

Waghoba tales: Adventures in leopard land

by

Ashok Ghule, Vidya Athreya,
John Linnell and Morten Odden

Edited by

Janaki Lenin

Waghoba tales: Adventures in leopard land. Ghule, A., Athreya, V., Linnell, J., Odden, M. and Lenin, J. 2014. - NINA Special Report 58. 58 s.

Trondheim November 2014

ISSN: 0804-421X
ISBN: 978-82-426-2692-9

COPYRIGHT HOLDER

© Norwegian Institute for Nature Research
This publication may be cited without restriction provided the source is stated.

GRAPHIC DESIGN

Kari Sivertsen, NINA

ILLUSTRATION CREDITS

Vinod More
Shreyas Deshpande
Girish Punjabi

NO. PRINTED

50



CONTACT INFORMATION

Norwegian Institute for Nature Research (NINA)

Postal address: P. O. Box 5685 Sluppen,

NO-7485 Trondheim

Office address: Høgskoleringen 9,

NO-7034 Trondheim

Telephone: +47 73 80 14 00

<http://www.nina.no>

COVER ILLUSTRATION

Jai our collared cat, his pugmarks were found at the bottom of a statue in the grounds of a local school and we could only laugh and wonder what he thought of this strange human.

Waghoba tales:
Adventures in leopard land

by
Ashok Ghule, Vidya Athreya
John Linnell and Morten Odden

Edited by
Janaki Lenin

Norwegian Institute for Nature Research

Table of contents

Preface.....	3
Introduction.....	5
Ghule.....	9
Poop collection.....	12
Chinese gold in rural Maharashtra.....	13
A five-legged leopard.....	17
Scat work.....	18
Cats in wells.....	19
Camera trapping.....	22
Conflict.....	25
Radio-collaring.....	29
Meeting Maharashtra.....	30
Man trapping.....	32
Community policing.....	34
Confounded by Waghoba.....	35
From lynx to leopards.....	36
Ajoba.....	37
Belling the cats.....	40
Leopard with a collar.....	42
Watching from a distance.....	44
Radio-collaring lessons.....	45
Radio-collaring results.....	46
Trying to catch the cats again.....	48
Catching Jai.....	50
Looking into the eyes of a man-eater.....	52
Lessons from leopards.....	53
Reality check: lessons from Akole.....	55
Conclusions.....	56
Acknowledgements.....	58
Further information / entertainment.....	58

Preface

Between 2007 and 2011, the Norwegian Institute for Nature Research and the Centre for Ecological Sciences of the Indian Institute of Science received funding from the Royal Norwegian Embassy (New Delhi) for a large project on Human-Wildlife Conflicts. The wider project involved many partners on both the Norwegian and Indian sides, and attracted co-funding from a diversity of other sources including the Research Council of Norway. Among the many sub-projects that were initiated it was the leopard studies that led to the closest and most productive cooperation between Norwegian and Indian researchers. This cooperation is ongoing even now, three years after the end of the original project. The leopard study had a great deal of focus on communication and outreach – and this booklet represents just one of these products. It is based on a translation from the original written in Marathi with additional sections added for a wider audience. The booklet is an attempt to provide insights into the process of conducting research as much as the results obtained. When people from diverse cultural backgrounds meet in rural India in the process of studying leopards some very bizarre situations can arise.

Trondheim, November 2014

John Linnell



An evening scene that might occur in leopard country -- a leopard mother and cub may be close to a farmer and his wife, whose child sleeps in a hammock slung between trees. The cats are eyeing a potential meal: the family's pet dog.

Introduction

Vidya recounts...

I began working on leopards in 2003 in Junnar, Maharashtra. For decades, it had been a peaceful rural valley, no different from other irrigated areas of the state. Onions, cauliflowers, cabbages, and beans grew abundantly. Grassy heads of sugarcane nodded in the breeze, while their dense purple stalks were impenetrable. There were also extensive vineyards. Unusual for rural India, we could buy bottles of red, white, and rosé wines.

Suddenly, this idyllic area became tense and fearful. Leopards prowled the valley, killing children and attacking women and men. In 2001 and 2002 alone, 50 people were attacked. When I went to live there in 2003, the residents were traumatized. An unofficial curfew descended as soon as darkness fell. If I was unavoidably delayed and had to walk home after dark with my three-year-old daughter, I held her hand tightly.

I'm a trained biologist and have worked on Asiatic lions and clouded leopards. I was puzzled by the leopard situation in Junnar. I wondered: Where did so many wild cats come from? There was no forest for miles around. Why were they attacking people?

Conservationists and biologists, quoted in the media, concurred: loss of forest, loss of wild prey, and disturbance caused by development caused leopards to turn on humans. Another commonly mentioned cause was sugarcane. Apparently, planting the tall crop spontaneously triggered a violent reaction in leopards. But these speculations didn't make sense.

Large cats like other wild animals generally avoid humans. How did the Junnar leopards overcome this extreme fear?

Leopards are among the most adaptable of predators – they can live almost anywhere and eat almost anything. If they lose forests, they can live in farmlands; if they lose wild prey, they can live on livestock. Leopards are also secretive animals, quick to duck undercover at the first sight of humans. What could turn such animals into man-killers? Whatever the trigger was, it had to be dramatic since attacks on humans began suddenly.

Collaborating with cartographer Sujoy Chaudhuri, veterinarian Aniruddha Belsare, and field researcher Sanjay Thakur, I gathered data from the Forest Department on the location of attacks, and the department's efforts to solve the problem.

Satellite maps showed no major habitat alteration had occurred in the last decade. That ruled out habitat disturbance by major infrastructure development as a cause for the attacks. Furthermore, in the southern part of Junnar, leopards attacked humans in areas where there was no sugarcane. These revelations disproved the widely accepted wisdom of what causes conflict with leopards.

Local officials admitted they trapped leopards from farmlands and moved them away to the adjoining forests. Whenever a farmer reported seeing a leopard or complained of losing livestock, an over-reactive department placed traps, caught an animal or two, and released them in the nearest wild area, Malshej Ghats, a tiny strip of the natural Western Ghat forests about 20 - 50 kilometers away.

The officials reasoned leopards were wild animals and wild animals need wild habitats. Letting them live in farmlands would invariably lead to conflict, they thought. Some of the relocated animals were mothers with cubs, which implied they were not "straying". Leopard mothers do not wander with vulnerable cubs in tow. The inescapable conclusion was these leopards belonged to this lush agricultural valley.

Sometimes, the officials didn't even take the trouble to release leopards in a forest. They just wanted to be rid of them and released them at the nearest district boundary, hoping the animals would go into neighbouring districts.

Did the released animals behave as the officials hoped? What did these territorial animals do after being released? In order to find out, we inserted rice grain-sized microchips in captured leopards and noted down the place of capture and release. If these animals were recaptured, we would know when and where they had been caught last, and how far they had traveled.

Many disappeared, never to be seen again. Some translocated leopards returned to their territories, traveling a couple of hundred kilometres through villages and farmlands. In some proven cases, leopards attacked humans near the release sites, where no one had been attacked before. Our data showed the

more leopards were translocated, the more people were attacked. By the time 50 people had been attacked, more than 100 translocations of leopards had taken place.

The officials made a mistake in assuming the animals would stay put wherever they were released. They didn't realize leopards are territorial animals, and relocated leopards are likely to return. Besides young dispersing males looking to establish their own territories, adult leopards are unlikely to wander. Yet, our scientific fraternity didn't attempt to enlighten the department. In fact, a reputed scientist who scoffed at this ad hoc management in private didn't take the effort to inform the officials.

Removing animals from their established and well-demarcated territories and releasing them in a new, unfamiliar area seems to create aggressive or potentially dangerous animals. We still don't know why. Maybe trapped leopards are severely traumatized. In typical capture situations, hundreds of yelling and screaming people surround the animals; some rattle the cage, while others poke the animals with sticks. In defence, the animals charge at the bars, bashing their heads, breaking their canines, and ripping their claws. Perhaps this extreme stress changes the way such animals perceive humans. It's likely that a combination of trauma sustained during capture and the stress of having to survive in a foreign landscape makes these animals attack people. We can only speculate.

