

Developing an Ecology-based Conservation Strategy

for the Indian Pangolin



Project Report



BNP PARIBAS



**Wildlife
Conservation
Trust**

Developing an Ecology-based Conservation Strategy for the Indian Pangolin



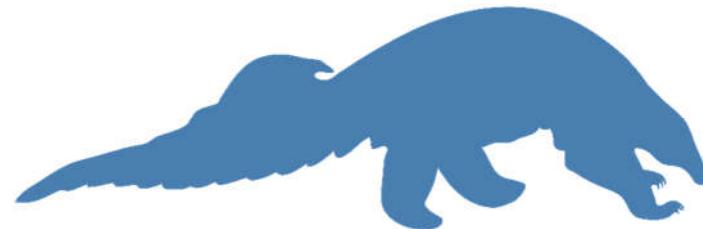
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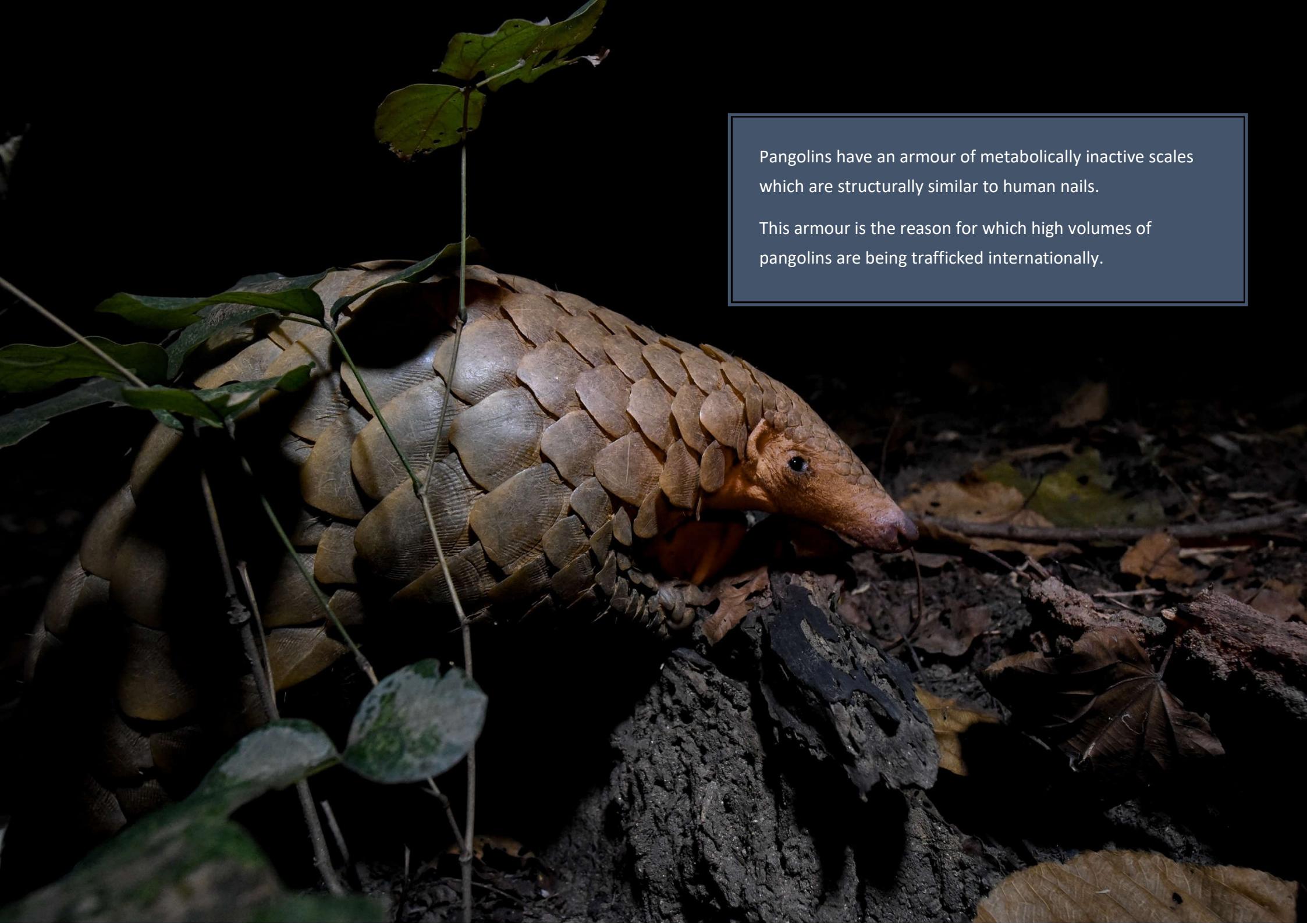
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Pangolins have an armour of metabolically inactive scales which are structurally similar to human nails.

This armour is the reason for which high volumes of pangolins are being trafficked internationally.

BACKGROUND

Over the last decade, pangolins have been globally recognized due to the threat from illegal trade. Pangolins were one of the lesser known species even within the pangolin range countries, especially when compared to charismatic species. Awareness campaigns focusing on the urgency of conservation interventions to curb pangolin trade and poaching highlighted their plight in national and global media. Pangolins have become synonymous with the illegal wildlife trade and this has led to a series of interventions from awareness to conservation actions.

Pangolin-focused conservation is a relatively new idea for most of the range countries. Out of the eight species of Pangolins (four in Africa and four in Asia), some have been studied to a greater extent than others leading to gaps in data associated with their distribution, abundance and habitats. The scale of the impact of poaching on such species with no population estimates is revealed by the number of cases where a large number of pangolin body parts are confiscated in anti-poaching raids. Typically, in the case of crime against wildlife, the rate of detection is very low. Most illegal consignments elude the attention of the enforcement agencies. Given that only a fraction of the raids are successful and that several consignments go undetected, the scale of poaching is much larger than what meets the eye.

Tracking conservation progress for a data deficient species is hard since there is no yardstick to compare the changes and correlate those with actions taken. Wildlife conservation requires a multi-faceted approach. However, with limited resources available for conservation projects, it is critical to focus on key aspects of conservation issues of a particular species and build on them to have a greater impact on species conservation.



Out of the eight species of Pangolin, the Indian pangolin *Manis crassicaudata* and the Chinese pangolin *Manis pentadactyla* are found in India. In terms of body size, the Indian pangolin is the largest Asian pangolin species (the third largest of all pangolin species). The species is protected and listed under the Schedule I Part I of the Wildlife (Protection) Act, 1972 and under Appendix I of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). Despite protective measures, pangolins in India are widely exploited and traded both domestically and internationally. The Indian pangolin is an Endangered species on the IUCN (International Union for Conservation of Nature) Red List.

Pangolins are in high demand for their scales mainly due to their use in Traditional Chinese Medicine (TCM), which has fuelled their poaching to an extent that globally, pangolins have seen a rapid reduction in populations ranging from 50% to 80 % across the genus.

There has been a rise in the trade of live Indian pangolins as even locals who find a pangolin in the wild look for buyers in the anticipation of high monetary returns as learned from various media reports citing values fetched by a pangolin in the global market. This has led to confiscation/seizures of several Indian pangolins which are kept in poor conditions and starved for a long period of time. This makes the task of successful rehabilitation of these pangolins a major conservation challenge.

Being an elusive nocturnal species occurring at low densities, there is very little information available on the behaviour and ecology of the Indian pangolin. It is critical to know the ecology of the species to develop an effective conservation plan for the species.

Wildlife Conservation Trust in collaboration with the Madhya Pradesh Forest Department started a unique field project supported by the BNP Paribas India Foundation for the conservation of the Indian pangolin. Under this project, we aimed at increasing the rate of successful rehabilitation of pangolins in the wild by using ecological data collected from the wild and rehabilitated individuals.

