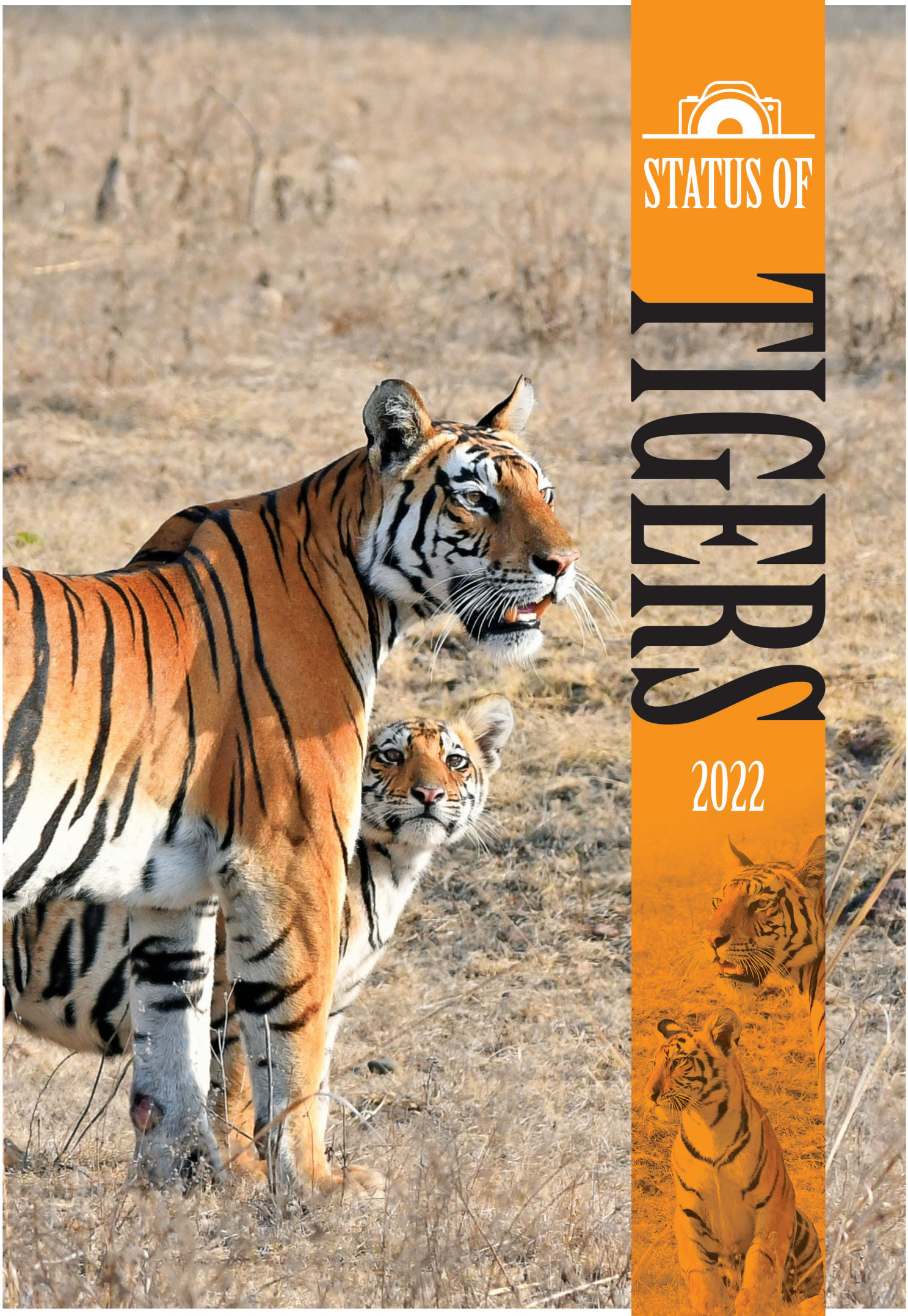

STATUS OF TIGERS

2022

Minimum population estimate

3,167

Total Man-days

2018 5,93,882
2022 6,41,102

Total Foot surveys (km)

2018 5,22,996
2022 6,41,449

Total camera count

2018 26,838
2022 32,588

Number of habitat/dung plot

2018 3,17,958
2022 3,24,003

Number of Tiger photographs

2018 76,651
2022 97,399

Number of total camera trap pictures

2018 3,48,58,623
2022 4,70,81,881

2022

Number of camera trapped Tigers

2018 2461
2022 3080

Status of Tigers, co-predators and prey in India

2006 - 1411

- Developed and implemented country wide Tiger estimation.
- Management Effectiveness Evaluation Exercise was initiated
- NTCA was established and strategy for the future was created.
- Creation of Tiger Conservation Foundation

2010 - 1706

- Incentivised village relocation
- Better protection with Special Tiger Protection Force
- Implementation of Tiger Conservation Plan
- Reintroduction of Tigers
- Developed and initiated use of MSTrIPES (Monitoring System for Tigers Intensive Protection and Ecological Status)

2014 - 2226

- Corridors Identified and integrated for conservation decision
- Tiger genetics & prey augmentation plan
- Leopard population estimation
- Village relocation intensified
- Tiger reintroduction
- Spatially explicit population model - tiger estimation
- Tourism Guidelines for Tiger Reserves

2018 - 2967

- Artificial Intelligence used in Photo identification of camera trap data
- Voluntary relocation incentive increased to 15 lac/Family
- Developed Water Atlas of Tiger Reserves

Entire phase - 1 data was collected using the **Mstripes android application.**

STATUS OF TIGERS 2022

Citation: Qamar Qureshi, Y.V. Jhala, S.P. Yadav and A. Mallick (eds) 2023. Status of Tigers in India - 2022: Photo-captured Tigers, Summary Report. National Tiger Conservation Authority and Wildlife Institute of India, Dehradun. TR. No./2023/03.

Cover photo: © Dr. Sanjay Shukla

सत्यमेव जयते

प्रधान मंत्री

Prime Minister

MESSAGE

It is heartening to learn that Project Tiger has completed 50 years of existence. This is a proud occasion for everyone who has been a part of the journey of conservation of one of the most iconic species of wildlife.

Our culture and heritage are marked by a strong tradition of respect for nature. A very famous verse says: निर्वनो वध्यते व्याघ्रो निर्व्याघ्रं छिद्यते वनम् | It means, without the forest, the tiger is in danger and without the tiger, the forest is in danger. The two are indispensable for each other's existence.

Drawing inspiration from such practical but profound insights, the nation has scripted a remarkable success story in the conservation and growth of tigers. From 9 tiger reserves in the initial stages of Project Tiger to 53 tiger reserves, we have indeed come a long way. Today, with 70 percent of the global tiger population, it is a great pride and honour that India is a leader in tiger conservation.

It was also a proud moment for India when we doubled the tiger population between 2010 and 2018, four years before the internationally accepted target of 2022.

The holistic approach towards tiger conservation driven by the participation of local communities has given great results. The contribution of the local communities, many of them from the tribal community, is especially laudable.

The creation of new tiger reserves, eco-development, science-based management interventions, delineation of tiger corridors and healthcare programmes for wildlife have made an impact. Through technological innovations like drones, E-Eye surveillance, M-STrIPES and camera traps, our tiger conservation efforts have got a new direction and a whole new dimension.

Greetings and heartiest congratulations to every member of the Forest Department of Tiger States, National Tiger Conservation Authority (NTCA) and Ministry of Environment, Forest and Climate Change for putting in wholehearted efforts for tiger conservation.

I am sure that the Tiger Estimation Summary Report being released on the occasion will encapsulate the success story of our tiger conservation efforts.

May the occasion of 50 years of Project Tiger provide new inspiration and energy to renew our dedication and commitment to conservation of nature and wildlife.

(Narendra Modi)

New Delhi
चैत्र 13, शक संवत् 1945
03rd April, 2023


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EXECUTIVE SUMMARY

In 1973, the Project Tiger was established with the objective of utilizing the tiger's functional role and charisma to garner public support and resources for preserving representative ecosystems. Since its inception, the project has expanded from nine tiger reserves covering 18,278 km^2 to 53 reserves covering 75,796 km^2, which account for 2.3% of India's land area. Despite this, most tiger reserves and protected areas in India are existing as small islands in a vast sea of ecologically unsustainable land use, and many tiger populations are confined to small protected areas. Although some habitat corridors exist that allow tiger movement between them, most of these habitats are not protected areas, continue to deteriorate further due to unsustainable human use and developmental projects, and thereby are not conducive to animal movement.