Reading about leopard behaviour and wildlife management, I found one review paper particularly significant – “Translocation of carnivores as a method for managing problem animals.” It confirmed that the events in Junnar were not exceptions. Around the world, moving animals around yielded poor results. While some died, others returned to their territories and continued to kill livestock making the translocation a failure. But in Junnar, translocations had a far more sinister effect: man-killing. The paper was written by a team of Norwegians and the main author was John Linnell. I wrote to him about my work in Junnar and we began exchanging emails.

After my team made its case against translocations, the Forest Department reduced shunting leopards around to a large extent. The already trapped leopards were placed in permanent captivity in a rescue centre. Peace prevailed once more. This was confirmation that translocations were the problem.

However, during the course of this project, several questions arose. Can people and leopards share the same space without hurting each other?

Leopards enjoy a high degree of protection under Indian wildlife laws. There is no management policy for handling life-threatening situations caused by wildlife outside protected forests. Even when protected carnivores threaten human lives in farmlands, killing of the predator is the last resort and requires the permission of the topmost wildlife official of the state.

If translocation was not an effective management tool, what should the Forest Department do to manage these animals? How should they deal with predators in a landscape with only humans and livestock?

I had heard about the neighbouring area of Akole that was identical to Junnar: leopards lived among extensive irrigated fields. But they weren't attacking people there. I was convinced unless we understood how leopards and people lived side by side without causing problems for each other, it would be difficult to say why leopards killed people elsewhere.

To initiate such a study, I needed both practical help and funding. By some strange twist of fate they both arrived from Norway. The Royal Norwegian Embassy in Delhi funded the project, and two carnivore researchers from Norway became my advisors. One of them was John Linnell, and the other, Morten Odden. There were also funds from the Kaplan graduate award (Panthera and WCS-NY).

Thanks to their help, I studied leopards in Akole for five years, asking questions like what do they eat, where do they den, how large is their territory, what is their density, and critically, how do people and leopards adjust and live together in the same area? It was an incredible voyage of discovery for us all. We learnt a lot about leopards, a lot about the people with whom they share the landscape, and also quite a lot about ourselves. The following stories share these experiences.

Ghule

In 2007, when the research permits came through, the local office of the Forest Department deputed Ashok Ghule, a temporary forest watcher to be my assistant. Ghule was also a farmer, and sympathized with fellow farmers' loss of livestock to leopards. But as an employee of the Forest Department, he also understood the compulsions of management. He was an ideal liaison man; he knew the villagers on whose farms we wanted to work, and he knew local politics, which he leveraged to our advantage and became an indispensable part of the research team.

Ghule recounts...

I remember the day my boss instructed me to help Vidya study leopards. Although I consented, I was doubtful of my abilities. I did not know anything about leopards. How was I to help someone else? My boss assured me, "Don't worry, I will help if any problem arises." That was a relief, but I was still not confident. Besides, I had to work with a lady!

My first encounter with a leopard was in 1986. A group of us boys took our cattle to a stream of the River Chiman for a drink. A Thakkar tribal boy called out excitedly from atop a hillock, "I can see a movement in this thicket...it's a leopard."

We ran up the hill and peered inside a cave. All we saw was a white tail tip. The animal was obviously frightened of us. We threw stones at it, and it came charging out.

Scared out of our wits, we ran in different directions. When I stopped to look back, I saw it walk into the scrub and disappear. Today, I know it is wrong to throw stones at a leopard because it can retaliate. If pushed into a corner, it can even kill.

In those days, nobody thought leopards lived in these parts. People tethered their livestock out in the open. There was nothing to fear.

One early morning in the early 1990s in Takli village, my cousin discovered that a goat was missing. Both of us looked everywhere and concluded someone had stolen the animal. When it became brighter, we



A true incident -- a farmer went to irrigate his fields at night. Near the well, he saw two white spots by the light of his torch. Only when he went closer did he realize they were the backs of the ears of a leopard.

saw tracks in the dirt: drag marks. We followed them for about 90 metres to a dry stream bed and found the half-eaten carcass covered with leaves. Leopard pugmarks were clearly etched in the fine dirt.

Since leopards are protected by law, the government paid compensation for livestock losses. But it was inadequate. If a goat was worth Rs. 2,000, the government compensated us Rs. 500 only. So learning from our losses, we built closed shelters to protect our animals or took the smaller animals like the goats and the young calves inside our house in the night to protect them from the predators.

Farmers like me need three-phase electricity to run water pumps to irrigate crops. In these parts, electricity is not available all through the day, and it is only in the nighttime that we get power to run the pumps. I've seen leopards' eyes shining back at me in the torchlight as I walked through the fields in darkness. Even though humans were rarely attacked, I was scared.

These were my only leopard experiences. How I was going to assist a research project?

Poop collection

Vidya recounts...

When I arrived in Akole, I didn't know where to find leopards. There were the lush green valleys where sugarcane, cauliflower, cabbage, and onions grew, and the town's congested lanes, open sewers, and filthy market. The river was the lifeline of the place, and at the edges of the irrigated valley were the dry, rocky hills in the distance. Where were the leopards hanging out? With no similar studies to provide clues, I was on my own and nervous. Was I going to get enough data for my Ph.D.?

The first part of the project was to collect scat samples. In forests, researchers find cat poop on trails. But the Akole landscape was crisscrossed with paths; there were walking paths, cycle tracks, dirt roads, and asphalt roads going everywhere. And to worsen the problem each field had a path all around it as well as in it. Where in this maze would I find scats?

I randomly marked routes on a map of Akole, so I could sample every kind of terrain – cultivated fields, streets, stream-beds, and pathways up hillocks.

The two teams of poop gatherers walked along the designated paths looking along the edges for scats. If we found any, we scooped them into Ziploc bags, and noted the site's GPS location. To my surprise, we found scats everywhere: on the bunds of fields, near houses, and even in town. Leopards were using the same paths as humans.

Chinese gold in rural Maharashtra

Ghule recounts...

It was the height of summer when we began collecting scats. I thought we would wander around the fields and pick up whatever we found. But Vidya had different ideas and she was very particular about them. There was no way I could deviate from her strange plans. She marked our routes on a map and gave us each a copy. She found the most circuitous way of going from A to B, when there was a nice road that would take you there faster. If I didn't follow her instructions and took a shortcut, she would get annoyed. It was a disgusting and pointless job, especially under the blazing sun.

On this job, there is one question you don't want to be asked: "What are you doing?" Everyone was inquisitive. Were we itinerant salesmen? Were we surveying land, water, or mobile phone towers? When I answered truthfully, some were shocked while others smirked. Frequently, I gave ludicrous answers – and that made the otherwise smelly and tedious work more fun.

At the end of a hot, tiring day, two other field assistants and I were walking through the hamlet of Bangalwasti with our large rucksacks.

An old man asked, "Where are you coming from?"

I replied, "Akole."

"Why have you come here?"

"We are looking for leopard shit."

"Leopards live in the forest and not in villages."



A sketch of Ghule walking with two students during the poop collection. They do look like shady characters!

Everyone in the countryside is a leopard expert. And then he asked, "What do you do with these scats?"

"We send them to China."

"Why?"

"They extract gold from the scats."

We continued on our way, smiling, while the man gazed after us, open-mouthed.

Another time we were walking from the village of Sherankhel towards the scrub jungle of Songalwadi. Suddenly, about 10 women, who had been collecting firewood, started yelling at the top of their voices, "Thieves, thieves, help, help, thieves."

We looked around, but there was no sign of anyone else; we were the suspects. We explained we were not thieves; we were researchers looking for leopard scats. They became more suspicious. Nothing we said convinced them. We headed back to Akole before we got into more trouble.

Meanwhile, the women returned to their village and described the three thieves they had seen in the forest. A group of young men set out on motorbikes to look for these antisocial characters. We met these brave young men on our way, but they didn't think we looked like thieves.

The story didn't end there. The next day, we were traveling through Adhalwadi, a neighbouring village, when a man winnowing rice on the road, interrogated us, "Where are you from? What are you doing here?"

We told him we were looking for leopard scats. Surprisingly, he was satisfied with the answer. He then warned us to take care while wandering in the forest. "Last night, three thieves with rucksacks were seen headed towards Sahakosha hill. "The villagers combed the entire area with torch lights, but never found them," he said. The news of the three thieves had scared the villagers, and we found a forest devoid of people.

Three days later, we visited another neighbouring village. When we headed up a hillock, people got suspicious. Our appearance matched the description of the thieves at Sherankhel.