The project started in late 2019 followed by a tough period faced in the field due to the COVID-19 related lockdowns.

Until now, we have successfully rehabilitated six Indian pangolins in the wild and have gathered ecological data from eight radio-tagged pangolins. This data is helping us to identify new sites suitable for the rehabilitation of the seized/confiscated pangolins.



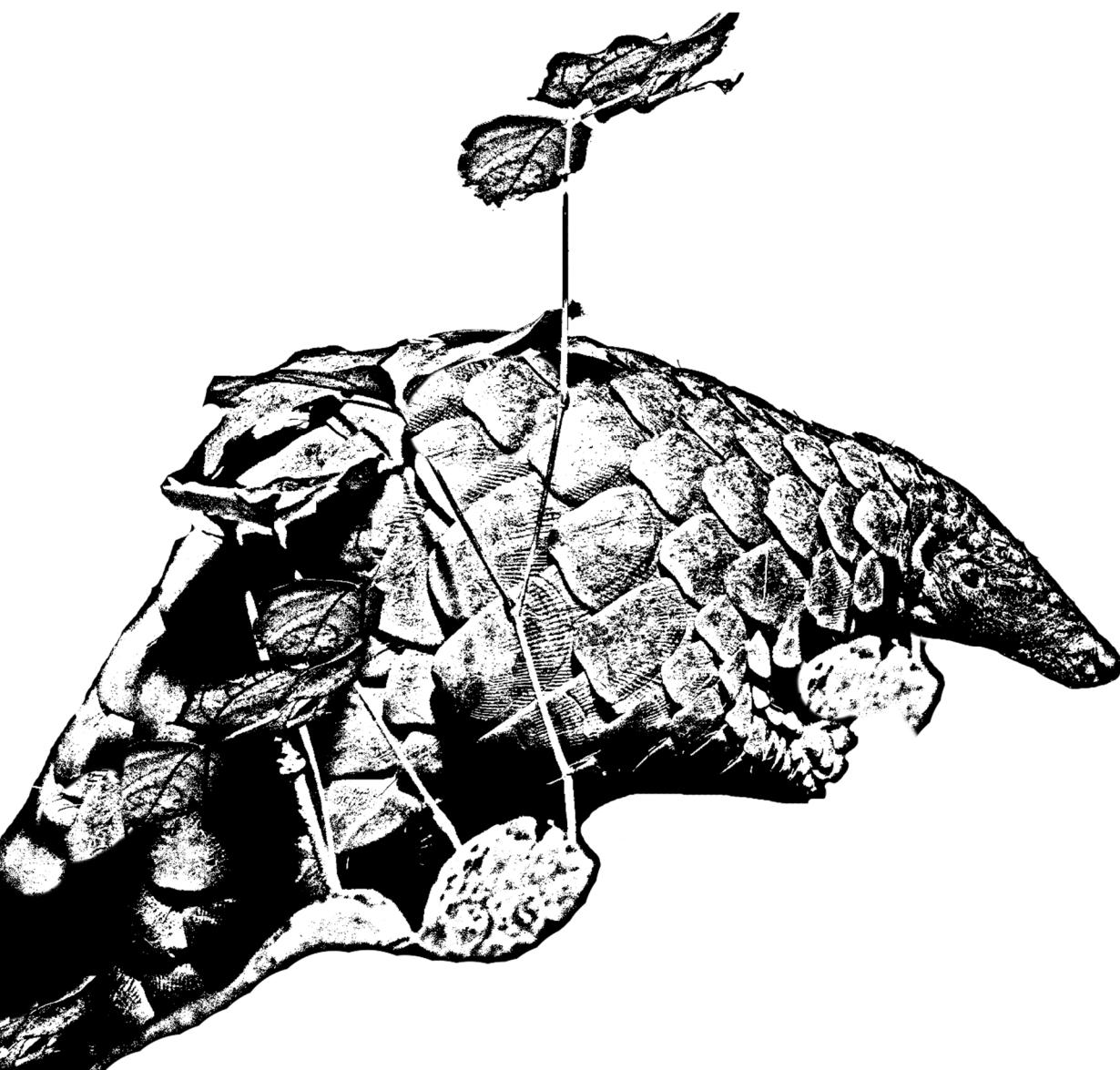
Until now, we have successfully rehabilitated six Indian pangolins in the wild and have gathered ecological data from eight radio-tagged pangolins. This data is helping us to identify new sites suitable for the rehabilitation of the seized/confiscated pangolins.

The objective of this project is to understand the ecology of the Indian pangolin (wild/rescued) and develop an effective rehabilitation plan for the rescued pangolins.

The key activities under this project were:

1. Radio-tagging of the wild as well as rescued pangolins.
2. Surveys to map pangolin burrows with the help of detection dogs and camera traps.

Using information from spatial, ecological and behavioural data of the species from the tagged individuals, we want to identify key factors essential for pangolin survival. This will help in the selection of ideal sites for the release of confiscated/rescued pangolins and increase the success rate of rehabilitation.



Radio-tagging of wild as well as rescued pangolins

In all, we have radio-tagged eight pangolins, two and six in the Satpura and Pench Tiger Reserves respectively.

Out of these eight pangolins, currently, seven are being monitored in the wild for their daily activity and site preference. The radio tag of Pangolin P2 of Satpura TR stopped functioning during the Covid 19 lockdown and due to the travel restrictions, we were unable to follow this individual post that.

Sr. No	Pangolin	ID	Sex	Type	Date	Site
1	Pangolin 1	P1	Female	Rescued	September 2019	Satpura TR
2	Pangolin 2	P2	Female	Confiscated	November 2019	Satpura TR
3	Pangolin 3	R1	Female	Wild	February 2021	Pench TR
4	Pangolin 4	R2	Female	Confiscated	February 2021	Pench TR
5	Pangolin 5	R3	Female	Confiscated	August 2021	Pench TR
6	Pangolin 6	R4	Female	Rescued	September 2021	Pench TR
7	Pangolin 7	R5	Male	Wild	March 2022	Pench TR
8	Pangolin 8	R6	Female	Confiscated	May 2022	Pench TR



The rescued/confiscated pangolins are examined by the wildlife veterinarians and are tagged and released at pre-identified sites based on habitat characteristics where the chance of animals settling down is the highest.



FIGURE 1: PANGOLIN SHIFTED TO THE RELEASE SITE IN SPECIALLY DESIGNED TRANSPORTATION BOX



FIGURE 2: RESCUED PANGOLIN BEING EXAMINED AND RADIO-TAGGED BY PARK VETERINARIAN & WCT SCIENTIST



FIGURE 3: PANGOLIN RELEASED IN THE WILD

All of the rehabilitated pangolins have settled down in and around the release sites. With additional seasonal data, the home ranges of these animals will be estimated.



FIGURE 4: WCT RESEARCH TEAM MONITORING RELEASED PANGOLIN IN THE FIELD DURING MONSOON

Post release pangolins are intensively monitored for the first two weeks. This monitoring is carried out to ensure that any health issue if present get noticed without any delay. Monitoring allows the team to keep track of the movement of released individuals till they settle down in a suitable area within the forest block.

One of the major challenges in the on-field monitoring exercise is the tracking of these animals in the monsoon season. Heavy rainfall transforms the landscape making it harder to follow these animals. The disturbance/interference caused by rainfall and storms makes it harder to monitor the radio signals and reduces the range at which the signals can be received in the field.