As tigers inhabit diverse habitats across a vast geographical expanse in India, we have categorized the tiger-bearing habitats into five major landscapes based on biogeography and interconnectivity of the habitats: 1) Shivalik-Gangetic plains, 2) Central India and Eastern Ghats, 3) Western Ghats, 4) North Eastern Hills and Brahmaputra Flood Plains, and 5) the Sundarbans. Each landscape is analyzed as a separate unit, since environmental and habitat covariates differ in their relationship with tiger abundance in each of the landscapes. Additionally, landscapes are an ecologically holistic entity because they function as a biological unit wherein tiger populations can share common individuals, a common gene pool, and can potentially disperse between populations. Given the current focus of landscape scale management philosophy currently being adapted, and that tiger movement between landscapes is rare in modern times, this division makes ecological sense, especially for management inferences and implementation.

The conservation of tigers in India can be divided into two phases. The first phase starting in the 1970s, involved the enactment of the Wildlife Protection Act and the establishment of protected areas that helped conserve tigers and tropical forest ecosystems. The second phase began in the 2005-06, with the government adopting a landscape-level approach and implementing strict monitoring for tiger conservation. This resulted in an increase in the tiger population from 1,411 in 2006 to 2,967 in 2018. The past four cycles of tiger monitoring in India have resulted in major changes in policy and tiger population management. This has included the designation and notification of inviolate critical core and buffer areas of tiger reserves, identification and declaration of new tiger reserves, recognition of tiger landscapes and the importance of corridors, integrating tiger conservation with developmental activities, planning reintroduction and supplementation strategies for tigers and ungulates, and prioritizing conservation investments to target unique vulnerable gene pools. This exercise brought to the forefront scientific thinking in forest staff and use of technology ensured transparency in data collection and collation. These outcomes provide an opportunity to incorporate conservation objectives supported with sound science-based data in policy and decision-making for the benefit of society.

At the beginning of the first tiger monitoring exercise in 2006, India was divided into 100 km^2 grid, and since then, this sampling space has remained constant. Each grid was uniquely coded so that subsequent inferences can be compared on the same spatial scale and extent. The overall sampled space for Phase I remains constant; what changes within that is camera-trapped space vs. model-predicted space for the tiger population. The estimation exercise is carried out in three phases, Phase I entails data collection at beat scale by forest department staff across country covering 10146 grids (of 100 km^2) followed by Phase III where the sampling is done at 174 sites encompassing 32588 locations which resulted in 4,70,81,881

photographs having 97,399 tiger pictures. Phase II is done at Wildlife Institute of India which involves generating landscape level data using remote sensing and secondary data sources. Total man-days in data collection and collation was 6,41,102. This is the largest survey done so far.

The tiger occupancy has increased from 1758 cells of 100 km^2 in 2018 to 1792 in 2022. The unique tigers photographed in 2022 is 3080, while in 2018 there were 2461 unique tigers captured. The minimum estimated population is 3167. Population increase is substantial in Shivalik & Gangetic flood plain which is followed by Central India, North Eastern Hills and Brahmaputra flood plains and Sundarbans while Western Ghats population showed decline with major populations being stable.

The tiger population in the Forest Divisions of the Shivalik hills and Gangetic plains landscape has recorded substantial increase with total of 804 unique tigers being photographed, which is higher than estimated population of 646 (SE 567-726) in 2018. The photographic evidence of tigers in new areas in Uttar Pradesh and Himachal Pradesh provide hope of range expansion. To ensure their long-term survival, it is necessary to supplement and repopulate the Shivalik Forest Division of Uttar Pradesh and increase protection for tigers in Suhelwa, and pay special attention to the genetically divergent population of Valmiki. Linear infrastructure projects in the congested corridor between western and eastern Rajaji have left the area functionally extinct for large carnivores and elephant movement, and the adoption of green infrastructure is needed to recover the tiger population in this fragmented landscape. Additionally, Uttarakhand and Uttar Pradesh need to invest in mitigating conflicts with tigers and mega herbivores due to their increasing populations outside protected areas.

The Central Indian landscape has witnessed an increase in tiger population, with 1,161 unique tigers being photographed as compared to an estimated population of 1,033 (SE 885-1193) in 2018. Tigers have occupied new areas in Madhya Pradesh and Maharashtra. However, it is crucial to record that the local tiger population has become extinct in several areas, Sri Venkateswara National Park, including Tiger Reserves like Kawal, Satkosia and Sahyadri. While the expansion of tiger habitats is a positive development, there is a need to pay attention and act quickly in these areas to reverse the trend of extinction of small populations and avoid negative human-tiger interactions. Serious conservation efforts are needed to help tiger population recovery in Jharkhand, Odisha, Chhattisgarh, Telangana, and Andhra Pradesh. The small and genetically unique population of tigers in Simlipal is a priority for conservation. Wildlife habitats in the region face various threats, including habitat encroachment, illegal hunting, conflicts with humans, unregulated cattle grazing, excessive harvesting of non-timber forest products, forest fires, mining, and expanding infrastructure. Mitigation measures, such as eco-friendly construction techniques, lower mining impacts, and rehabilitation of mining sites, are essential to mitigate these threats. The construction of mitigation structures, such as the one on NH-44, is an example of a successful effort to mitigate the impact of infrastructure on wildlife habitats.

The protected areas within the Western Ghats are some of the most biodiverse in the country. However, the rise of development has led to an increasing overlap between wildlife and humans. As of 2018, the tiger population was estimated at 981 (SE 871-1093) tigers in the region. In 2022, 824 unique tigers were recorded, indicating a decline in some regions and stability in well-protected tiger reserves. To safeguard the indigenous flora and the ecosystem as a whole, invasive species must also be contained. The Nilgiri cluster is home to the world's largest tiger population, but recent data shows a decrease in tiger occupancy throughout the Western Ghats, except in a few areas like Kali (Anshi Dandeli). While tiger populations within protected areas have either remained stable or increased, tiger occupancy outside of these regions has significantly decreased in areas, such as the Wayanad landscape, BRT Hills, and the border regions

of Goa and Karnataka. The Mookambika-Sharavathi-Sirsi landscape and Bhadra have also experienced a substantial decline in tiger occupancy. Beyond the protected area border of Anamalai-Parambikulam complex, a decrease in tiger occupancy was also observed. Although tiger populations in the Periyar landscape have remained stable, tiger occupancy outside of Periyar has decreased. Local extinctions of tiger populations were noticed in Sirsi, Kanyakumari, and Srivilliputhur.

The landscape of North Eastern Hills and Brahmaputra is secure, with 194 distinctive tigers being captured on camera traps, with an estimated 219 (SE 194-244) tigers in 2018. The tiger population of North East is genetically unique and is small in size thus requiring intensive conservation efforts. The North East region of India holds immense ecological and cultural significance. Its unique wildlife species composition and high level of endemism make it ecologically important, coupled with its natural beauty and several indigenous communities. However, the region is currently facing several threats such as habitat loss, poaching, and human-wildlife conflict, which necessitate increased conservation efforts. The region is home to several tiger populations, and although various Tiger Reserves have been established, only Kaziranga and Manas have sizeable tiger populations. Tiger populations continue to be threatened, and more measures need to be implemented to address these threats, including fortifying protected area management, intensifying anti-poaching measures, involving local community to wean away from traditional hunting practices and tackling the underlying reasons for human-wildlife conflict.