A group of 25 villagers gathered and yelled at us. "Where are you from? What are you doing in our forest? Come down immediately."

"Why don't you come up here?" I called back. The distance was only 150 metres. They were not ready to come up, and we were not willing to go down. More men gathered and the mob grew restless. Many were armed with clubs, machetes, and axes.

There was no way we could have continued on our way with this armed and agitated mob at our heels. Despite our better judgment, we climbed down and explained we were respectable people on a scientific mission. They let us go.

Later, we heard a rumour that villagers had beaten up three thieves of which one died and another was in a critical condition!

Had anyone told me the job entailed hauling heavy bags of stinky shit, I would not have undertaken it.

In fact, after a month of walking around in the hot sun, I had enough.

I told my boss, "I don't want to work on this project anymore."

He said, "Fine. Before you quit, find someone else who is honest and dependable to work on the project." I couldn't find anyone else who might satisfy my boss so I had to continue. But once I committed myself to the project, I started enjoying it and even learnt a lot about leopards.

A five-legged leopard

Ghule recounts...

A leopard was found dead in a sugarcane field near Rede. The badly decomposed carcass was crawling with maggots, and the stench was awful. Other Forest Department staff finished the paper work while Vidya, her student Kiran, and I looked around.

I found a spot of trampled grass. I followed the tracks and discovered a severed leopard leg. I shouted across the high vegetation to Forester Gondke and the others who were near the leopard carcass, "How many legs does the dead leopard have?"

There was pin drop silence before he replied, "How many would you expect a leopard to have?"

Everyone laughed.

I asked again, "Are all four legs of the dead leopard intact?"

"Well, yes, it does have all four."

I held up the severed leg and asked, "Then whose leg is this?"

Everyone was shocked to see the gory trophy. We were three-quarters of a leopard short.

Vidya recounts...

It was only after Ghule found the leg of a second leopard that we noticed the scats and scrape marks around the first dead leopard. We searched for an injured or dead animal but found nothing.

Next morning Kiran and I went back to the site. We combed the whole area, and suddenly, we found the dead leopard lying in front of us. Most of it had been eaten. Three legs, head and tail joined by the vertebral column were all that remained on a tiny path at the edge of a field.

Nearby lay steaming hot leopard scat, banded with yellow, black, and white leopard hair. Ghule and I were convinced the cannibal was a large leopard we called the Rede Male. The dead animals were obviously young because their teeth were sparkling white. The Rede Male may have defended his territory from these intruders, and scratched the ground in a show of territorial ownership. Striped hyenas may have also fed on the carcass; only their powerful jaws could have ripped that leg off.

Such cannibalistic behaviour in leopards has been recorded in other parts of India. When newly independent cubs set out to establish their territory, they are likely to encounter older adults. The bigger resident animals will drive them off, or kill and eat them. This is how leopards and their cat relatives control their own populations.

Scat work

Vidya recounts...

We got about 300 scats from an area of 300 square kilometres. We measured the diameter of each scat at the broadest section, preserved a piece in alcohol for DNA analysis, and dried the rest. We washed the dry scat in a sieve until only hair, claws, and bones remained. We studied cross sections of the hair under a microscope and examined the claws and bones.

We couldn't tell the difference between the scats of dogs and leopards, especially since dogs ate livestock carcasses discarded by farmers and offal near the butcher shops. We identified leopard scats by examining the DNA extracted from the poop.

Leopards in this area seem to live off domestic animals. That's no surprise because there is little else to eat in farmlands. Dogs make up almost half their diet (39%), even though the density of goats is seven times higher than that of dogs. Most farmers protect their livestock, leaving leopards with no choice but to hunt the dogs.



Dogs and pigs are ubiquitous in the rural Indian landscape.

Cats in wells

Ghule recounts...

This area has numerous open agricultural wells with no protective walls around them. Frequently, leopards and other animals fall inside, and we rescue them. I'll narrate two incidents here.

The silence of the night was broken by a loud noise, waking up a family living nearby. Later, they said it sounded like something had fallen from a height. They looked around in the dark, but nobody had a torch.

The grandfather was hard of hearing, but was nonetheless woken by the commotion caused by the family. He couldn't understand what was going on, so he retreated to the rear of the house to stay out of everyone's way. The rest of the family couldn't find the cause of the loud noise. Someone realized grandfather was missing. Had he fallen into the well?

They called out to him, and their shouts roused the neighbours. They arrived on the scene with a torch and found the old man. With reinforcements and a torch, they tried to solve the mystery of the loud noise. Had someone committed suicide by jumping into the well? They shone the torch into the well and found a leopard swimming around. Not knowing what to do, they waited till daybreak to inform us.

We lowered a large wooden plank into the well, and the exhausted leopard climbed on board. Then we surrounded the rim of the well with branches and thorns, leaving only one spot open where we set a trap cage. We lowered a ladder into the well, and positioned it so it led to the door of the cage. The leopard climbed up the ladder and was trapped.

The animal looked about 18 months old, and weighed 30 kilograms. The following night, when no one was about, we quietly let him run away. Presumably, he reunited with his mother. Everything went well with this operation, but it's not always so simple.

Foresters Pande and Gondke and I were summoned to rescue a leopard from a similar situation. By the time we arrived, a large crowd had gathered. Everyone was trying to look inside the well. We couldn't control the crowd and had to call the police.

The 20-metre-deep well was under construction. Despite the hard fall, the leopard seemed fine.

The owner of the well narrated, "This morning, the construction workers descended into the well by crane. The leopard must have fallen in sometime last night, but we didn't know that. It was hiding behind those boulders. Just as the crane was setting them down, one of the men spotted the leopard's tail and shouted. Immediately, it attacked the man. His father was also there, and he tried to save his son. But the leopard attacked the father, too. The others leapt off the crane platform in an attempt to escape. In the ensuing melee, the leopard attacked and injured some of them. Hearing their shouts, I looked into the well and was shocked to see the leopard. I yelled at the men to climb on to the crane platform.

Once they were aboard, we started the crane. But the leopard also clung to the platform and was hoisted for six metres or more. When the crane operator saw the animal, he stopped the motor. The platform jerked to a halt, and the leopard fell back into the well. The injured men were taken to the medical centre."

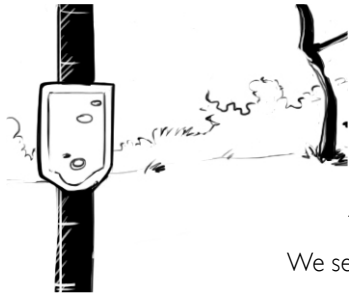
We tried the same method we used in the last incident: We fenced off the well with thorny branches, leaving only one narrow opening for the cage, and lowered a ladder. We waited for the rest of the day, but the leopard would not come out. So we camped there for the night.

Early the next morning, I looked inside the well and could not see the leopard. It was too dark to see clearly. One of my colleagues insisted it must still be there. We threw a chicken into the well and it scampered around without fear. This proved beyond a doubt that the animal was gone.

We wondered what could have happened. While it was still dark, the leopard must have climbed up and walked into the cage. Perhaps the trap door did not close, and the animal managed to escape.

As it became brighter, a crowd started gathering. We didn't allow anyone near the well. We were in a tricky situation: We had no leopard to show the eager crowd nor could we explain why the leopard was missing. If the villagers realized the leopard was gone, we would be blamed for freeing the animal. To make matters worse, the media arrived as well.

Then Forester Gondke had an idea. A couple of us announced we were going to get breakfast and left for Akole. Our colleagues near the well also left one by one on some pretext. The last person to leave told the lone policeman it was best if he left, too. We heard later that when the public realised there were no officials, they peered inside the well and discovered the leopard was missing. There was no one to ask, and they went away perplexed. If they had figured this out while we were there all of us would have got thrashed by the public who would have thought we purposely made the leopard run away.



A sketch of a camera trap.

Camera trapping

Vidya recounts...

We use remotely operated cameras to take photographs of animals that are hard to observe. These cameras are triggered by heat sensors when warm-blooded animals walk in front of them. We set up two cameras facing each other in order to obtain photos of both flanks of the animals.

No two leopards have an identical arrangement of spots, so we can recognize individuals. Depending on the number of nights we set camera traps, the number of animals we identify, and the area covered, we can statistically estimate the density of leopards in the locality.

From the scat collection phase of the work, we had already identified areas frequented by leopards. They became the choice locations for setting up camera traps.