FIGURE 5: PANGOLIN MONITORING DURING THE RAINY SEASON

Camera traps have been installed on all the burrows used by these tagged pangolins to understand their activity and usage patterns. Data from camera traps also help us to derive the burrow visiting frequency for each pangolin in different habitat types. Heavy rainfall makes the maintenance of these camera traps and frequent download of data from different sites very challenging.



FIGURE 6: WCT TEAM ALONG WITH THE FOREST STAFF CHECKING CAMERA TRAPS

Animal Movement and Area Utilization

Using the telemetry data from the tags and photo-captures from camera traps we analyse animal movement and map the area utilization for all the individuals.

We used **Linear Time-Density (LTD)** Utilization Distribution model using movement data in combination with the date-time information to calculate the percentage of time spent per grid cell. There is a limitation in this model as it assumes a straight-line movement between two data points.

Hence for comparison, we used **Elliptical Time-Density Model (ETD)** Utilization Distribution model to calculate the amount of time spent per location in the landscape by encompassing the surrounding bounding regions (elliptical).

We also used **Brownian Bridge Movement Model (BBMM)** to map the space-use from auto-correlated data points. The BBMM is based on the properties of a conditional random walk between successive pairs of locations, dependent on the time and distance between locations, and the Brownian motion variance that is related to the animal's mobility

A. Satpura Tiger Reserve (STR)

i. P1 STR (Female)

P1 was the first pangolin which was rescued and tagged under this project in September 2019. Since then this individual has been monitored and has provided key insights related to habitat use and movement patterns of a young pangolin.

At the time of rescue (Sep 2019), P1 was a sub-adult individual weighing around 4.1 kg and was estimated to be about 1-1.5 years old. She travelled from the release site and settled on a plateau in the Bori Range of STR.

In 2020 when she was last examined she weighed 12.2 kg and in May 2022 she was recorded with a young one. This provided us with a unique opportunity to observe the growth, sexual maturity, breeding and parental care displayed by a rescued young pangolin.

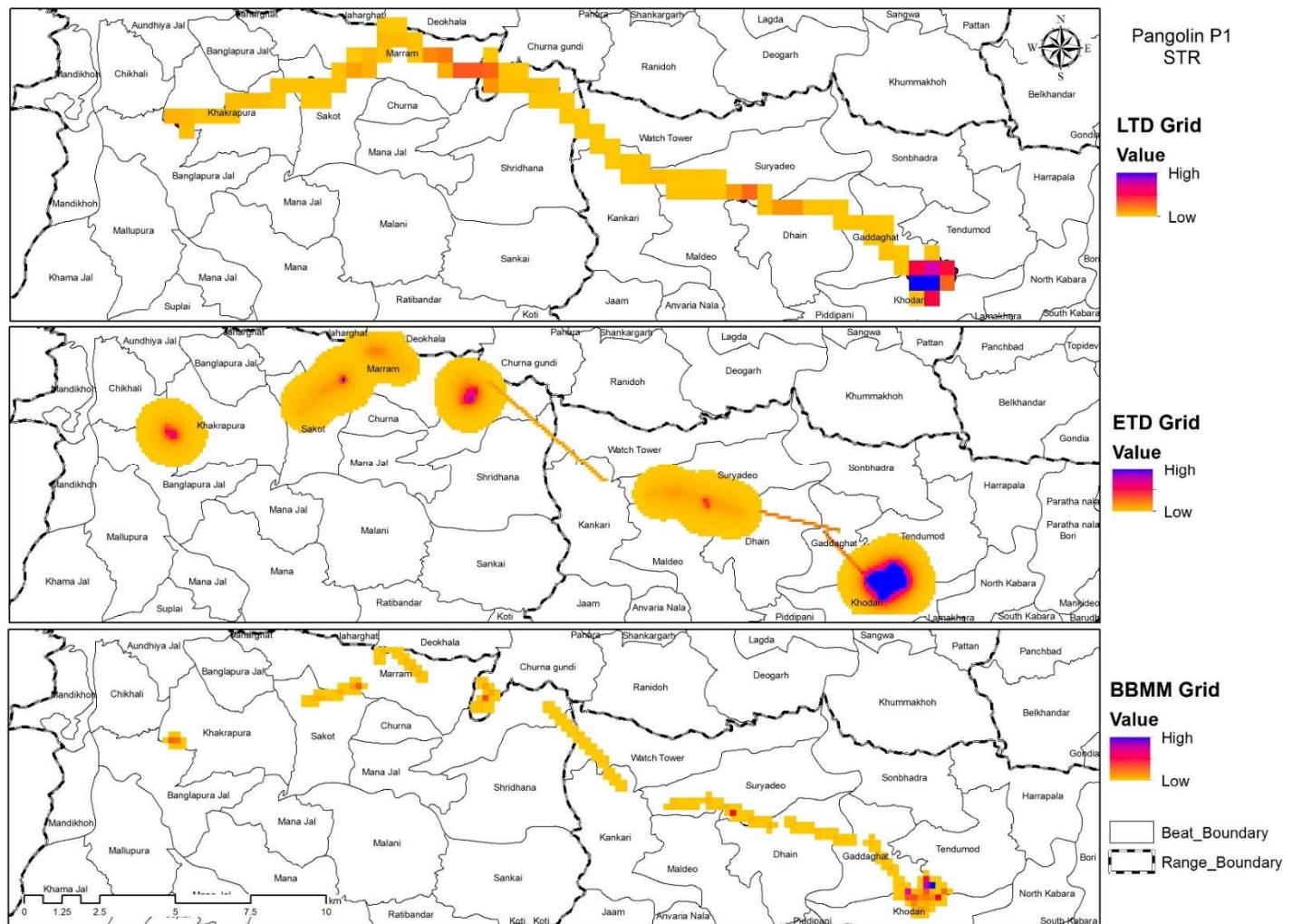


FIGURE 7: MAP SHOWING THE SPACE-USE OF P1 SATPURA TR



FIGURE 8: PANGOLIN P1 ALONG WITH THE RESEARCH TEAM CONSISTING OF SATPURA TR VETERINARIAN AND WCT BIOLOGISTS

B. Pench Tiger Reserve

i. R1 PTR (Female)

