Numbers

- Central Indian states of Madhya Pradesh and Maharashtra connect five tiger reserves.
- Sharma and Dutta have identified 217 individual leopards and 273 individual tigers from their field samples.
- Preliminary results suggest that forest corridors are playing an important role in maintaining genetic diversity for these two big cat species.