The Sundarbans holds a unique and significant position for biodiversity conservation of mangrove ecosystem, and is situated near Kolkata. This region is susceptible to the effects of climate change and the rise of sea levels, which could cause submergence. The region undergoes yearly accretion and erosion, and it is surrounded by several forest villages that depend on its natural resources for sustenance. The Sundarbans tigers are well-suited to the mangrove ecosystem, but their habitat is confined. The tiger population and landscape are both threatened by biotic interference in the form of forest exploration, fishing, palm and timber extraction, and the expansion of waterways. To preserve the ecological integrity of the area, cross-border collaboration and knowledge exchange between India and Bangladesh are imperative. In 2018, tiger population was estimated to be 88 (SE 86-90), whereas in 2022, images of 100 tigers were captured. The population is steady, with a limited potential to extend its range.

To ensure the long-term survival of tigers in India, a multi-faceted approach is needed, including protecting and expanding tiger habitats, preserving population connectivity, minimizing human-tiger conflicts, and combating threats like habitat loss, poaching, and illegal trade. It's important to restore habitats, increase ungulate populations, and plan reintroduction of tigers in low density areas to tackle conflict issues. The involvement of various stakeholders, such as governments, NGOs, local communities, and businesses, is crucial. Strategies like increased patrolling, monitoring, and law enforcement, focus on "Other Effective Area-based Conservation Measures (OECM)" along with promoting eco-tourism and sustainable livelihoods for local communities, can help achieve this goal.

The accomplishments achieved through Project Tiger are truly remarkable and unmatched worldwide. This is in part achieved due to our cultural traditions of believing we are one with nature – *'Vasudaiva kutambakam'*. It is our duty to uphold this legacy and ensure that our conservation efforts don't go in vain, securing it for future generations by sustaining the progress we have made so far. We should strive to maintain our leadership position in global conservation efforts by setting the standards for ecosystem restoration while ensuring the progress of our developmental objectives and considering the well-being of all living beings – One Earth, One Family, One Future.

INTRODUCTION

Tigers are a vital aspect of India's wildlife heritage and culture, and the country is proud to be home to more than 70% of the world's wild tiger population. They have played a significant cultural and philosophical role for centuries, and conserving them is crucial for preserving biodiversity, a way of life and a connection to nature. Tiger conservation effort reflects India's commitment and respect towards preservation of its rich biodiversity and natural heritage. The Indian philosophy of interdependence emphasizes the interconnectedness of all living beings and their dependence on each other for survival.

निर्वनो वध्यते व्याघ्रो निर्व्याघ्रं छिद्यते वनम्।
तस्माद्व्याघ्रो वनं रक्षेद्वयं व्याघ्रं च पालयेत् ॥

-महाभारत – उद्योग पर्व : ५.२९.५७

If there is no forest, then the tiger gets killed; if there is no tiger, then the forest gets destroyed. Hence, the tiger protects the forest and the forest guards the tiger!

-Mahabharat (Kumbhaghonam Edition) – Udyoga Parva: 5.29.57

The conservation of tigers in India can be thought of as two major phases. The first phase began in the 1970s with the enactment of the Wildlife Protection Act and the establishment of protected areas that facilitated the conservation of tigers and tropical forests. However, in the 1980s, the trade in tiger parts began to decimate the population, leading to a shocking revelation of local extinction of Tigers in the Sariska Tiger Reserve in 2005 and thus began the second phase, wherein the Government innovated and implemented new ideas. In this phase, the government adopted a landscape-level approach and implemented strict monitoring for tiger conservation, this resulted in an increase in the tiger population from 1,411 in 2006 to 2,967 in 2018, occupying an area of 88,985 sq. km. This effort of conserving tiger benefits ecosystems and human well-being, requiring attention, resources, and efforts from all sectors of society.

In 1973, the Project Tiger was established with the objective of utilizing the tiger's functional role and charisma to garner public support and resources for preserving representative ecosystems. Since its inception, the project has expanded from nine tiger reserves covering 18,278 km^2 to 53 reserves covering 75,796 km^2, which account for 2.3% of India's land area. Despite this, most tiger reserves and protected areas in India are similar to small islands in a vast sea of ecologically unsustainable land uses, and many tiger populations are confined to small protected areas. Although some habitat corridors exist that allow tiger movement between them, most of these habitats are not protected areas, and continue to detriorate due to unsustainable human use and developmental projects, and thereby not conducive to animal movement.

The information generated from the past four cycles has resulted in major changes in policy and the management of tiger populations. It has also provided scientific data to fully implement provisions of the Wildlife (Protection) Act 1972, in letter and spirit. The major outcomes that were a direct or indirect consequence of information generated by the monitoring exercises were: 1) tiger landscape conservation plans, 2) designation and notification of inviolate critical core and buffer areas of tiger reserves, 3) identification and declaration of new tiger reserves, 4) recognition of tiger landscapes and the importance of the corridors and their physical delineation at the highest levels of governance, 5) integrating tiger conservation with developmental activities using the power of a reliable information system, 6) planning reintroduction and supplementation strategies for tigers and ungulates, and 7) prioritizing conservation investments to target unique vulnerable gene pools (Qureshi et al. 2014, Kolipakam et al. 2019, Jhala et al. 2021). All of these provide an opportunity to incorporate conservation objectives supported with sound science-based data, on equal footing with economic, sociological, and other values in policy and decision-making for the benefit of society.

Despite efforts to conserve tigers, there are still several challenges that need to be addressed. One of the major challenges is aligning the aspirations of large-scale economic development while safeguarding forests and their wildlife and mitigating human-tiger conflict. Other silent and surmounting threats are climate change-related impacts on habitats and the loss of the quality of forests over time. Out of the approximately 400,000 square kilometers of forests in tiger states, only one-third are in relatively healthier condition. Another significant challenge is the illegal wildlife trade. Even though poaching is illegal, the demand for tiger products remains high, and poachers continue to kill tigers for profit. To combat this, the Indian government has implemented strict laws and increased surveillance to prevent poaching and illegal trade. The increase in the tiger population is a positive sign, but we must not become complacent and there is a need to continue our efforts to ensure the survival of this magnificent animal and safeguard our forested ecosystems in their entirety. Tigers are not just a part of India's wildlife heritage but also a symbol of the country's ecological richness and economic well-being.

METHOD

The tiger, ungulate, and habitat monitoring method was adopted and implemented across almost 400,000 sq km of India's forested habitat. Such large-scale data collection requires a large workforce, discipline, seamless data flow, and technology for analysis. As tigers inhabit diverse habitats across a vast geographical expanse in India, we have categorized the tiger-bearing habitats into five major landscapes based on biogeography and interconnectivity of the habitats: 1) Shivalik-Gangetic plains, 2) Central India and Eastern Ghats, 3) Western Ghats, 4) North Eastern Hills and Brahmaputra Flood Plains, and 5) the Sundarbans. Each landscape is analyzed separately since environmental and habitat covariates differ in their relationship with tiger abundance in each of the landscapes. In addition, landscapes form logical and biological units wherein tiger populations can share common individuals, a common gene pool, and can potentially disperse between populations. Given the attention of landscape scale management philosophy that is currently adapted, this division makes sense ecologically and for management inferences and implementation. However, tiger movement between landscapes is rare in modern times.

At the beginning of the first tiger monitoring exercise in 2006, India was divided into 100 km^2 grid, and since then, **this sampling space has remained constant**. Each grid was uniquely coded so that subsequent inferences can be compared on the same spatial scale and extent. **The overall sampled space for Phase I remains constant;** what changes within that is camera-trapped space vs. model-predicted space for the tiger population.

Phase I: Frontline staff of State Forest Departments of 20 potential tiger bearing States were trained to collect the Phase I data **(Fig. 1)** in a digital format on the M-STrIPES mobile application. Field guides in nine regional languages was published and provided to each beat guard.

Data collection on each of the following components was implemented in 2022:

a) Carnivore sign encounters (Form 1: multiple occupancy surveys in a beat)
b) Ungulate abundance (Form 2: Distance sampling on line transect(s) in a beat)
c) Vegetation (Form 3A and 3C: Canopy cover, tree, shrub and herb composition, weed infestation on plots on a transect in a beat)
d) Human disturbance (Form 3B: Multiple plots of 30m diameter on line transects in a beat) and
e) Dung counts (Form 4: count of all dung identified to species in multiple 40m^2 plots on transects)

For the Sundarbans, the above protocol was modified so as to allow sampling using a boat along river channels *(khals)* and in North East India, barring Assam, polygon search method was used. Phase I sampling took a maximum of 10 days for each forest beat with the sampling effort by two persons.