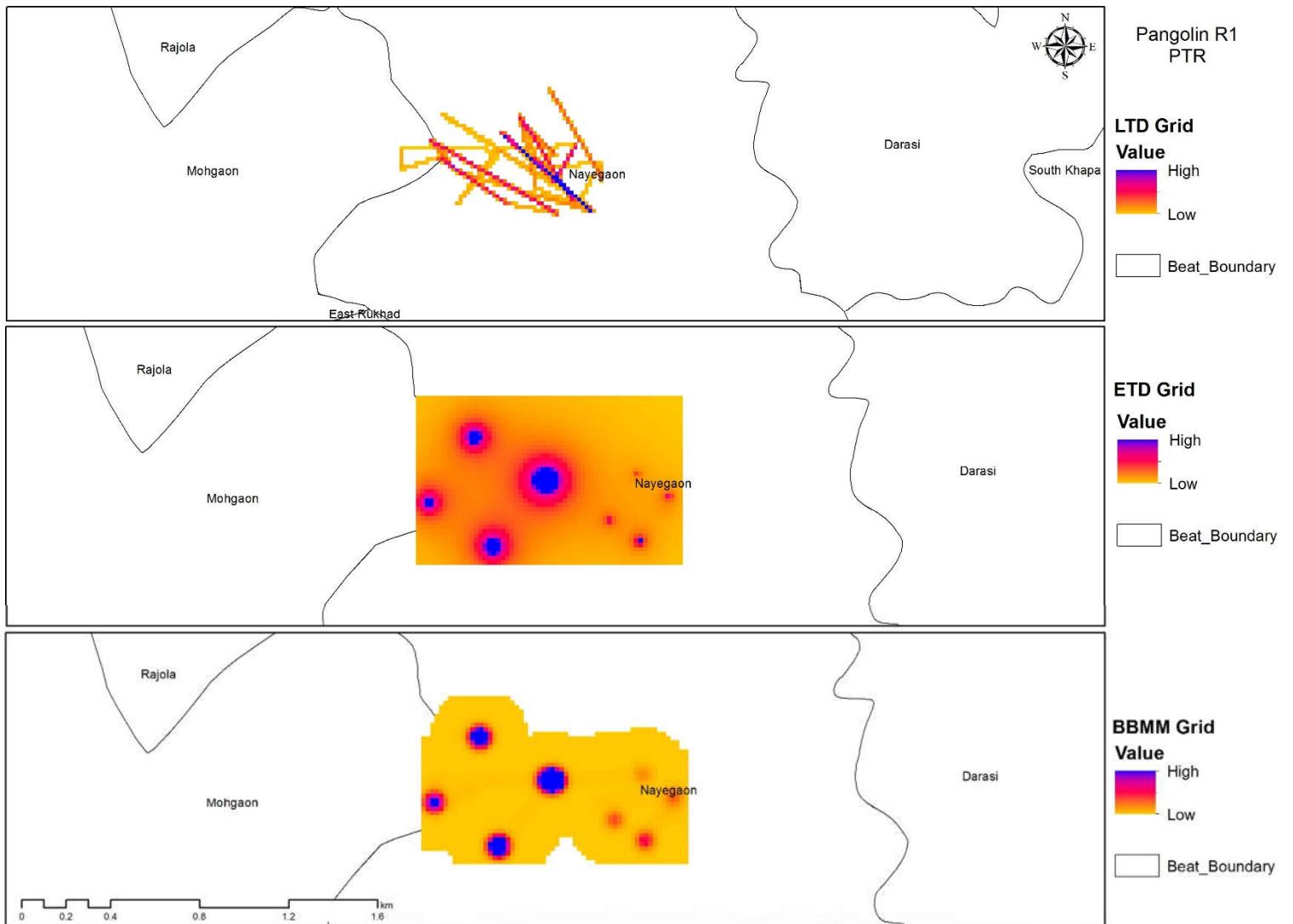


FIGURE 9: MAP SHOWING THE SPACE-USE OF R1 PENCH TR

ii. R2 PTR (Female)

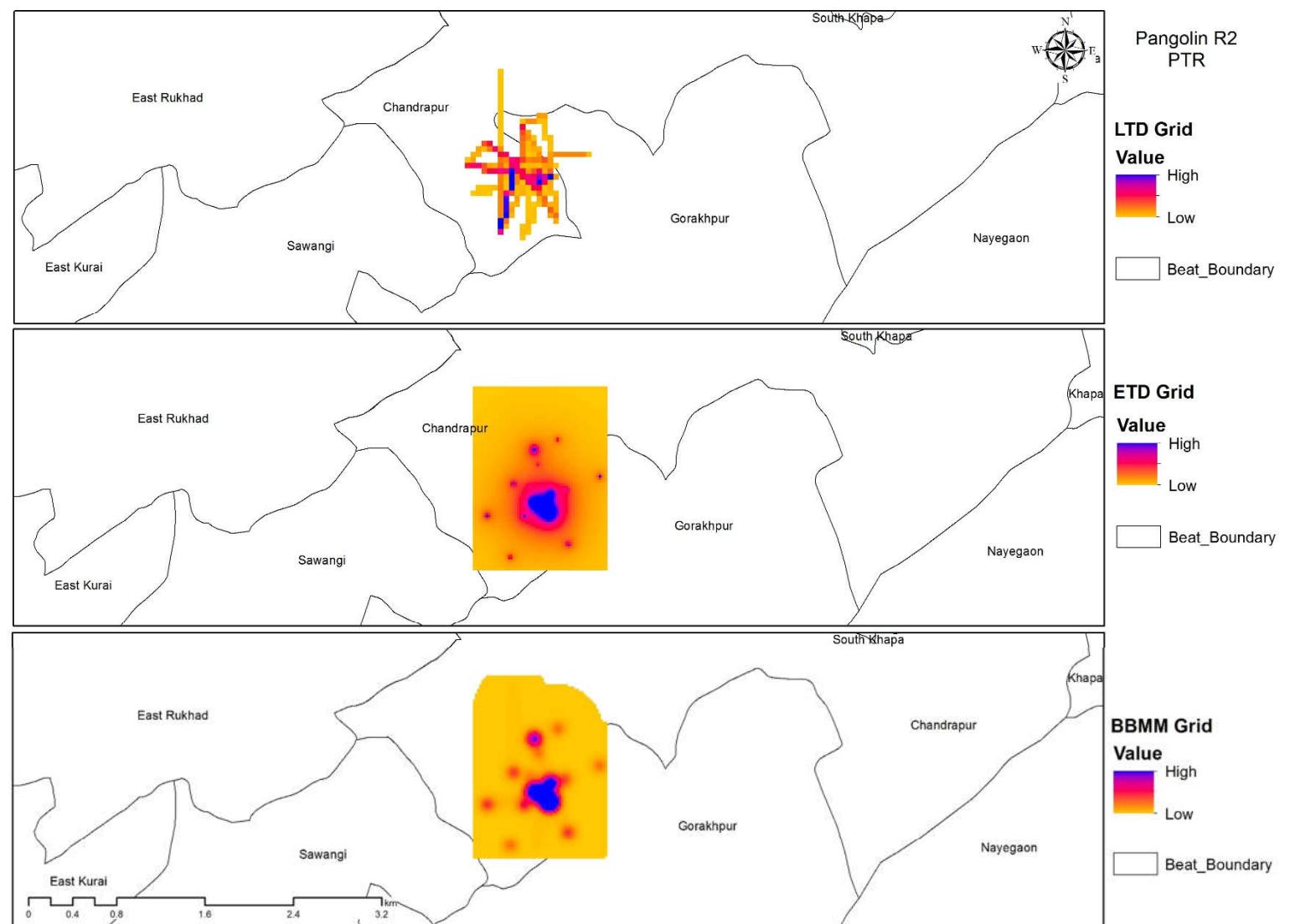


FIGURE 10: MAP SHOWING THE SPACE-USE OF R2 PENCH TR

iii. R3 PTR (Female)