At Rhumbodi Village, a large, old Acacia tree spread its branches over a house. One early morning, a lady was sweeping her courtyard, when her ten-year-old son pointed up to the tree and said, "Look! Cat." The mother was astonished to see a leopard sprawled on an overhanging branch. As soon as it realized it had been spotted, the animal ran down the tree and vanished.

We thought the Acacia tree would be a perfect location to fix a camera trap. However, when we visited the house again, the tree was nowhere to be seen. The family said when they saw the leopard reclining on the tree yet another time, they cut it down. Not even a stump remained.

Farmers living near the camera traps kept an eye on our devices, and threw gunny sacks over them as soon as they woke up every morning. If they didn't cover the cameras, a lot of film was wasted on photographs of milkmen driving by, livestock being driven to grazing grounds and children going to school.

Later in the morning, three teams of the research project set out for six sites each to switch off the cameras, and every evening, they returned to switch them on again.



A sketch of the incident where the little kid saw a leopard on a tree and after another such incident, the family cut down the tree.

I tried to ride a lightweight motorbike on the dirt roads to visit the camera trap sites, but after a few falls, I bought a pink bicycle that had “Avon Honey” written on it that became my trusted field vehicle. As mist rose from the water and the sun warmed my back on cold winter mornings, I really enjoyed the cool morning cycle rides through the farmlands. On one occasion, I took a curve at great speed and startled a family of mongooses sun-bathing on the path. Sometimes, villagers flagged me down and invited me to tea. Other times I would stop and eat mulberries straight off a tree by the path.

Although we set up camera traps to enumerate leopards, local people, especially children, found the devices entertaining. They traveled many kilometers just to trigger the cameras; they could expose a roll of film within half an hour with their antics, posing like action heroes, performing yoga postures, and crawling on all fours like leopards.

One farmer found another use for our camera traps. When he wanted photographs of the previous night, we thought he was interested in leopards. He told us thieves had stolen his onion seedlings, and he wanted to find them. They could not have avoided the camera traps, he said. We gave him the pictures, but he never told us if he caught the thieves.

During our study we lost only four out of 40 cameras. The ones that were stolen were far from houses with no one to guard them. Despite the loss, we managed to get 1,500 photographs of people and about 80 of leopards.

We identified at least eleven adult leopards from the images. Besides these cats and people, there were hyenas, jackals, foxes, jungle cats, and rusty spotted cats. All these carnivores and humans used the same paths. We calculated that Akole valley which has at least 300 people per sq. km. also supported five leopards and five hyenas per 100 sq. km.

Camera trapping also provided interesting insights into leopard behaviour. On many occasions, two or more leopards used the same path on the same night. We also learnt they move long distances. The Rede Male, for instance, was photographed at two locations, eight kilometres apart.

Ghule recounts...

I took a friend along to switch on the camera traps one winter night. I asked him to focus the motorbike's headlight on the device. Dense sugarcane fields stretched on either side of the path that was regularly used by a large leopard that we called the Tavangmala Male. Just as I was opening the camera, the motorbike went dead and it was pitch dark. I switched on my head torch and continued to work. Insects buzzed around my face, attracted to the beam of light. The only light besides my torch was the occasional firefly. I set up one camera and was about to switch on the other one when my torch became dim.

Just then something hit my back. I froze, certain it was the Tavangmala Male. After the initial shock, my grey cells started functioning. Why would a leopard hold on to my back and to only one side of it, I wondered. Finally I worked up the courage to look behind me. It was a butterfly-sized pipistrelle bat, attracted to the insects hovering in the light beam. After that scare, my friend never accompanied me again.

Conflict

Akole valley was chosen as a study site because of the apparent lack of serious attacks on people by leopards. However, we were reminded of the potential for serious conflicts by the following two episodes which occurred on the borders of the district, but far from our study area.

Ghule recounts ..

Like many similar villages, people of Sangvi slept outdoors at night because of the cool breeze. One night, a leopard picked up a small girl asleep among adults. The animal dragged her for almost 10 metres by the head. The girl's cries woke up her family and they chased the leopard away. The girl was taken to hospital and survived.

That same night, a boy was attacked at Pimpaldharawadi, a tiny settlement of the same Sangvi village. A search party found the leopard was sitting on the lifeless body. Only when people shouted did the animal run off. The next day, young men from the village combed the forest, and discovered the animal hiding in a cave, not very far from where the body was found.

The news spread far and wide. Several people from neighbouring villages gathered around the cave. Sharpshooters were called. But the permission to shoot the leopard had to come from the Chief Wildlife Warden. When daylight started to fade and there was no sign of the paperwork, the desperate and enraged villagers lit a fire at the mouth of the cave. The leopard came charging out, and the crowd pelted it with stones. Some armed with axes, machetes, spears, and clubs tried to get close to the animal and were injured. Villagers tried to catch it with the nets they use for catching hares. But the leopard managed to find a gap and escaped.

Vidya recounts..

When leopards and humans share the same landscape, the cats usually sense human presence and slink away into the undergrowth unseen. Or they may crouch out of sight and stay still until the coast is clear. That is the normal behaviour of leopards.

Therefore, when a human is killed and eaten, it is in all likelihood an abnormal situation. Something triggers a change in some leopards' perception of humans leading to attacks.

Many hunters and natural history writers say it is the old and injured large cats that attack humans because they are easy prey. If that were the case, then aging and incapacitated animals should be attacking people all over the country. However, such incidents are localized, and we do not understand why large cats turn man-eaters.

Both these incidents occurred at the district boundaries, a choice location for the release of "nuisance" leopards. Just as we witnessed in Junnar, leopards attack people near such release sites.

However, where leopards are left alone, such incidents generally do not occur. The number of attacks on people is very low within the 300 sq. km. Akole valley. Leopards live and breed surrounded by people,

and yet there have been only one or two injuries a year:

India's wildlife laws primarily deal with wildlife inside National Parks and Wildlife Sanctuaries where the density of people is very low. However, when a leopard deliberately attacks humans in villages and farmlands with high numbers of people, as the above examples show, it is necessary to deal with the situation differently. If the administration does not react fast enough to such a volatile situation, then desperate and panicky people will kill many more leopards.

Ghule recounts ..

When people and leopards live in the same area, some minor skirmishes are bound to occur:

One winter's day, a man was walking along a path that wound around a hill covered with dry stunted forest trees. He came upon two leopard cubs playing on the path oblivious to him. To scare them off, the man raised his stick and shouted. When the frightened cubs called in distress, the mother sprang out of the bushes in an instant. She knocked him to the ground, and clawed and bit him.

Since it was considered an accident, the Forest Department covered his medical bills and let the leopardess be.

We heard that a man had been attacked by a leopard near the sugar factory in Akole. This was strange because there has never been a case of a leopard deliberately attacking a human in this region. So we investigated.

The man had given some of his land to the factory promoters in return for employment. But he stole scrap metal from the factory. When he was caught red-handed, he was dismissed from his job. In protest, he and his mother set up a tent outside the factory and went on hunger strike.



The man said that two nights ago, a leopard had dragged him for 15 metres. The wounds on his shoulders and head were superficial, and distinctly un-leopard like. When we grilled him, his answers were vague and his eyes evasive.

Factory workers told us another story. The man had climbed up an electric pole to tap electricity illegally. But he got electrocuted and fell down, hurting his shoulders, hands, and face. The next morning, he showed up at the factory with his head and hands wrapped in bandages, and told everyone a leopard had attacked him.

A week later, he demanded compensation from the Forest Department. The officials told him to get a doctor's certificate, but the doctor, of course, refused to issue a false declaration.

Sadly, some people exploit leopards like this for their own gain.

Radio-collaring

Vidya recounts ...

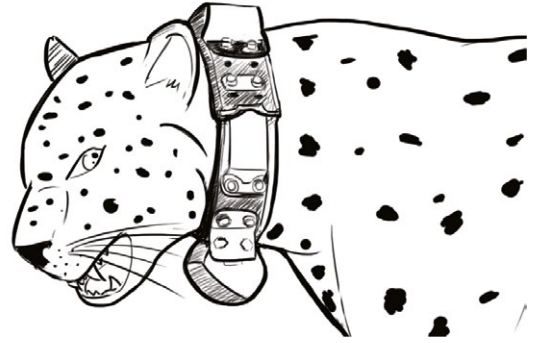
One technological innovation helping wildlife biologists around the world is the "Collar," a gadget used for tracking wild animals.