Phase II- Remotely sensed spatial and attribute covariates: Distribution and abundance of wildlife are likely to be determined by habitat characteristics and anthropogenic impacts. These covariates were obtained from remotely sensed data and used to model tiger occupancy and abundance, in combination with Phase I data. Habitat characteristics were surrogated by forest area, vegetation cover [Normalized Difference Vegetation Index, **(NDVI)**], forest patch size, forest core areas, elevation, distance from protected areas and drainage density. Human impacts were surrogated by human footprint, distance to night lights, night light intensity, distance to roads and density of road network.

Phase III: Camera trap based Capture-Mark-Recapture: Camera trap surveys are a well-established method for abundance and density estimation of carnivores. Development of spatial capture-recapture methods have led to a greater clarity and precision in density estimation by integrating the spatial location information of animal photo-captures.

Camera traps were placed at 32,588 locations spread across 174 sites for mark recapture analysis (**Fig. 2**). These Camera traps were placed within the sampling area, in 2 km^2 cells, which are a subset of the aforementioned fixed 100 km^2 grids, and deploying at least one pair of cameras within each cell. Within the 2 km^2 cells, locations are identified for the placement of cameras through extensive search during sign surveys, so as to maximize photo-captures of tigers and leopards. Sampling was carried out simultaneously in a minimum block of 200 km^2. If more number of camera traps were available to cover, then sampling was done in larger size blocks. A minimum spacing of ~ 1 km was maintained between camera trap locations. Cameras were usually operated between 25 to 35 days at each site, with an average effort of over 1500 trap-nights per ~100 km^2.

In areas where camera trapping is not possible (logistically or due to insurgency), and tiger densities are very low, molecular tools are used to determine the presence of tiger by extracting DNA from scats collected in this area.

Table 1: Country wide sampling effort for ground surveys during Phase I of each landscape

2022					
Landscape	**Number of trails**	**Total length of trails (km)**	**Number of line transect**	**Total length of line transect (km)**	**Number of Plots**
Shivalik Hills and Gangetic Plains	4,237	20,576	4,258	7,688	14,024
Central India Highlands and Eastern Ghats	74,619	3,71,310	71,160	1,41,680	2,55,990
Western Ghats	12,462	64,570	13,213	24,663	41,800
North-East Hills and Brahmaputra Flood Plains	1,749	7,565	1,069	2,059	11,594
Sundarbans	315	1,339	NA	NA	595
India Total	**93,382**	**4,65,360**	**89,700**	**1,76,090**	**3,24,003**

The spatial covariates of relative abundance of tigers, co-predators, and ungulates, human impact indices, and habitat characteristics across all potential tiger habitat in India, are collected (via remote sensing and on ground surveys) at a fine spatial resolution of a forest beat which is on average about 15 km^2 (Phase I **(Table 1)** and II). Subsequent to Phase I & II, an adequate area within each landscape was sampled using camera traps (Phase III) **(Fig. 2)**. The methodology followed for the population estimate is a derivation of double sampling concept, wherein indices or raw counts of abundance obtained from the entire sample space are calibrated against absolute density obtained from limited samples. This approach estimates tigers directly within camera trapped areas and extrapolates it to areas with tigers (information obtained through indirect evidences during phase I), but not camera trapped, based on joint distribution of covariates.

Figure 1: Spatial Coverage of Sampled forests for carnivore signs, ungulate abundance, habitat characteristics and anthropogenic impacts in 2022. Tiger presence locations are depicted in orange.

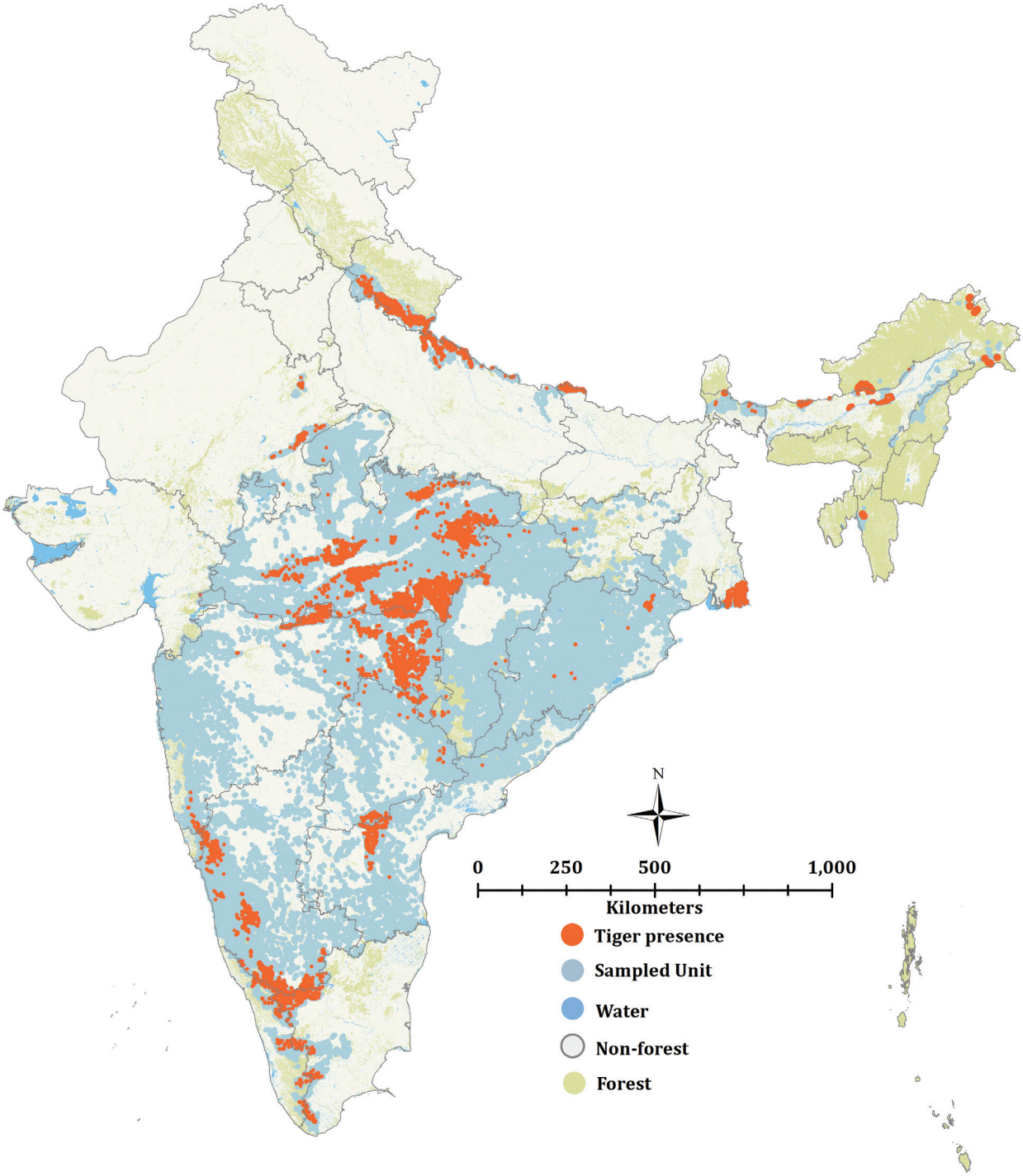
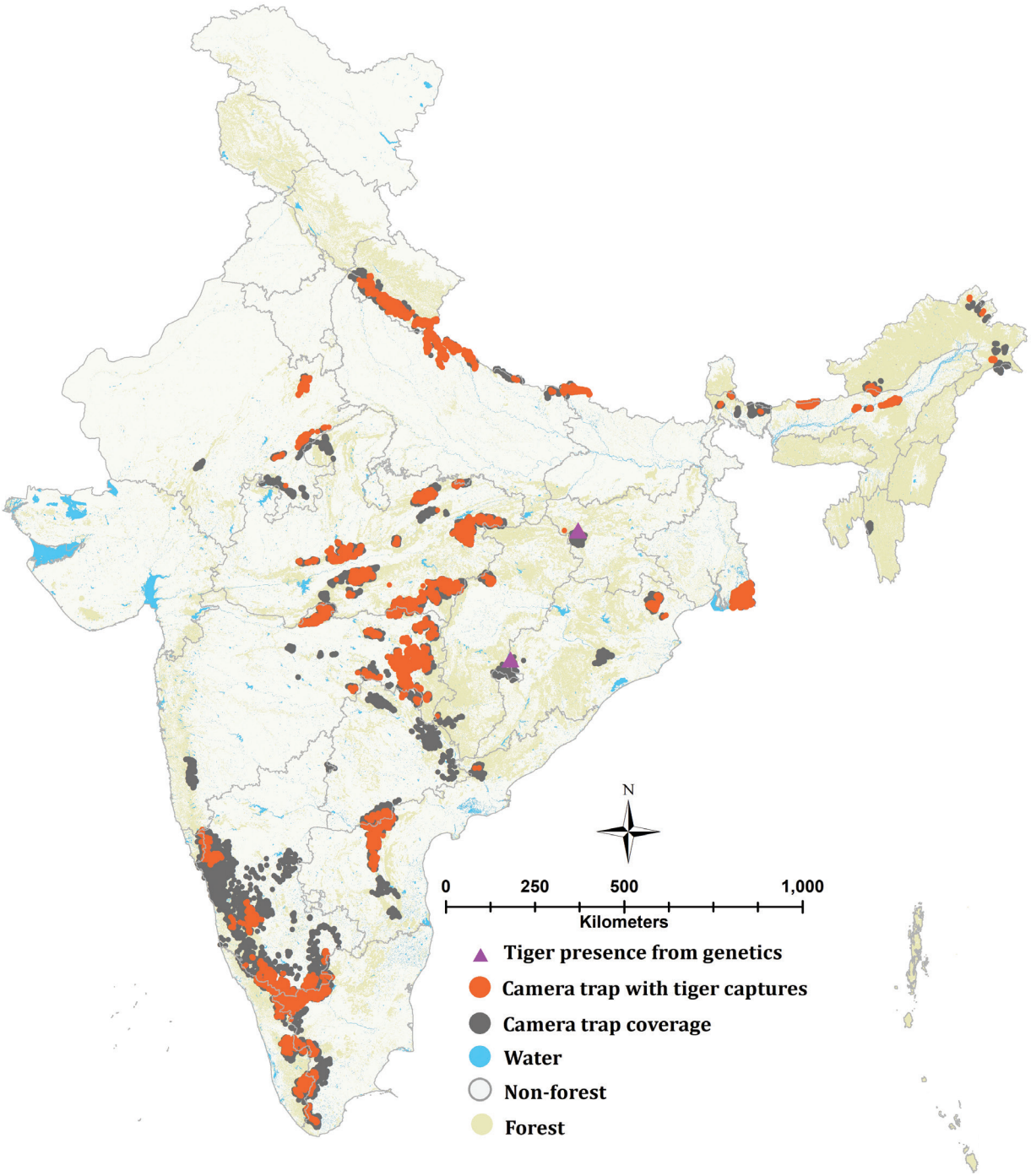