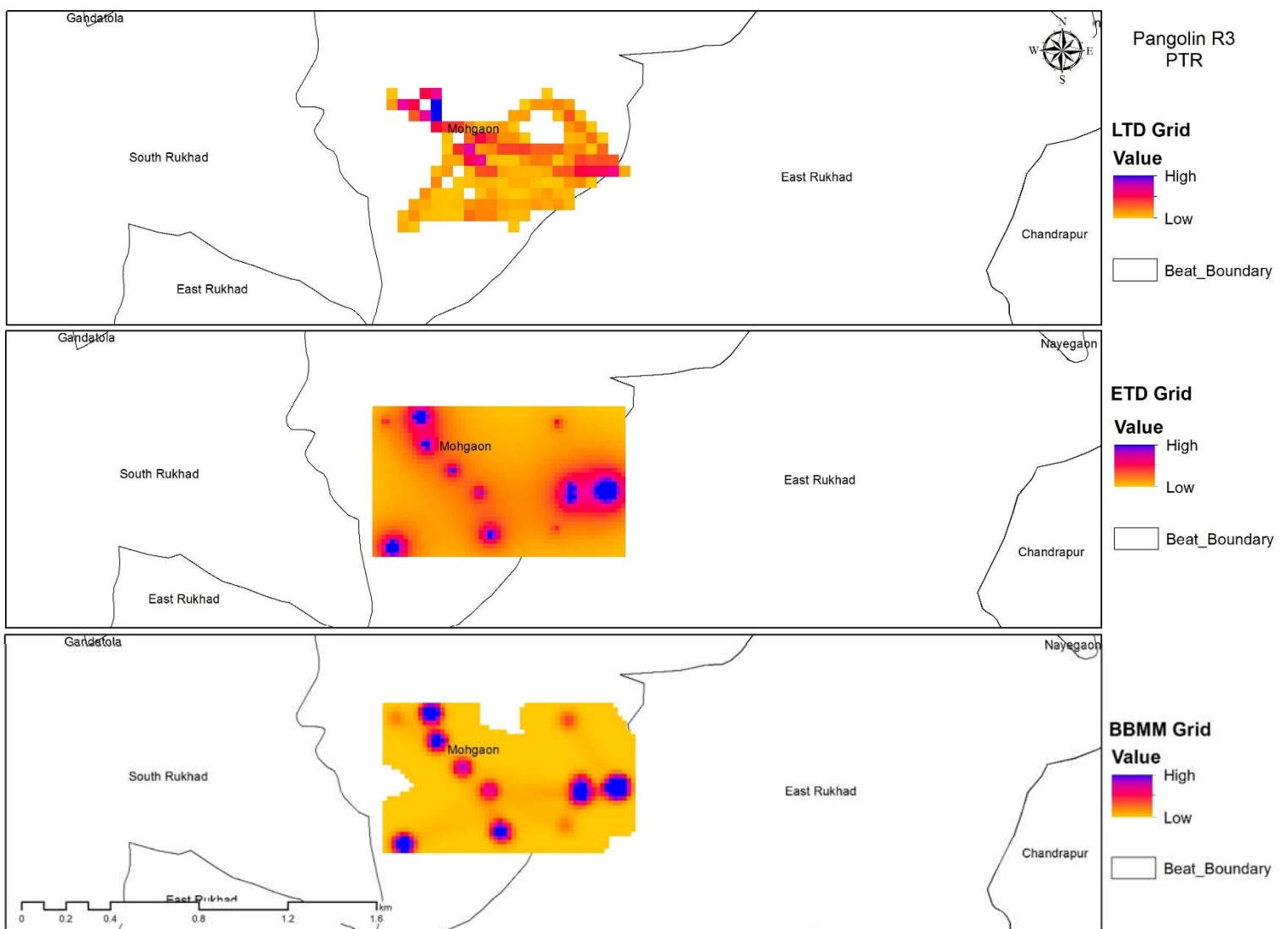


FIGURE 11: MAP SHOWING THE SPACE-USE OF R3 PENCH TR

iv. R4 PTR (Female)

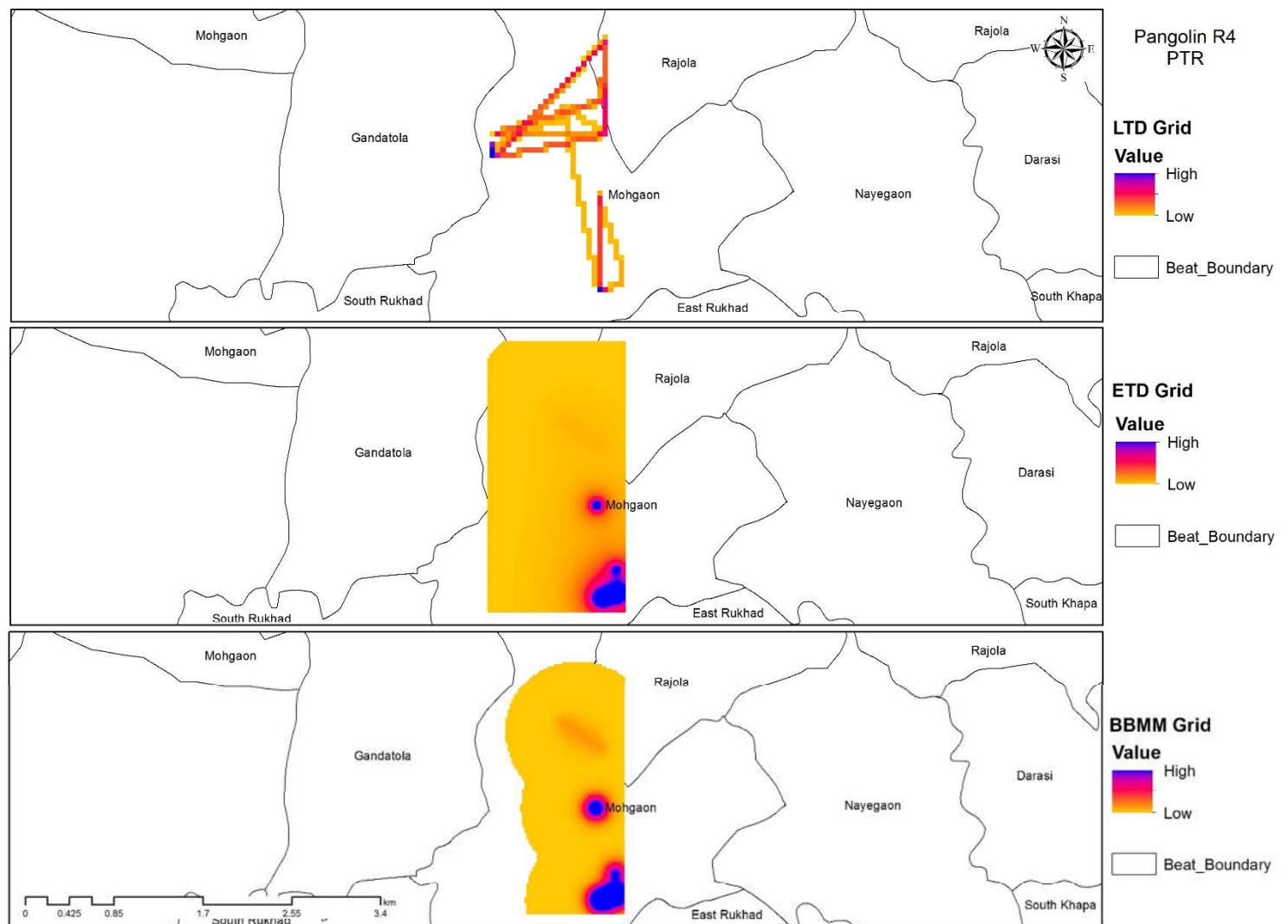


FIGURE 12: MAP SHOWING THE SPACE-USE OF R4 PENCH TR

v. R5 PTR (Male)