Initially, I wasn't planning to collar leopards. But the Chief Wildlife Warden insisted I demonstrate that leopards can live peacefully among people. Only then would he be convinced of my recommendation. I could not tell him no as he was really interested in resolving the conflict issue but I thought to myself that I would not get permission from the Ministry of Environment and Forests in Delhi, so I confidently answered, "Yes." But the approval came within three weeks and I had a scientific noose around my neck.

The collars we used in Akole had a GPS unit that uses signals sent by satellites to determine where they were, and a cell phone chip that could send this information as a text message back to John and Morten's lab in Norway, half-way around the world. To see a collared animal's movements, we logged on to the Internet.

The collar also had a radio transmitter as a backup. In case the GPS device or cell phone chip malfunctioned, we could physically track down the animal by using a receiver and listening for the radio signals emitted by the transmitter. At the end of the study, a programmable drop-off device severed the collar and the animal didn't have to be caught again in order to remove the collar.

John and Morten, both experienced in collaring cats in Europe and Nepal respectively, arrived for this phase of the project. Not only did I learn a lot from them, I was gratified to see their reactions to Akole. They couldn't believe large carnivores like leopards and hyenas lived among so many people.



Meeting Maharashtra

Morten recounts...

I come from Norway, home of the popular tourist attraction “Cape North”, famous for being the northernmost point of the European mainland. My country is cold, barren, and sparsely populated compared to India, but physical differences didn’t make the strongest impression. The cultural differences were far more apparent and interesting.

Local people were lively and open-minded, and their sense of humour was immediately evident. I once went across the road to a tea stall, shook hands with the owner, and introduced myself as Morten. The man and all his customers burst out laughing. The following days were no different. Every cup of tea I bought was accompanied by lots of laughter. I didn’t know why I caused so much merriment.

Finally, when someone addressed me as Mr. Mutton (meat of a goat or sheep), I understood. My strange name wasn’t the only thing that drew attention to me.

Although I tried to blend into the crowd, it was impossible. I once rode a bicycle into Akole town to shop, and ended up being interviewed by a television journalist. I stuck out like a sore thumb, perhaps because I am six feet tall and my skin was sunburnt pink. I am tempted to believe the latter is my most obvious attribute after the housekeeper at our field station commented in Marathi at the end of my first visit, “So you are leaving now that you finally look like a human being.” Obviously, my face had turned from pink to a more agreeable brown after a month in the Maharashtrian sun.

I’ve visited Akole several times since, and every time I returned home with excess weight – the consequence of great hospitality and a cuisine I dream about in Norway. More importantly, I learned some valuable lessons about life in general, and especially how humans can coexist with carnivores.

Our Norwegian carnivores – lynx, wolverine, wolf, and brown bear – were absent for several decades following intensive eradication campaigns in the early 1900s. Their density and distribution has increased over the past 20 years. As a consequence, we have had hot debates about them. Current livestock

husbandry practices – letting domestic animals roam free without shepherds or guard dogs – developed during the carnivore-free period. Most Norwegians think this is “the natural state of the environment.”

Farmers have not adapted to the new situation because they see carnivores as alien invaders that have no place in the landscape. So livestock losses to carnivores are massive in some areas. Wild game hunters now have to adapt to living with competitors, another source of conflict.

At Akole, people's attitudes toward large carnivores were different from those I faced in Norway. Although opinions vary, tolerance of these animals was far more widespread than back home. This was surprising for several reasons.

Firstly, most households keep livestock, and because of the high density of people, most of the population is potentially affected by the presence of large carnivores.

Secondly, economic losses are likely to be more severe in Akole, although the government pays compensation for kills that are verified. Indian farmers must find and show the kill before they receive any compensation. Lastly, carnivores attack and sometimes kill people in India.

In Norway, livestock owners are relatively few and the government pays compensation for both verified and non-verified kills. Most importantly, human injuries caused by carnivores are practically non-existent.

Although conflicts are generally less severe in Norway than in India, few Norwegians seem to accept wild carnivores in villages and farmlands. These attitudes are not easily changed. Perhaps a visit to Akole is the answer?

Man trapping

Ghule recounts...

We set up a cage trap near the Pravara River next to a forest nursery. We camouflaged it with twigs and leaves. At the back of the trap cage was a separate smaller cage where we tied up a dog as bait. Even if a leopard got trapped, the puppy would be safe. However, the resident leopard refused to walk in.

Villagers regularly walk past the forest nursery to reach the weekly market in Akole. At the end of the day, a Thakkar tribal, who had had his fill of hooch, stumbled homewards along the path. He heard the bait-dog whining and tried to rescue it. As soon as he entered the cage, the trap door fell and he was imprisoned.

The forest guard, who was sitting about 15 metres away, heard the trap door slam shut. The dog stopped whining because it had company. But the guard thought the dog shut up on seeing the leopard and didn't bother to check the trap. He called his boss and said, "A large leopard has been caught."

The next morning, the forest staff crept towards the cage quietly, as any loud noise can scare a trapped leopard into growling and charging. Instead of a leopard, they found a sober man. The poor man sheepishly said, "I thought some cruel person had tied up the dog. It was whining so pitifully that I decided to rescue it."

The staff shook their heads in disbelief as they released him after his night in the trap cage with a silent dog for company.



A sketch of the drunken man who got caught in the trap cage and a leopard probably having a laugh at the situation.

Community policing

Ghule recounts..

Migrant labourers were working on a canal project at Ambad. The locals were curious about the new people because their clothes, mannerisms, and cuisine were different. There was one other crucial difference: The outsiders were hunters. In India, hunting any animal protected by law is illegal.

One day, some farmers found a leopard trapped in a foot snare. In many places, poaching leopards for their pelt and bones is a serious threat to the animals' survival. The trapped animal's growls attracted the villagers' attention and they alerted the Forest Department. The leopard was rescued and the villagers also identified the three culprits. Luckily for the leopard, the villagers' alertness saved the animal.



Tigers usually grace Waghoba shrines. In some places, leopards are also revered as Waghoba.

Confounded by Waghoba

Vidya recounts...

Many wildlife biologists like to avoid having much to do with human beings. It's no surprise that their efforts to change other people's behaviour are awkward and insensitive. I had my epiphany when I stumbled on Waghoba.

Ghule and I were on our way to interview a Thakkar tribal lady when I saw a small statue of a tiger on the roadside. The artwork was crude but someone had gone to a great deal of effort and built a concrete platform lined with bright ceramic tiles, the kind we use to line bathroom walls. What was the significance of the tiger, I wondered in passing as I focused my thoughts on the interview.

I asked the tribal lady if leopards bothered her. She grew annoyed and replied brusquely, "At night he walks along the narrow paths, but keeps to himself and does not create any trouble." She talked of leopards with the same respect she would accord people.

Later, Ghule told me the Thakkars revere Waghoba, the god of tigers and leopards. Naturally, they are unlikely to speak ill of a sacred animal. They understand the animal's ways, protect their goats in sturdy shelters at night, and during the day, keep watch over their flocks. That was when it occurred to me that the tiger figurine I had noticed earlier was a shrine to Waghoba.

Since then I've noticed many more Waghoba altars in Maharashtra. Obviously this religious belief influences the way local people relate to leopards. But should a crisis arise, people will kill the animals.

Biologists are not trained to understand cultural and social influences impacting conservation. Since this incident, I realised how important it was to work with social scientists who are better able to analyze and understand these issues.

From Lynx to Leopards

John recounts...

For most of my professional life I have studied the way large predators behave and how they interact with people. Living in Norway, my main focus has been on the Eurasian lynx, the same species that's also found in the Indian Himalayas. Although this cat weighs only about 20 kilograms, it can kill deer weighing up to twice its own weight.

In Norway, lynx live in the vast conifer forests that cover almost half the country. Most of these forests are commercially exploited, although hardly any people live there. The climate is cold, with snow covering the ground for almost half the year. Lynx are so secretive that they are rarely seen. In order to work with these cats, we depend on radio-tracking collars – so we can follow them wherever they go. We capture and drug them, attach a collar, and let them go again. This is standard research practice.

When working on a research topic, you get so consumed by asking and answering questions that you think your microcosm is the whole world. Your subject animal becomes the only species that counts. Luckily for me, I was dragged out of my little bubble and given a major dose of perspective.