Figure 2: Camera trap locations with tiger captures (orange) and tiger positive scat locations (purple triangle) across tiger bearing forests of India in 2022



DATA ANALYSIS

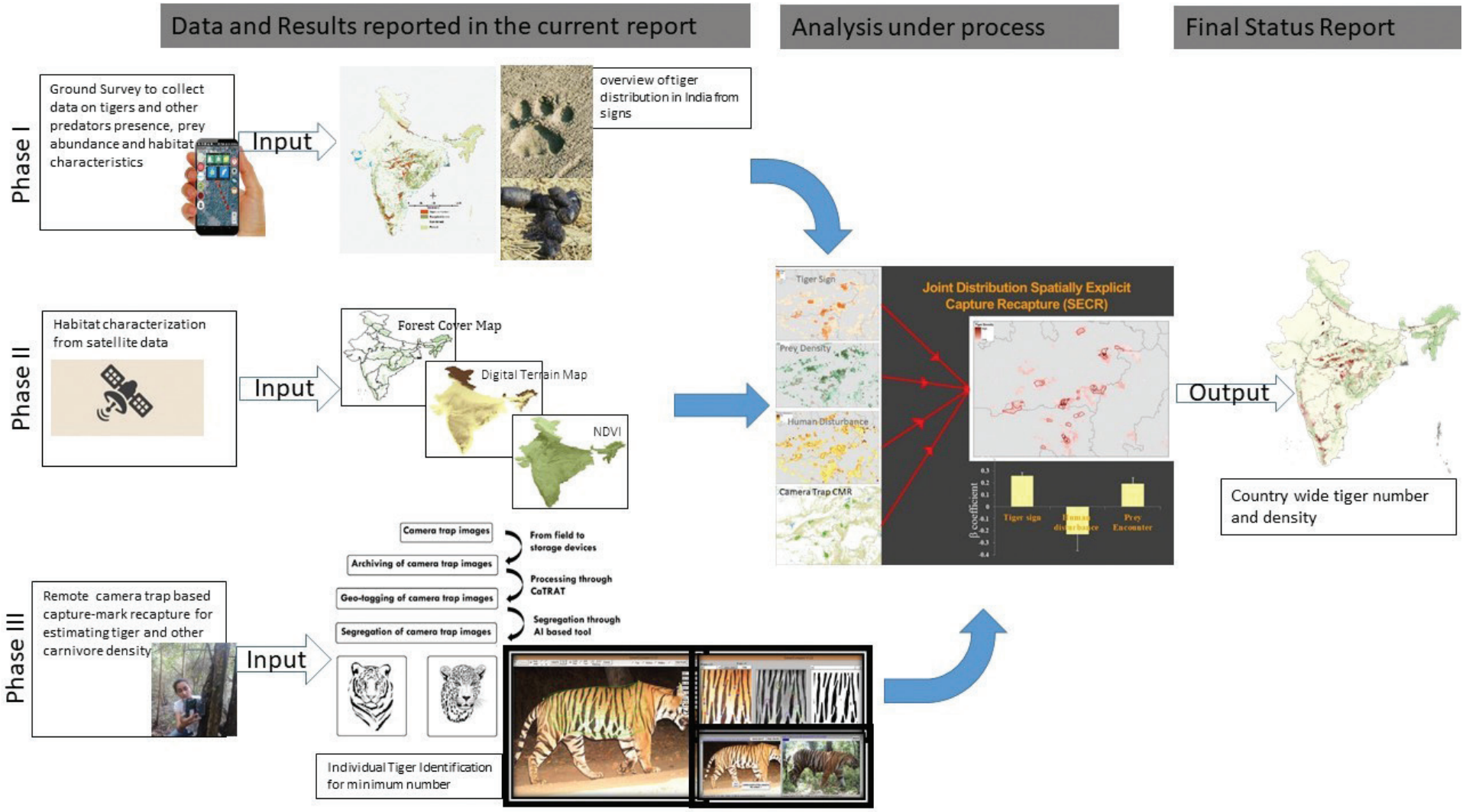
Processing of Phase I data in M-STrIPES desktop software: Phase I data was received from different States of India and these were processed using M-STrIPES desktop software **(Fig.3)**. Data entry errors, if any, were communicated back to the respective forest divisions for rectification. The M-STrIPES desktop software is capable of exporting the collected data into a data format that can be readily analysed by existing quantitative analysis software. Data of carnivore sign survey (Form 1) was used to model the occupancy of different species (single season single species format), and herbivore abundance. The data from habitat assessment which includes information on different plant species (Form 3 & 4) including invasive plants and ungulate dung is being processed. Results of these are not presented in this summary report and are currently under analysis at WII.

Phase II- Remotely sensed spatial and attribute covariates: Remotely sensed data was extracted grid wise, and used as a covariate in occupancy and abundance models.