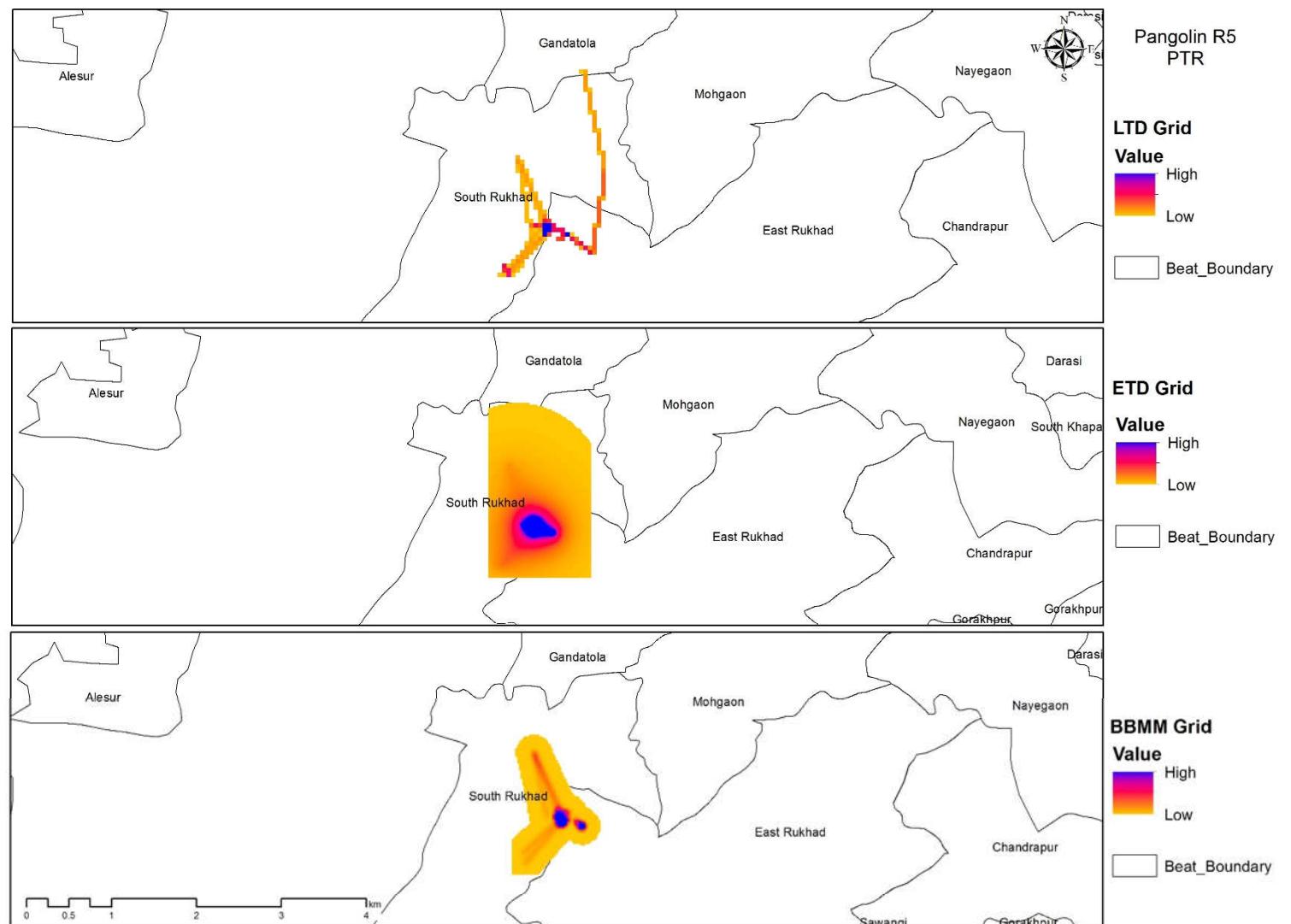


FIGURE 13: MAP SHOWING THE SPACE-USE OF R5 PENCH TR

Combined map of area utilization for pangolins in Pench TR

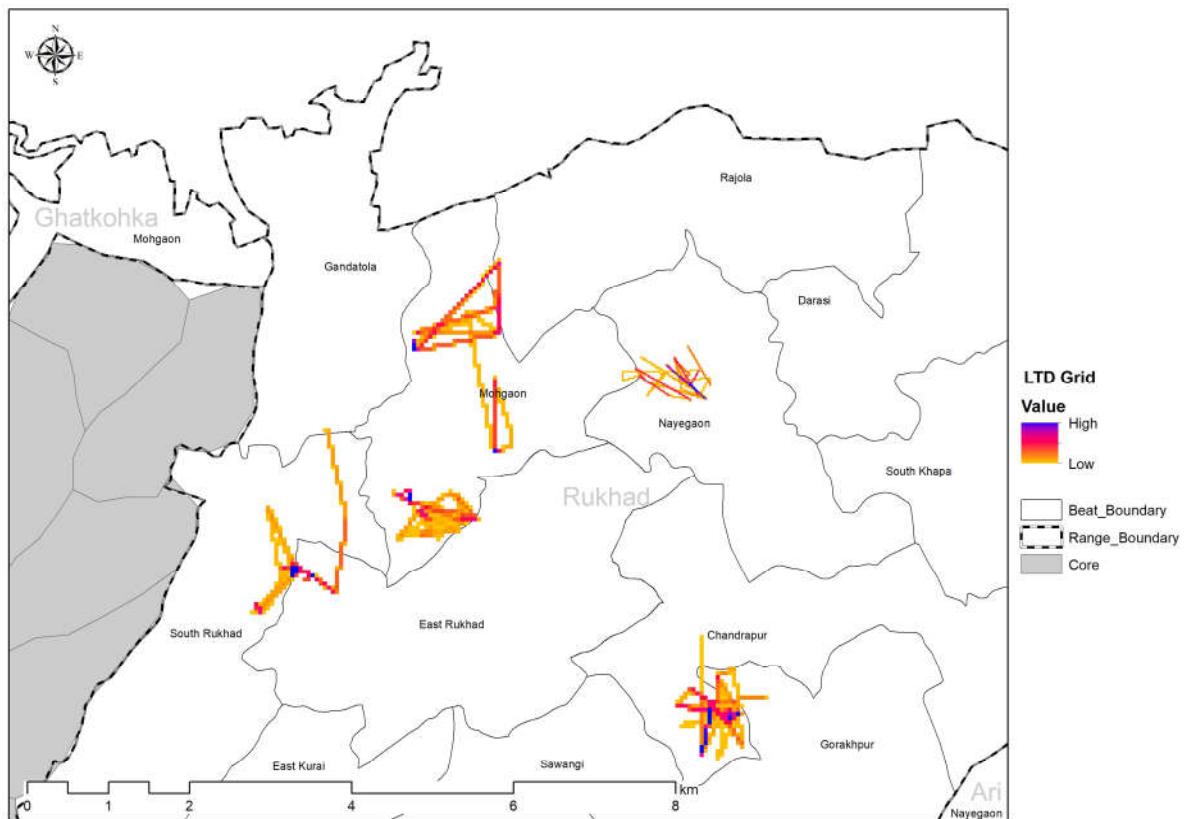