For some time, I had been in email correspondence with a young Indian biologist called Vidya Athreya, discussing her work on man-killing leopards in Junnar. The whole thing seemed so abstract and distant. Then all of a sudden, a funding opportunity appeared, and before I knew it, I was heading to India to begin a cooperative project with Vidya, on leopards around Akole.

It is hard to imagine a greater contrast in environment. I was used to the silence and calm of vast northern forests, with cool moist summer air, glistening snow in winter, and great distances between people. Akole was hot, dry, dusty, and resonated with the sound of people. Motorbikes, car horns, the latest Bollywood music. The landscape was filled with people. Never a place to find a moment of peace. No habitat not dominated by humans, their crops, and development. Was this the place to find leopards, those powerful, almost mythic beasts of the jungle? Kipling placed the leopard Bagheera in the "Jungle book," not the "Sugarcane field book."

Yet in the coming days, we saw tracks and signs of leopards almost everywhere: behind farm houses, along tracks between fields, even in town. I saw more leopard signs in this landscape in a few days than I saw lynx signs in the northern forests of Norway in a month.

I was hooked. The whole set-up with leopards in farmlands was so surreal I was bursting with curiosity to find out how they lived. And thus a wonderful partnership was born. During the following years, I was lucky to assist Vidya as she went on her own voyage of discovery into the world of people, leopards, and gods in this amazing landscape. My own frames of reference were altered. And while I still think that my lynx are cool cats, I admit having developed an incurable fascination for the leopards of India.

Ajoba

Vidya recounts...

For two weeks in April 2009, John and Morten waited for a leopard to get trapped. It was the middle of summer, with frequent power cuts. The temperature shock – sometimes reaching 37°C – for the Scandinavians must have been significant. I splashed water on the floor and lay on it in the afternoon waiting for the sun to set. At dusk, we set traps to catch leopards.

Initially, my plan was to let the villagers know of the collared leopards, but the Forest Department staff cautioned me. They said if the collaring became common knowledge, villagers would blame the collared leopards for every dead goat. Since villagers don't understand technology, they could claim the collars are causing leopards to misbehave by taking livestock. Besides, how could we work on a drugged leopard with a hundred people breathing down our necks? Just as villagers came from afar to see the camera traps, they may be curious to know where the collared animals were hiding and disturb them. It would be impossible to do research with such interference. We had to be secretive. I couldn't set up cage traps for leopards along paths; the game would be up immediately. However, there were a few places with hardly any humans.



*Ajoba fell into a well while chasing a dog.
Witnesses say predator and prey perched
precariously on the same ledge, the only dry place.*

We found the house of a tribal family that was ideal for our work. Every evening we set the cage trap and slept about 100 metres away, under the beautiful night sky. But anyone sleeping on the edge of the group was nervous – what if a leopard comes close? One morning we found the pugmarks of a hyena 20 feet from where we had been asleep.

At the end of two weeks, John's time was up, and we had still not caught a leopard. John was on his way to the Pune airport when I received a message: a leopard had fallen into a well at Ale Phata. Since the well was on the way, John stopped to see it.

The leopard had been stalking a dog that fell into a well. In the heat of the chase, the leopard also fell in. When John arrived, both leopard and dog were sitting on the only ledge available. As soon as the villagers and Forest Department staff lowered a crate, the dog promptly jumped aboard, and was hauled out. But getting the leopard out was not easy. Unfortunately, John had to leave.

After two days, the leopard climbed up a ladder and was trapped in a cage. We collared the full-grown male and named him Ajoba, Marathi for 'grandfather'. Over the following months, he walked from the Western Ghats to Mumbai without harming a single human, crossing highways and railway stations and swimming across a wide creek.

In 2014, a film director grew fascinated by the leopard's adventures and made a Marathi feature film, 'Ajoba.'



Belling the cats

Vidya recounts...

The morning after we released Ajoba, we heard of another leopard that had fallen into a well near Sangamner. We rushed there to check if we could collar the animal. She had many injuries, possibly sustained during her fall. After she was hauled out, we noticed she had a thin neat cut on her lower lip. It was deep enough to see her gums. Many farmers put broad metal collars with sharp, protruding spikes to protect their dogs from leopards. We wondered if the leopardess's lip had been sliced by one of these dog collars. She seemed to be tired and weak, so we gave up the idea of collaring her.

When the location points of Ajoba began trickling in, Ghule became excited that we could track leopards remotely. His eyes were shining when he said, "Madam, when we get the Rede Male, I will not sleep at night. I'll follow him and observe what he does." Camera trap images indicated he was a large individual. He had walked eight kilometres between two camera traps, probably killed the two young leopards, and feasted on rare breeds of cows in his territory. We respected this chap.

Although we set a trap for the Rede Male, we trapped a young animal on May 1st, Maharashtra day. We called him Jai Maharashtra. After we collared him that night, I reached the field station at 1 a.m. and went online. Jai had also reached town.

We also collared two leopardesses, Sita and Lakshai. Lakshai was named after our elderly housekeeper who used to terrorize all the men in our team.



Jai's GPS pinpointed his location at a chicken coop. The next day, the man who owned the chicken told our team that he had seen a leopard attempting to get inside the robustly built coop.

Leopard with a collar

Ghule recounts....

We were following the pugmarks of Jai Maharashtra along a field near Shekewadi village, when a farmer said, "Why are you taking all this trouble? The leopard will come out only at night. It's hiding in the sugarcane field."

I inquired, "How can you be so sure the animal is inside the sugarcane?"

He replied, "I was watering the sugarcane field two days ago when I heard a noise. About seven metres away from me was a leopard. It kept its eyes on me as it walked slowly towards me, so I backed away. It disappeared into the sugarcane. It must be there now."

He added, "Uncle, someone has tied a collar with many holes around its neck."

I suppressed a smile, and asked, "Why do you think anyone would put a collar with holes round a leopard's neck?"

He was adamant. "I saw it from close range. It's just like a dog collar."

To throw him off the scent trail, I said, "You know sometimes pigs muck about in the garbage. The leopard must have followed the pigs, and something from the garbage might have got stuck round its neck."

That explanation satisfied him. After a moment's pause, he said, "Uncle, the leopard was good-natured. It didn't attack me."

Vidya recounts...

Jai and Lakshai were caught about two kilometres apart near sugarcane fields. Once the collars were activated, we discovered they were interacting, and occasionally meeting up. They hid in adjoining fields during the day. In fact, after Lakshai was released, she hung out with Jai for some time. How did she know where to find him? That's a mystery. Later, DNA analysis showed Lakshai was most likely Jai's mother.

While it was fascinating to see what the animals were doing, that year was perhaps the most stressful period of my fieldwork. Jai and Lakshai were not living in farmlands as we had earlier assumed; they were town animals. They walked the streets, hunted pigs and dogs at the market's garbage dump, and rested on rooftops. If people found out about the collared animals, how would they react?

To make matters worse, Lakshai gave birth in a sugarcane field, 100 metres from the front entrance of a school. What if some kids blundered into a protective leopardess?

One night, the GPS data showed us that Jai had been on the school lawns, below the statue of the school's founder, unbeknownst to anyone else. We could not help wondering if he looked up at the bust of the founder and wondered what kind of strange human this was.

Knowing the details of this closeness between people, sometimes children, and leopards unnerved me. It seemed just a matter of time before one of the leopards got into trouble. Not only would that lead to a public relations disaster, it could so easily jeopardize my research. There were days when I was pessimistic and expected my whole research project to unravel.

Watching from a distance

John recounts...

When walking around rural India, it is easy to think time stands still. Oxen plough the fields, migratory shepherds travel with their flocks, crops are planted and harvested by hand, and people have the time to be curious, to offer hospitality, and to chat. Somehow, the constant presence of mobile telephones, satellite antennas and motorbikes does not disrupt the impression of being back in an old-fashioned world. However, there was nothing old-fashioned about the technology we deployed to study the leopards of Akole.

In Norway, I'd wake up, make a cup of coffee, sit down in front of the computer, and log in to the internet to see the latest locations of our leopards on the other side of the world. The information was delayed by just a few hours, so it was possible to follow the adventures of Jai and Lakshai almost in real time, as they hunted and rested around the edge of town. I could look out the window at my snow-covered garden, while the cats roamed under the burning sun. From a distance, I could follow Lakshai while she raised her cubs in a field next to the town school. Surreal is an understatement.