Processing of Phase III data: The image processing software CaTRAT (Camera Trap Data Repository and Analysis Tool), developed at Wildlife Institute of India in collaboration with Indraprastha Institute of Information Technology (IIIT), New Delhi, to analyze camera trap data, was used for organizing, geo-tagging (tagging individual pictures with the location of the camera trap site) of photo-captures obtained from field. The geo-tagged images were further processed for segregation into species using an artificial intelligence tool (AI) **(Fig. 3)**. The AI based image processing tool was developed in collaboration with IIIT, Delhi, helps to automatically segregating the camera trap images of different species. This segregated data was subsequently processed for individual identification of tigers and leopards (Hiby et al. 2009).

In some areas, molecular tool based confirmation of tigers was carried out. From the collected scats, DNA was extracted and species confirmation was obtained by using a species specific marker that can differentiate between tigers and other co-predators. A panel of eleven microsatellites was further used on tiger positive scats to evaluate the minimum number of individuals in the sampled area (Kolipakam et al. 2019).

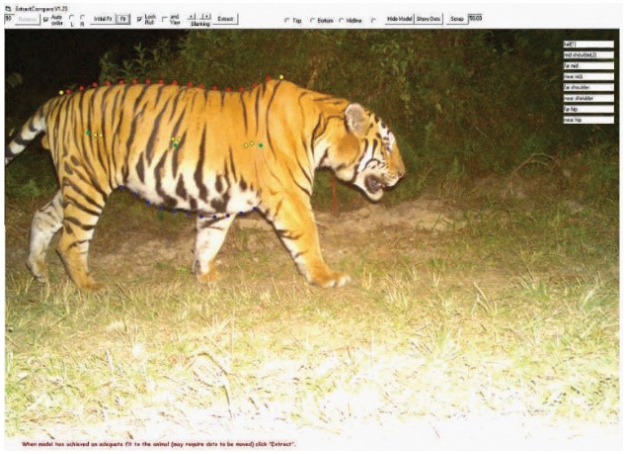
Figure 3: Workflow of data collection and analysis, AITE (All India Tiger Estimation)



Individual identification of tigers: Individual identification is carried out using pattern recognition program ExtractCompare (Hiby et al. 2009). Using an automated process, pattern recognition software searches through the database of images, to calculate similarity between digitized tiger coat patterns to recognize common and unique individuals **(Fig 3 & 4)**.

Individual tigers were first identified within each protected area (camera trap site), and subsequently, tiger photographs of adjoining sites and other sites within the landscape were compared using the National tiger database, so as to remove duplicate or shared tigers, if any, and to understand tiger dispersal events. Once all unique individual tigers are identified, a matrix of spatial capture history for each tiger is developed for each site with camera trap IDs, their coordinates and, deployment and operation history of each camera. This information is needed to estimate the population abundance.

Figure 4: Process of individual identification of tigers using Extract Compare software. This has generated National Tiger Photo Database Library in India.



a) Placing seeds on prominent body parts (mid shoulder, tail, hip)

b) 3-D model fitting which takes into account the angle at which the photo is taken

c) Pattern extracted

d) Visual compare to match tiger images after the computer program has provided a few options from several thousand images

Abundance estimation through Spatially Explicit Capture Recapture (SECR): We will use the maximum likelihood based SECR method (Efford et al. 2009, Borchers and Efford 2008) implemented in program R (R Development Core Team 2010), to estimate tiger abundance from camera trap data. A habitat mask with a sufficiently realistic buffer around the camera trap array that excludes non-habitat will be used and density will be modelled as a function of covariates. Tiger sign encounter rate, prey encounter or dung densities, and human footprint variables obtained from the ground surveys and remotely sensed data will be used within SECR as covariates in a joint likelihood framework to model tiger density (Fig. 3) The spatial estimation process is under way at WII. The minimum population is also estimated using traditional capture-mark-recapture method.

RESULTS

The fifth cycle of All India Tiger Estimation (2022) covered forested habitats in 20 states of India. A foot survey of 6,41,449 km was done for carnivore signs and prey abundance estimation **(Table 1)**. In these forests, 3,24,003 habitat plots were sampled for vegetation, human impacts and ungulate dung **(Table 1)**. Camera traps were deployed at 32,588 locations, resulted in 4,70,81,881 photographs of which 97,399 were of tigers. The total effort invested in the survey was over 6,41,102 man-days. We believe that this is the world's largest effort invested in any wildlife survey till date, on all of the above counts.

A total of 3,080 individual tigers (> 1 year of age) were photo-captured (Table 2) which is larger than the ones captured in 2018 (Table 3). The minimum population estimate is 3,167 individuals.

Table 2: Unique tiger individuals photo captured in each landscape

Landscape	Camera Trapped Tigers
	2022
Shivalik Hills & Gangetic Plains Landscape	**804**
Central Indian Highlands & Eastern Ghats Landscape	**1,161**
Western Ghats Landscape	**824**
North Eastern Hills & Brahmaputra Plains Landscape	**194**
Sunderbans Landscape	**100**
India	**3,080***

**Ranipur (Uttar Pradesh) is added in Shivalik landscape for convenience. Three tigers were common between Ranipur & Madhya Pradesh (Central Indian landscape), hence 3 tigers were subtracted from the Total addition of all landscapes.*

Table 3: Estimated tiger numbers in each landscape from 2006 to 2018 (Number in parenthesis are one standard error limits of the mean).

Landscape	Tiger Population Estimate			
	2006	2010	2014	2018
Shivalik Hills & Gangetic Plains Landscape	297 (259-335)	353 (320-388)	485 (427-543)	646 (567-726)
Central Indian Highlands & Eastern Ghats Landscape	601 (486-718)	601 (518-685)	688 (596-780)	1,033 (885-1,193)
Western Ghats Landscape	402 (486-718)	534 (500-568)	776 (685-861)	981 (871-1,093)
North Eastern Hills & Brahmaputra Plains Landscape	100 (84-118)	148 (118-178)	201 (174-212)	219 (194-244)
Sunderbans Landscape	Not Sampled	70 (62-96)	76 (62-96)	88 (86-90)
India	1,411 (1,165-1,657)	1,706 (1,507-1,896)	2,226 (1,945-2,491)	2,967 (2,603-3,346)

1. Shivalik Hills and Gangetic Plains Landscape

The Shivalik Hills and Gangetic Plains landscape in India spans across several states and includes five important Tiger Reserves and several other protected areas. The Terai region of India holds a significant position for the conservation of tigers, as it hosts several key tiger reserves, including Corbett, Rajaji, Pilibhit, Dudhwa, and Valmiki. These protected areas are the only representatives of the rich biodiversity of the Bhabar and Terai regions of the country. Unfortunately, this region has undergone considerable change due to anthropogenic activities. Another important facet of this landscape is that those tiger reserves located in Uttar Pradesh and Bihar are linked through the forests of Nepal, making cross-border cooperation critical to preserve this invaluable natural heritage of both India and Nepal (Qureshi et al. 2006). Terai region is part of one of the 200 globally important eco-regions for its intact large mammal assemblages (Olson and Dinerstein 1998). The forest patches are connected by means of 13 essential narrow corridors (Johnsingh et al. 2004). Although there have been significant on-ground efforts, more input is needed to ensure eco-friendly development. Notably, emphasis is to be laid on the protected areas in Uttarakhand and Uttar Pradesh, which are linked through narrow corridors and require investment to ensure connectivity for the long-term survival of these areas.

The landscape is characterized by three geological zones - the Shivaliks, the Bhabar tract, and the Terai plains. The Bhabar tract is characterized by seasonal streams and the Terai plains are composed of the floodplains of river Ganga. The area supports highly endangered wildlife like Barasingha, one-horned rhinoceros, Bengal florican, Hispid hare, and Hog deer. Recent studies have recorded the presence of wolf in Rajaji TR (Krishna, 2022), and photographic evidence of hyenas in Corbett TR. Additionally, photographic

evidence of tiger was recorded for the first time from Suhelwa WLS (Sadhu et al. 2022) and Himachal Pradesh (Himachal Forest Deptt.). This highly productive landscape with high ungulate density sustains some of the highest density tiger populations in the world (Dinerstein, 1980, Sunquist, 1981, Smith, 1993, Jhala et al. 2018). But this fragile ecosystem is currently being rapidly converted and there are many linear infrastructure projects, particularly expansion of roads. In 2020 the western most tiger distribution in this landscape (Western Rajaji) was supplemented where one male and one female tiger were reintroduced in this area from Corbett TR (Uttarakhand Forest Deptt.).