FIGURE 14: MAP SHOWING THE LTD GRID FOR ALL THE PANGOLINS IN PTR

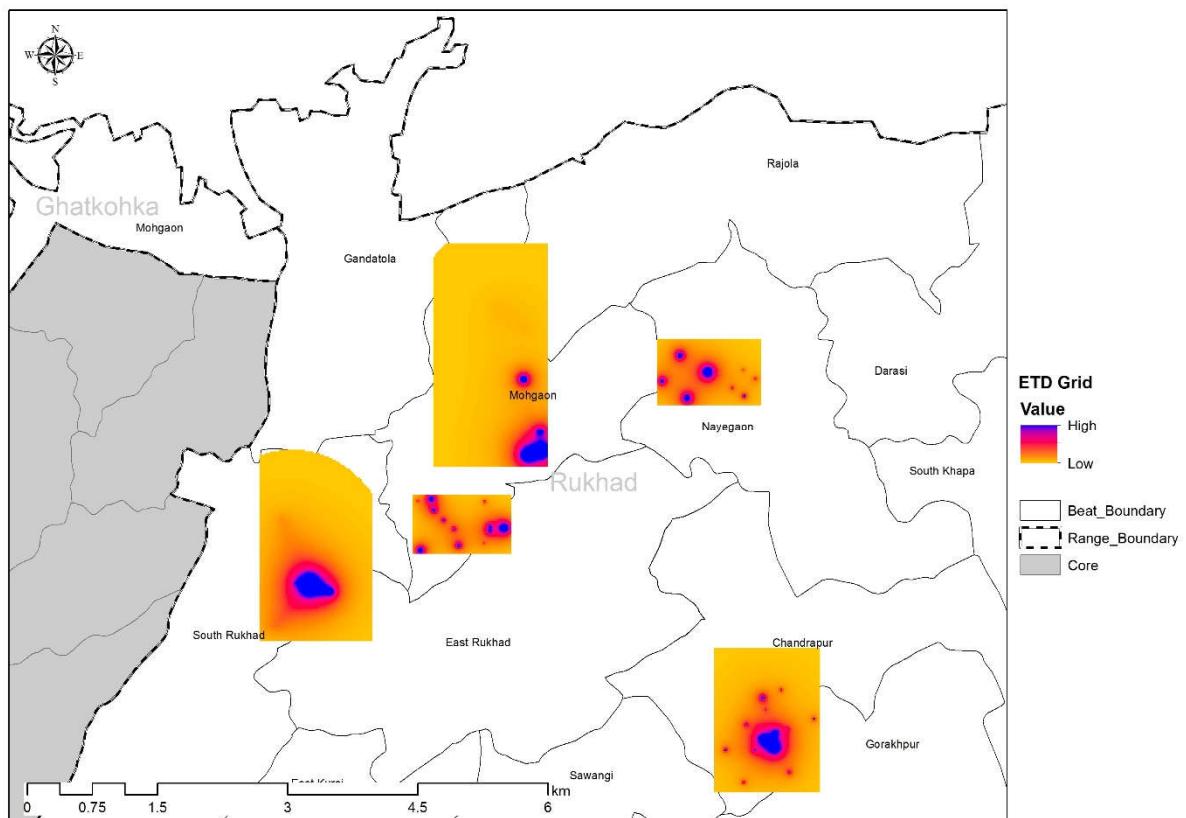


FIGURE 15: MAP SHOWING THE ETD GRID FOR ALL THE PANGOLINS IN PTR

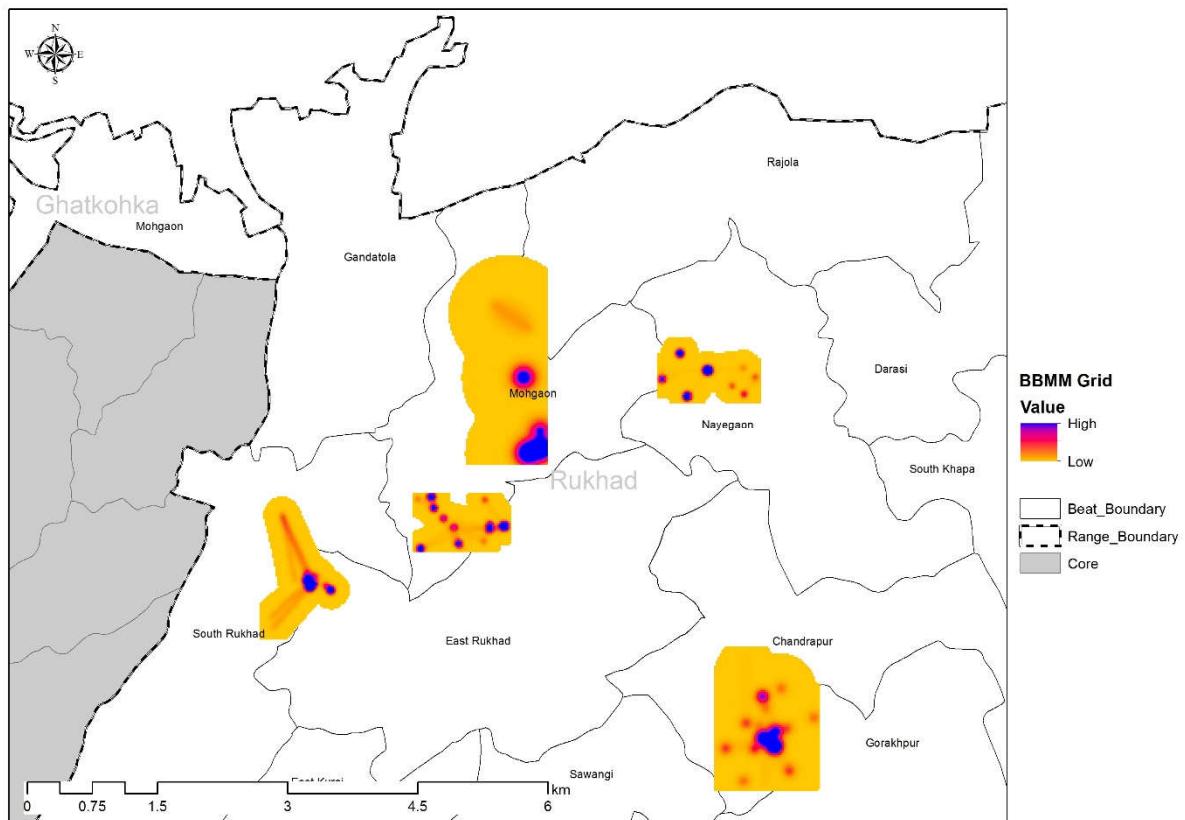
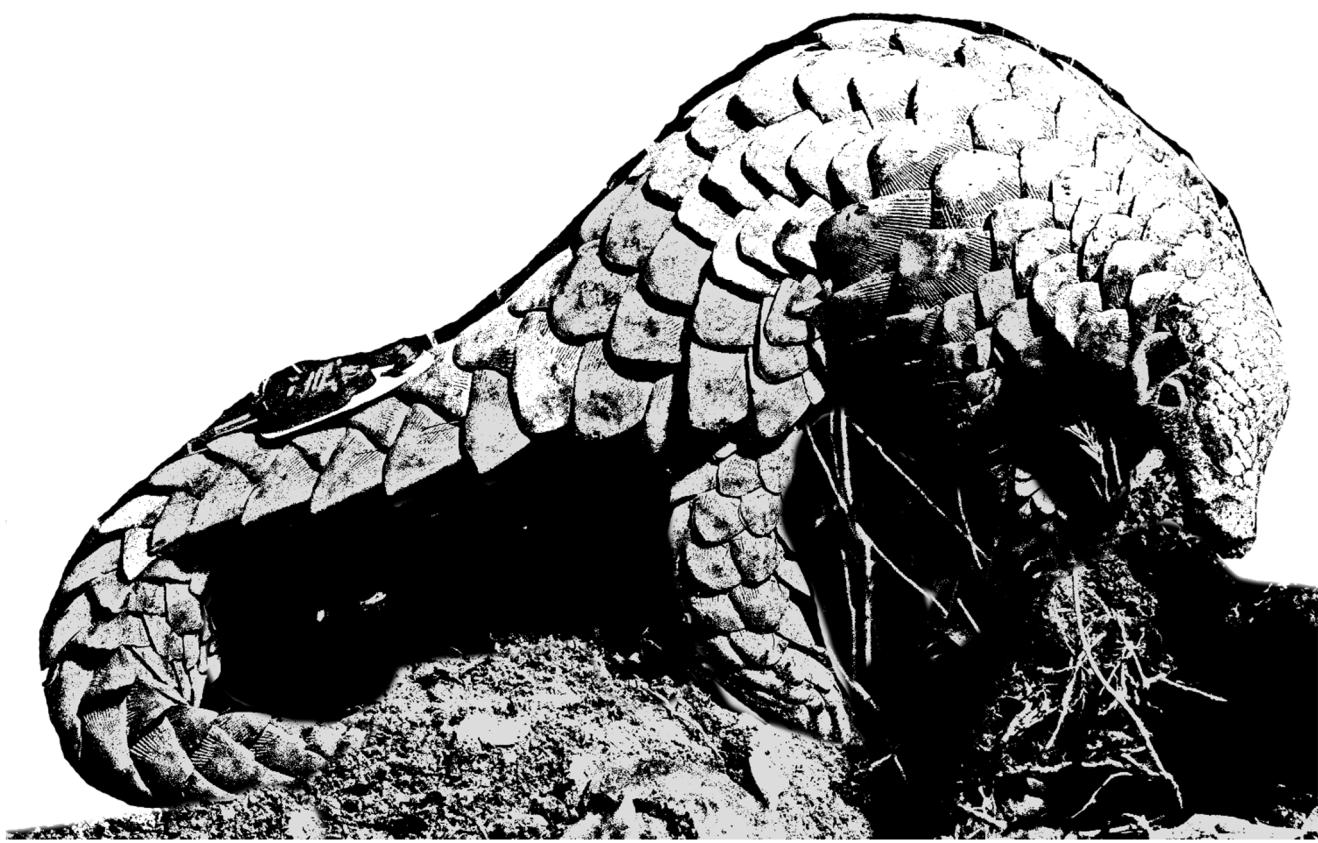