I visited Akole on several occasions, walked the tracks, felt the sun, smelt the smells, heard the sounds, and tasted the food. This gave me a point of reference to understand the real meaning of these abstract data points that ticked into my computer every day.

The reality of how closely leopards lived with humans hit home one day when we were in Akole. We logged in to download Jai's latest locations, and were shocked to see he had been on the street just outside the field station a few hours earlier. We went out to locate him with the radio signals that his collar transmitted, and soon we were standing on the edge of a small patch of sugarcane. He was less than 50 metres away. So close, very much present, but still invisible. This is the reality of leopards – the most solid ghosts that walk the Earth.

Radio-collaring lessons

Ghule recounts...

Before this project began, I used to think if a leopard was interrupted while feeding, it would abandon its meal.

Now I realize it returns to the carcass later the same night, and sometimes, even the next night.

I tell villagers, "If you want to reduce your loss, do not bury the goat; do not deprive the leopard of its meal. Leave it at the same spot so the leopard can eat its fill. If it is starving, it will surely kill another animal."

One farmer retrieved a goat killed by a leopard, so it killed another. When he deprived the cat of that goat as well, the hungry leopard killed another. It killed a fourth goat and this time managed to take it away. Had the first farmer let the cat feed on the first goat, the others farmers would have not lost their goats.

Leopards also scavenge freshly dead animals which can lead to them being blamed for killing more livestock than they do. In Dhumalwadi village, a goat died in labour, and the owner threw the carcass in a nearby dry streambed. Not one, but two of our collared leopards, Jai and Lakshai, ate the entire goat.

Radio-collaring results

Morten recounts...

Following the collared leopards hour to hour, day and night, has given us insights into their secretive lives. Cats establish a territory that they will defend against intruders. When food is plentiful, territories are small; when prey is scarce, territories are large. Even though lynx are much smaller in size, in the barren Norwegian landscape, they prowl over territories 10 times larger than tigers do in the productive tropical jungles of India.

Akole is not a tropical jungle teeming with wild prey. The town has 20,000 human inhabitants, a density of more than 300 people per sq.km. Therefore, most biologists would expect leopards living here to have large territories. From the scat analysis, we knew these Akole cats fed on the abundant feral animals and livestock, but we were astonished when the data from the collared animals started ticking in.

The average leopard territory was about 10 sq.km., among the smallest ever recorded for the species. Until now only leopards living in productive jungles with lots of wild prey were known to have such tiny ranges.

Although leopards are dependent on domestic animals, they remain largely invisible to villagers. That's because these animals are stealthy, experienced, and clever at avoiding people. After dark, when people retire indoors, leopards walk freely, as if they own the streets, hunting and patrolling their territories. Darkness covers them with a cloak of invisibility. Many people in Akole would be surprised if they knew leopards visit their homes. For instance, Jai spent nearly half his time around houses, looking for free meals in cattle shelters.

During the day, when people are about, leopards hide in thick vegetation, often sugarcane fields. They lie low even if people are close enough to step on their tails. Had it not been for the collars, we would have never known how leopards live in farmlands and towns.



One night a farmer went to tap into an illegal electricity connection from the roof of a house that was used only for storage. As he climbed the stairs at the outside he saw two leopards on the terrace and one jumped down on seeing him. The other came down a few stairs and jumped off. The farmer was shaken when Ghule met him. We realised it was Jai and Lakshai on the terrace of the house on that moonlight night.

Trying to catch the cats again

Vidya recounts...

A few months after activating the collars, we set traps to recapture Jai and Lakshai to check the tightness of their collars. They approached the traps but refused to enter them. Instead, the trap-shy animals attempted to get the bait goat from the back of the cage. Then Lakshai had a cub, and shifted her ranging to the north of Akole. We placed a trap there as well. Although she managed to prevent her cub from getting trapped, she couldn't stop him from falling into a well.

Lakshai paced around the edge of the well all night and retreated only at daybreak. When Ghule and the Forest Department staff rescued the little shivering fellow around 10 a.m., Lakshai was hiding in a sugarcane field about 250 metres away. As soon as it grew dark, her collar told us that she was back at the well looking for her cub. At 10 p.m., Ghule let the cub go near the well. Half an hour later, mother and cub reunited and even met up with Jai. The next morning, we followed three sets of pugmarks to the carcass of a pig on which they had feasted.

We continued our efforts to catch these clever leopards for six months, changing the position of the traps, camouflaging them, and using different bait animals, but we were unsuccessful. Eventually, Lakshai's collar fell off.



Hyenas are known to steal kills from leopards. That's why leopards hoist their meals into trees. One farmer at the study site saw one such carcass on a tree.

Catching Jai

Ghule recounts...

On Mahashivratri festival, I got a call at 1.30 p.m. A leopard was trapped inside a house at Malizap village. We set up a trap cage at the door of the house and blocked all other escape routes.

While we waited for the leopard to be trapped, I asked the family, "How did this leopard get in?"

One of them replied, "Our guests and the entire family had just finished lunch, when a large animal walked in. The leopard looked at us casually, and walked past the kitchen. We came to our senses and quickly shut the kitchen door."

I asked, "How did a leopard come to the house in broad daylight?"

"The leopard was drinking water at the canal. Some kids threw stones at it and it tried to escape. There was no place for it to hide so it kept walking, followed by the stone-pelting kids. It entered the village pursued by a mob. Our door was open so it went inside to hide."

A crowd of about 5000 people gathered to watch the capture operation. I caught a glimpse of the frightened leopard hiding in the kitchen loft. Before calling us, villagers tried to scare it away by bursting firecrackers. But that had freaked the animal out, and it didn't budge from its hiding place. We were in for a long wait.

At 3 a.m., we removed a few bricks from the wall of the house with the owner's permission, and poked the leopard with a long bamboo pole. It ran out and was trapped.

It was Jai Maharashtra.

Vidya recounts...

When I arrived in the village from Pune at 3 a.m., I saw women dragging half-asleep children to see the leopard. Even at that time of the morning, there were at least 100 people hanging around the house. Jai had just been trapped, and we had to let people look at him first before we could take him away.

It was only later that we noticed Jai was injured. The collar seemed to have caused a big open wound on his neck. Any further delay in veterinary help and he might have died. It was sheer good luck that he was trapped in the house because he never went into the cage trap which we had set for the last four months.

Throughout the 20-day period when the vets treated Jai, Ghule tended him daily. It was a horrible time for Ghule and I. Jai held a special place in our hearts. He had been a caring elder brother when his mother had her litter. He had never hurt anyone. Villagers often thought Jai was the mother and Lakshai was the cub, as she was just 45 kilograms and he was close to 60.

After Jai recovered, we released him near Akole. However, I felt terrible that the collar had been the cause of his terrible wound.

Weeks later, Ghule and I were near the village's old pump house. A goatherd said a leopard often slept in the cool building. From the scratches on the wall, we figured the animal had to jump down five metres onto a pipe, and then walk up a flight of stairs to the hut that housed the pump. Under the switchboards was a cool dug place where big fellow would probably lie in peace.

A few weeks ago, the goatherd said he had opened the door of the building, and startled the sleeping leopard. It dashed off in the opposite direction and escaped by squeezing between two tin sheets that formed the wall of the pump house. We realized from the hair and dried blood that the sharp edge of one of the sheets must have sliced Jai. The collar didn't allow the wound to heal, worsening the wound.

Despite suffering from pain, Jai hadn't retaliated when those kids threw stones at him. It illustrates how well-behaved these animals are, and how much we underestimate them. Jai must have become a father by now.

Looking into the eyes of a man-eater

John recounts...

Wildlife SOS, an animal welfare organization, runs a leopard rescue centre along with the Forest Department just outside Junnar. A few of the animals at the facility were caught after deliberate human killing instances and can never be released. Some orphaned cubs raised by humans are also unfit for release. The rest are incarcerated for misdemeanours like lifting a goat or simple transgressions such as being seen by people. In many other countries these animals would be euthanized, but putting an animal to death is not common in India even if they are a huge drain on the monetary resources and do not contribute to the conservation of the species.

Captive facilities can provide good care to some leopards, but many more are crammed in small dismal cages for months or years by the Forest Department. While it's easy to blame the department, it's expensive to care for leopards and there are so many of them that as long as traps are set out, there will always be leopards caught. Long-term captivity is not a sustainable solution to a widespread and chronic issue across large parts of India.