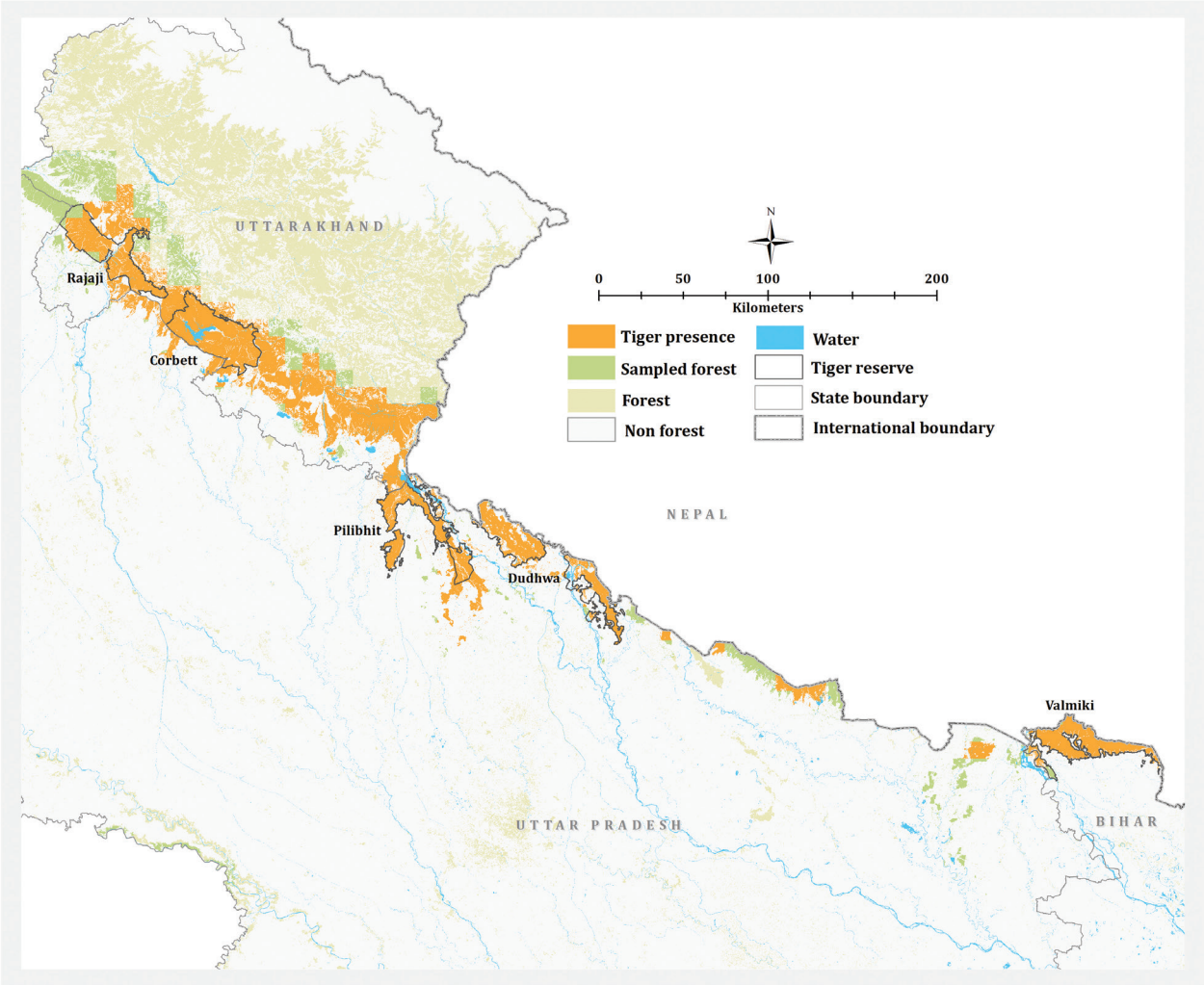
Kolipakam et al. (2019) identified two separate populations of tigers in this landscape viz., Valmiki and Rajaji-Corbett-Dudhwa. Given, its continuity with Nepal, importance has been given to connecting large tracts of this landscape with the aim of securing a single meta-population of tigers between Nepal and Indian terai (Wikramanayake et al. 2004; Dinerstein et al. 2007; Jhala et al 2015). Apart from the tigers, the landscape harbours subspecies of the endangered barasingha and the only surviving population of gaur and wild dog (in Valmiki Tiger Reserve) present in the Indian Terai. Amongst the rare and endangered birds, Bengal florican (Houbaropsis bengalensis) and the swamp francolin (Francolinus gularis) are present patchily in the grasslands. Hence, the forest tracts of this landscape need to be conserved to continue to harbour its endangered fauna and flora.

With photographic evidences coming from Suhelwa WLS and Dehradun Forest Division, tiger distribution in the landscape has increased in 2022 **(Fig. 1.1)**. Dehradun Forest Division, parts of Nainital, Champawat,

Suhelwa and Sohagibarwa WLS have been added in tiger detected grids. Suhelwa and Sohagibarwa WLS in Uttar Pradesh need prey and habitat restoration along with major investment in protection for securing tiger population, which is important from trans-boundary tiger conservation point of view as well.

In 2022, tiger signs were detected in 193 grids and 804 unique tigers were photo-captured **(Table 2).**

Figure 1.1: Tiger distribution in Shivalik Hills and Gangetic Plains landscape in 2022



Conclusion

The tiger population in Forest Divisions (territorial forests) of this landscape has seen a significant increase. New areas in Uttar Pradesh (Suhelwa WLS) and north west of Yamuna in Himachal Pradesh have recorded photographic evidence of tigers in the landscape. Important step to ensure long term survival of new populations in this landscape is to supplement and repopulate the Shivalik Forest Division of Uttar Pradesh along with Kalesar WLS of Haryana, and increase protection for tigers in Suhelwa. The genetically divergent population of Valmiki also requires special attention to ensure continuity of its genepool. The already congested and populated corridor between the western and eastern part of Rajaji has seen linear infrastructure projects since 2018, mostly under the Hardiwar and Rishikesh ring road project. Expansion of road in this section leaves this corridor functionally extinct for large carnivore and elephant movement, therefore adopting adequate number of green infrastructure is an important step in recovery of tiger population in this fragmented landscape. With tigers increasing outside Tiger Reserves in the landscape, Uttarakhand and Uttar Pradesh need to invest in mitigating conflict with tigers and mega herbivores.