FIGURE 16: MAP SHOWING THE BBMM GRID FOR ALL THE PANGOLINS IN PTR



Surveys to map pangolin burrows with the help of detection dogs and camera traps.

It is difficult to detect pangolin burrows in the forest, especially in densely wooded and hilly terrain. To increase the chances of detecting pangolin burrows, we are using wildlife detection dogs. We have trained two conservation canines on pangolin detection to help find pangolin burrows (i.e. active burrows and feeding burrows), and pangolin scat.

The dogs indicate the burrows and based on the activity level we set up camera traps to monitor pangolin activity.



FIGURE 17: CAMERA TRAPS BEING PLACED ON A BURROW INDICATED BY THE CANINE HIRA

We are continuing our surveys with the help of dogs in the Pench Tiger Reserve to map pangolin presence in the landscape.

The survey effort is shown in the map below. Cumulatively, 160 km of track was clocked on the dog's GPS during the surveys.

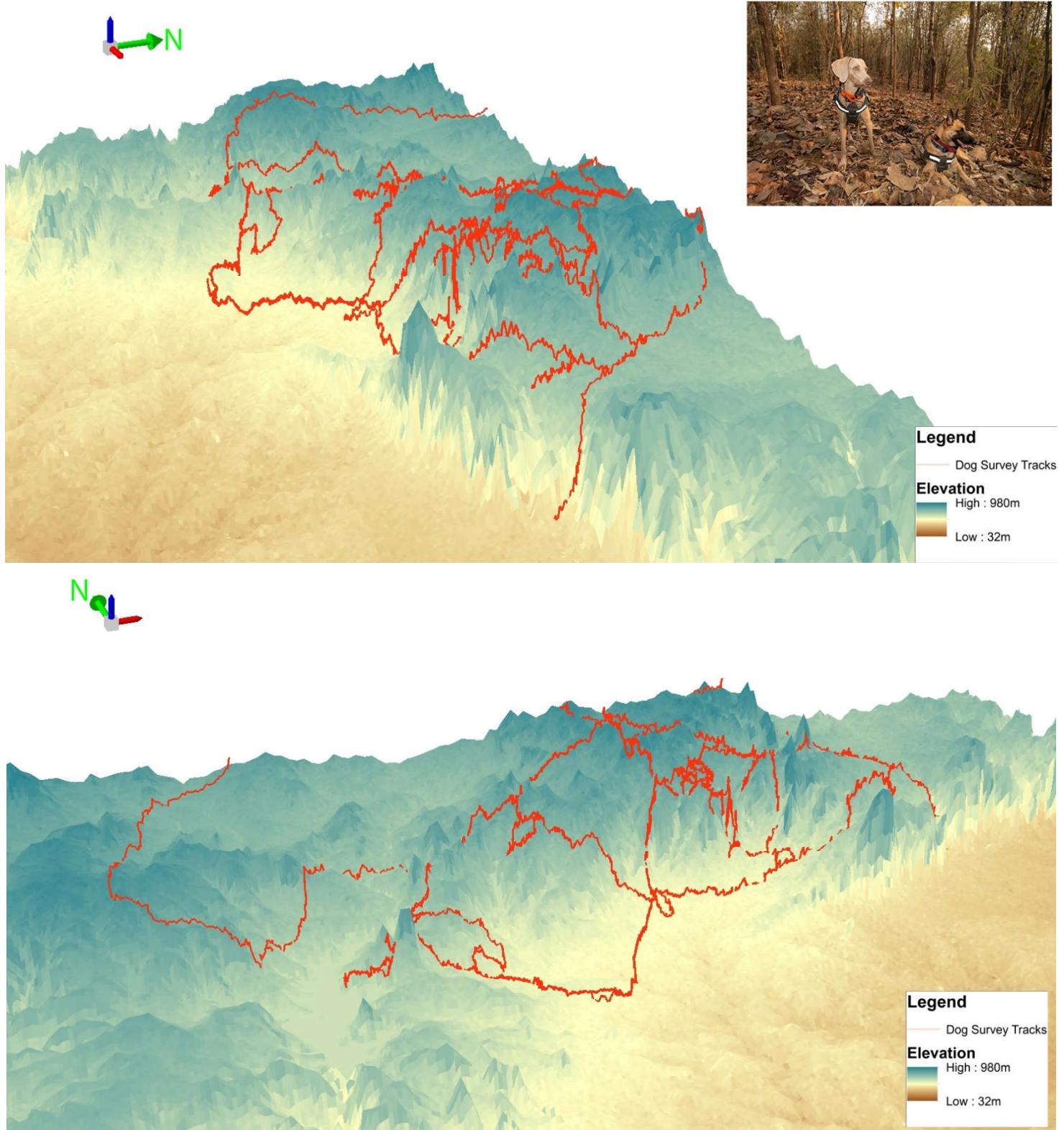


FIGURE 18: MAPS SHOWING THE AREA SURVEY WITH THE HELP OF DETECTION DOGS ALONG WITH THE ELEVATION PROFILE.

Conservation Impact:

Based on the field learnings last year we designed and fabricated pangolin transportation boxes. These boxes were provided to the key forest divisions where the frequency of pangolin rescue/confiscation was relatively higher.

These boxes have been used extensively to safely transport pangolins, thereby reducing both stress and chances of injuries to the rescued/confiscated animal.



FIGURE 19: INDIAN PANGOLIN EXPLORING AFTER BEING TRANSPORTED FROM THE RESCUE SITE.

All of the rehabilitated pangolins have settled down within the forest areas where they were released

Three female pangolins (P1 of STR, R1 and R2 of PTR) have been breeding. The camera traps data show a rare sight of a female pangolin pairing up with a wild male.



FIGURE 20: A REHABILITATED FEMALE COURTING WITH A WILD MALE PANGOLIN

All the three female pangolins (P1 of STR, R1 and R2 of PTR) have given birth to young ones. This is highly encouraging as successful breeding will have an overall positive impact on pangolin populations and will also help us understand the factors essential for their breeding.

No.	Pangolin	ID	Sex	Type	Release Date	Site	Recorded with young one
1	Pangolin 1	P1	Female	Rescued	September 2019	Satpura TR	May 2022
2	Pangolin 3	R1	Female	Wild	February 2021	Pench TR	Dec 2021
3	Pangolin 4	R2	Female	Confiscated	February 2021	Pench TR	March 2022



FIGURE 21: TAGGED PANGOLINS WITH A BABY ON THEIR BACK

In the coming season, we will continue the monitoring of the tagged pangolins and will focus on tagging additional wild individuals. We will also scale up the survey effort to cover more forest areas to map pangolin presence.



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