There are no easy solutions in leopard management. It has to address the conservation of the cats while minimizing risks to people. The Forest Department officials need to make tough decisions. Our research ensures good science is available to inform these decisions.

Lessons from Leopards

Ghule recounts...

During this project, I learnt that if we trap an adult leopard and move it far away, even 100-150 kilometres, it definitely returns to the original site. If it is a young animal (in the teenager category of humans) then it might learn to live near its release site. Just like a house cat would. Also I experienced that no matter how many individuals you remove, there will always be leopards in the same place period, Hence trapping and releasing is not the way to clear an area of leopards. On the contrary, such an operation irritates them and makes them unpredictable. They don't know the new territory, where to hunt, or where to hide safely. Such animals, if hungry, can attack young children.

To reduce livestock losses to leopards, villagers should keep their animals in well-protected shelters at night. If leopards do not get enough animals to feed on, they won't be able to have cubs. If we take good care of pregnant cows, their calves will be strong and thrive. But, if we do not provide adequate care, the calves are unlikely to survive. I am sure this holds true for leopards.

Just as urban parents do not allow their children to go out after dark, villagers living in leopard areas should not allow little children to go outdoors unattended after nightfall.

Sleeping outdoors at night should also be avoided even though leopards have not hurt anyone so far. People should tap a stick on the ground while walking at night, so nearby leopards on hearing the sound of a human will stay out of sight and avoid a confrontation.



Jai would often visit the garbage areas of Akole to prey on the feral pigs.

Reality check: lessons from Akole

John recounts...

Wherever they live, large predators cause conflicts of some form with humans. Back home in Norway, lynx kill sheep but have never threatened a human being's safety in recorded history. The result is an incredibly passionate political debate: Should we allow lynx to live in the forests of Norway? Many loud voices demand a great reduction in lynx numbers across large areas of the country. And the method to achieve this target is a hunter armed with a gun. They rarely ask sheep farmers to take better care of their animals. Even though Norway has expansive habitat with abundant wild prey, almost no people, and one of the highest standards of living in the world, there seems to be little room in people's hearts for lynx.

And then there is Akole: A landscape devoid of natural habitat and wild prey. People and livestock everywhere. Leopards that prey on dogs and goats. Leopards that spend most of their lives within a stone's throw of a house. Leopards that are capable of killing people. And yet people here seem to accept the presence of leopards. Old ladies tell stories of pulling a goat out of the jaws of a leopard. Of chasing one out of the barn at night. Of being knocked off bicycles or motorbikes by leopards. Some of these are poor people, to whom a goat represents a significant loss, and to whom access to medical assistance is limited. Yet there is no call for the wholesale removal of leopards. Their right to exist is never questioned. There is space in people's hearts for leopards.

Norway may have provided the funding and technical support for the study of leopards in Akole, but it was Akole that was teaching us the meaning of humility and respect for living creatures.

Conclusions

Vidya, John and Morten..

How best to conserve wildlife, including large carnivores like leopards? This is a global debate. One school of thought argues that protected areas – national parks and wildlife sanctuaries – with no human inhabitants offer the only hope for wildlife. Proponents of this school often say such wildlife areas should be fenced to ensure separation between people and wildlife.

An alternative school of thought argues that protected areas will never be large enough to protect wildlife, and the only way forward is to allow wildlife to share the wider landscape with humans. While our work does not document the importance of protected areas, it provides insights to the coexistence-conservation model.

We've shown that leopards, in addition to hyenas and other carnivores, can live in heavily modified landscapes with high human densities. Not only can these large cats survive here, they are very much resident here, successfully raising young and going about what they do best - living as secretive cats even among high densities of humans. Most importantly, they manage this with a minimum of conflict if they are left to themselves and if people take basic precautions and adopt preventive measures. The people of Akole have demonstrated an amazing ability to adapt to the presence of their wild neighbours. This is good news as leopards and other carnivores like hyenas can be conserved across India – with farmlands providing new areas for conservation and ensuring connectivity between protected areas. This has probably always been the case but unknown to us because hardly any research on large wildlife has been carried out in human dominated areas.

However, we must also acknowledge that things can sometimes go terribly wrong. Interacting with the villagers who share their living space with leopards has given us a human face to this conflict. While some of the problems can be attributed to misguided interventions like translocations, there's always potential for tragic encounters between people and leopards.

Leopards are dangerous neighbours and can't be taken lightly. There are hundreds, probably thousands, of leopards living in areas just like Akole, far from any protected area. These animals are not going to disappear on their own. How should these animals be managed to reduce the probability of people and

leopards bumping into each other? Translocation makes the problem worse, and removal to captivity is not a sustainable option. What then can the authorities do?

Firstly, and most importantly, we must accept that leopards live in farmlands. They are not lost or straying from elsewhere. They are breeding populations, and they are there to stay. Once we accept this then better and more appropriate management and policy actions can be planned which would be much more effective than the current idea that these animals only belong in the “forests”.

Secondly, preventive management is the key. Farmers need help to better protect their livestock. Civic authorities should reduce food sources like garbage that attract leopard prey to small and large towns. When prey becomes scarce, leopards will tend to have larger territories, live in low densities, and produce small litters. This will minimize the risk of encounters between man and animal. Providing compensation for loss of livestock complements these preventive measures.

Thirdly, most situations require no action. A leopard seen close to a house or a leopard killing a goat or dog is not a situation that warrants reaction. If leopard cubs are found in a field, they should be left untouched or moved to the adjacent field, if the field needs to be harvested. This is done more often than not in the sugarcane areas of Akole and nearby Junnar and Nashik, sometimes by the farmer or the Forest Department.

When people are deliberately attacked, action should be immediate and decisive and aim at removal of the danger. It is often impossible to determine which individual deliberately attacked a human. In a human use area, it is more important to remove the danger swiftly before more people are killed.

Coexistence is not easy; it comes with some risks attached. However, rural India appears to be practising it long before we were debating it in scientific journals and conferences. At this time when many countries are debating how to live with carnivores, the Akole example offers new opportunities for wildlife conservation in human-dominated areas, in addition to protected areas.

Acknowledgements

The authors are grateful to the Maharashtra Forest Department for all manners of administrative, logistical and moral support during the course of our studies. The study was funded by the Royal Norwegian Embassy in New Delhi and the Research Council of Norway, by a Kaplan Graduate Award, and a Rufford Small Grant. The authors are very grateful to all who took part in the project and helped make it a success. Jørn Thomassen (Norwegian Institute for Nature Research) and Dr R. Sukumar (Centre for Ecological Studies, Bangalore) took care of most of the administrative aspects associated with the project and spared us from much of the bureaucratic burden. We are grateful to the many individuals who helped in the field and in other ways.

Further information / entertainment

Copies of technical reports, scientific papers, popular articles, and links to videos can be found on the project's website at <http://www.projectwaghoba.in/>

NINA Publications

NINA Report (NINA Rapport)

This is an electronic series beginning in 2005, which replaces the earlier series NINA commissioned reports and NINA project reports. This will be NINA's usual form of reporting completed research, monitoring or review work to clients. In addition, the series will include much of the institute's other reporting, for example from seminars and conferences, results of internal research and review work and literature studies, etc. NINA reports may also be issued in a second language where appropriate.

NINA Special Report (NINA Temahefte)

As the name suggests, special reports deal with special subjects. Special reports are produced as required and the series ranges widely: from systematic identification keys to information on important problem areas in society. NINA special reports are usually given a popular scientific form with more weight on illustrations than a NINA report.

NINA Factsheet (NINA Fakta)

Factsheets have as their goal to make NINA's research results quickly and easily accessible to the general public. They are sent to the press, civil society organisations, nature management at all levels, politicians, and other special interests. Fact sheets give a short presentation of some of our most important research themes.

Other publishing

In addition to reporting in NINA's own series, the institute's employees publish a large proportion of their scientific results in international journals, popular science books and magazines.



ISSN 0804-421X
ISBN 978-82-426-2692-9

Norwegian Institute for Nature Research (NINA)

P. O. Box 5685 Sluppen, NO-7485 Trondheim, NORWAY

Telephone: + 47 73 80 14 00

E-mail: firmapost@nina.no

<http://www.nina.no>



Cooperation and expertise for a sustainable future