2. Central Indian Highlands and Eastern Ghats Landscape

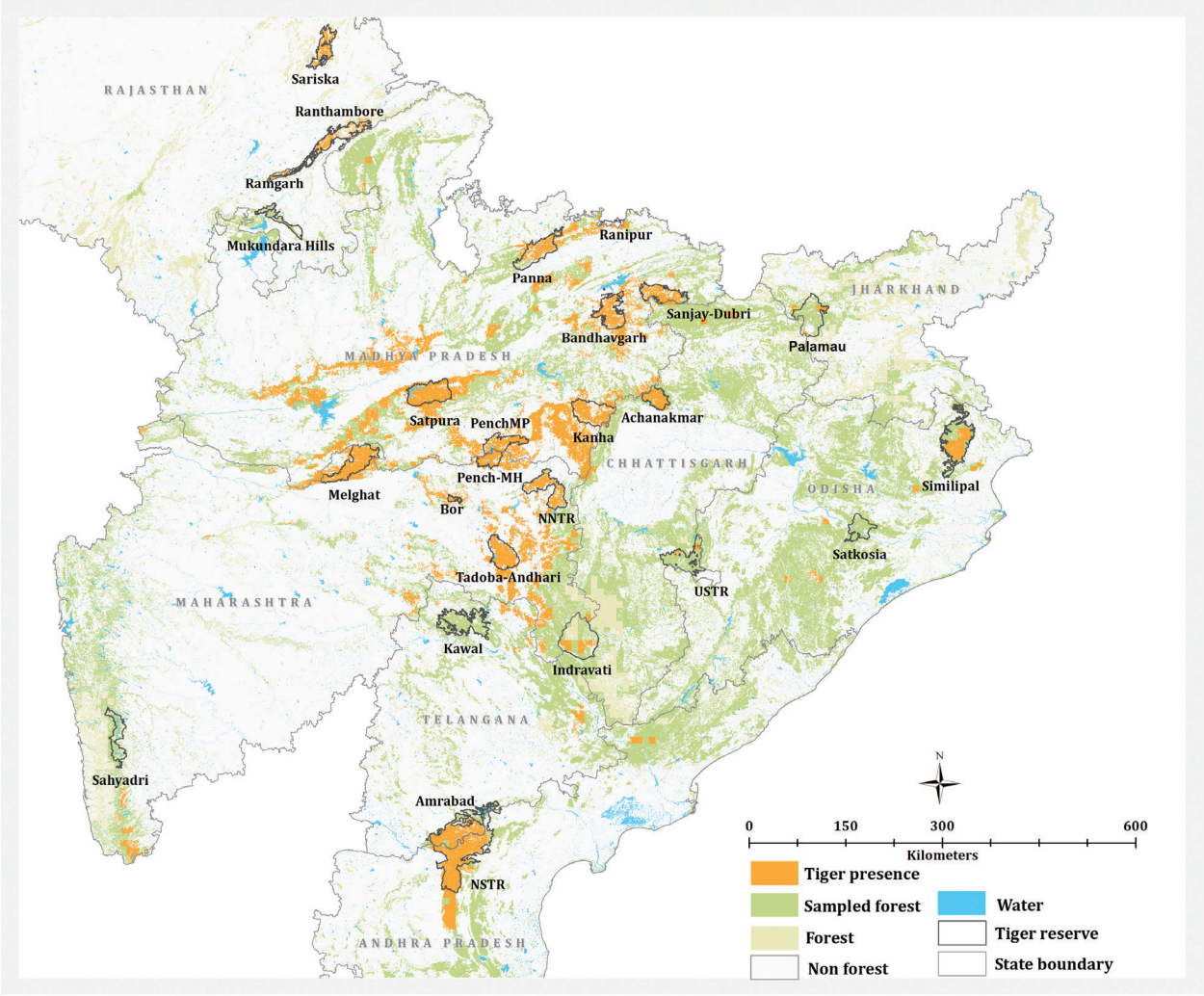
The Central Indian landscape has played a prominent role in the history of wildlife in the region and this is intrinsically entwined to its cultural and ecological evolution. Evidence of human habitation in this landscape dates back to the Stone Age. Today, the region is home to a diverse range of wildlife, and tiger conservation efforts have been successful. However, the region also has the highest level of conflict between tigers and humans, requiring appropriate policies to be developed. Conservation efforts continue to be a top priority, balancing with the needs of the growing human population, and the region has received significant investment in green infrastructure to reduce the impact of roads.

The landscape of Central India and the Eastern Ghats includes the semi-arid areas of Rajasthan, the central Indian plateau, and portions of the Eastern Ghats in Telangana, Andhra Pradesh, and Odisha. The Aravalli Range borders the northwest, the Satpura Range borders the south, the Chota Nagpur plateau borders the northeast, and the Odisha hills border the southeast. The Sahyadri Mountains in the north connect the Western Ghats and the Central Highlands. The Eastern Ghats had historic continuity with Central India forests, but this is now almost lost. The Central India landscape is a vast network of protected areas, with around half (25) of the total notified tiger reserves in India and numerous other protected areas that contain extensive tiger occupied forests. The region encompasses diverse habitats, ranging from moist to dry deciduous forests, and from valleys to hilly terrains, supporting a rich biodiversity. This region has also been the site of numerous reintroduction plans for large mammals. Successful reintroduction of tigers has been done in Panna and Sariska, while gaur was reintroduced in Bandhavgarh and Barasingha in Satpuda and Bandhavgarh tiger reserves. Cheetahs were introduced in Kuno National Park. Gandhisagar and Nauradehi Wildlife Sanctuary have been identified as potential relocation sites for the cheetahs.

The region is home to the largest population of scheduled tribes who rely on forest lands and it also has some of the best tiger habitats in India. Conservation efforts by the forest departments of Odisha, Maharashtra, and Madhya Pradesh have been successful in protecting the core areas of tiger reserves through incentivized village relocations. However, the high concentration of mining activity poses a significant challenge to conservation. The region contains five biosphere reserves and is home to the largest number of tigers and contains the largest tiger-occupied forest in the country. The forests of this region are under threat from various activities, despite their high biodiversity and conservation significance. Two endangered subspecies, the Central Indian Wild Buffalo and Hard Ground Barasingha, are now confined to the tiger reserves in this landscape. The tiger landscape is further sub-divided in 13 smaller tiger landscapes: (i) Sariska, (ii) Ranthambore-Kuno-Shivpuri-Madhav (iii) Panna-Ranipur (iv) Bandhavgarh-Sanjay-Guru Ghasidas-Palamau, (v) Kanha-Pench-Achanamkmar, (vi) Tadoba-Navegaon-Pench-Bor, (vii) Ratapani-Bhopal-Dewas, (viii) Satpuda-Melghat (ix), Sunabeda-Udanti Sitanadi, (x) Indravati-Adilabad-Gadhchiroli (xi) Amrabad- Nagarjunsagar Srisailam, (xii)Sahyadri-Radhanagari, and (xiii) Simlipal-Satkosia.

In 2022, tiger signs were detected in 1049 grids **(Fig 2.1)** and 1,161 unique tigers were photo-captured **(Table 2)**.

Figure 2.1: Tiger distribution in Central India and Eastern Ghats landscape in 2022



Conclusion

Tiger has occupied several territorial areas of Madhya Pradesh and Maharashta which were not occupied in 2018. Tigers occupancy has been expanded towards the territorial forest divisions of Maharashtra and Madhya Pradesh. This expansion require urgent attention and preparedness to deal with negative human-tiger interactions. The Ranthambhore tiger population (only source population) has contributed to the expansion of tiger distribution in the semi-arid landscape of western India (Dholpur, Kuno-Shivpuri, Ramgarh Visdhari). However, tiger occupancy declined in the states of Jharkhand, Odisha, Chhattisgarh, and Telangana. If management activities like prey augmentation, habitat restoration, and protection are undertaken with serious efforts, tiger reserves and protected areas in the states of Jharkhand, Odisha, Chhattisgarh, Telangana, still hold potential for further recovery of tiger populations. Tigers were locally extirpated form Kawal tiger reserve and Chennur of Telangana, Sri Venkateswara National park in Andhra Pradesh, Satkosia tiger reserve from Odisha, Sahyadri Tiger reserve from Maharashtra and Andhra Pradesh The genetically unique and small population of tigers in Simlipal is of high conservation priority in the landscape. The wildlife habitats (PAs and corridors) within this region face a range of threats, including habitat encroachment, illegal hunting of both tigers and their prey, conflicts between humans and wildlife, unregulated and illicit cattle grazing, excessive harvesting of non-timber forest produces (NTFP), human induced forest fires, mining, and ever-expanding linear infrastructure. This region is also having several mines of important minerals, hence mitigation measures like lower mining impact techniques and rehabilitation of mining sites should be done on priority. Construction of eco-friendly measures for mitigating impact of linear infrastructure on the connectivity between two habitats are essential. A good example is the mitigation structures on NH-44, which crosses between Kanha-Pench wildlife corridors, constructed by the National Highway Authority of India, which is the largest mitigation structure to have been built.

3. Western Ghats landscape

The Western Ghats in India is a region of natural beauty with diverse ecosystems, rivers, and water bodies that support a variety of flora and fauna, including several endemic species. The area also has a rich cultural heritage with indigenous communities living sustainably off the land. However, the region faces several conservation issues due to human activities, including habitat loss and fragmentation, poaching, illegal wildlife trade, human-wildlife conflict, and invasive species. To address these issues, various initiatives have been implemented, such as habitat restoration, anti-poaching measures, and human-wildlife conflict management. A multi-pronged approach balancing the needs of local communities with ecosystem protection and endangered species is necessary for effective conservation in the Western Ghats.

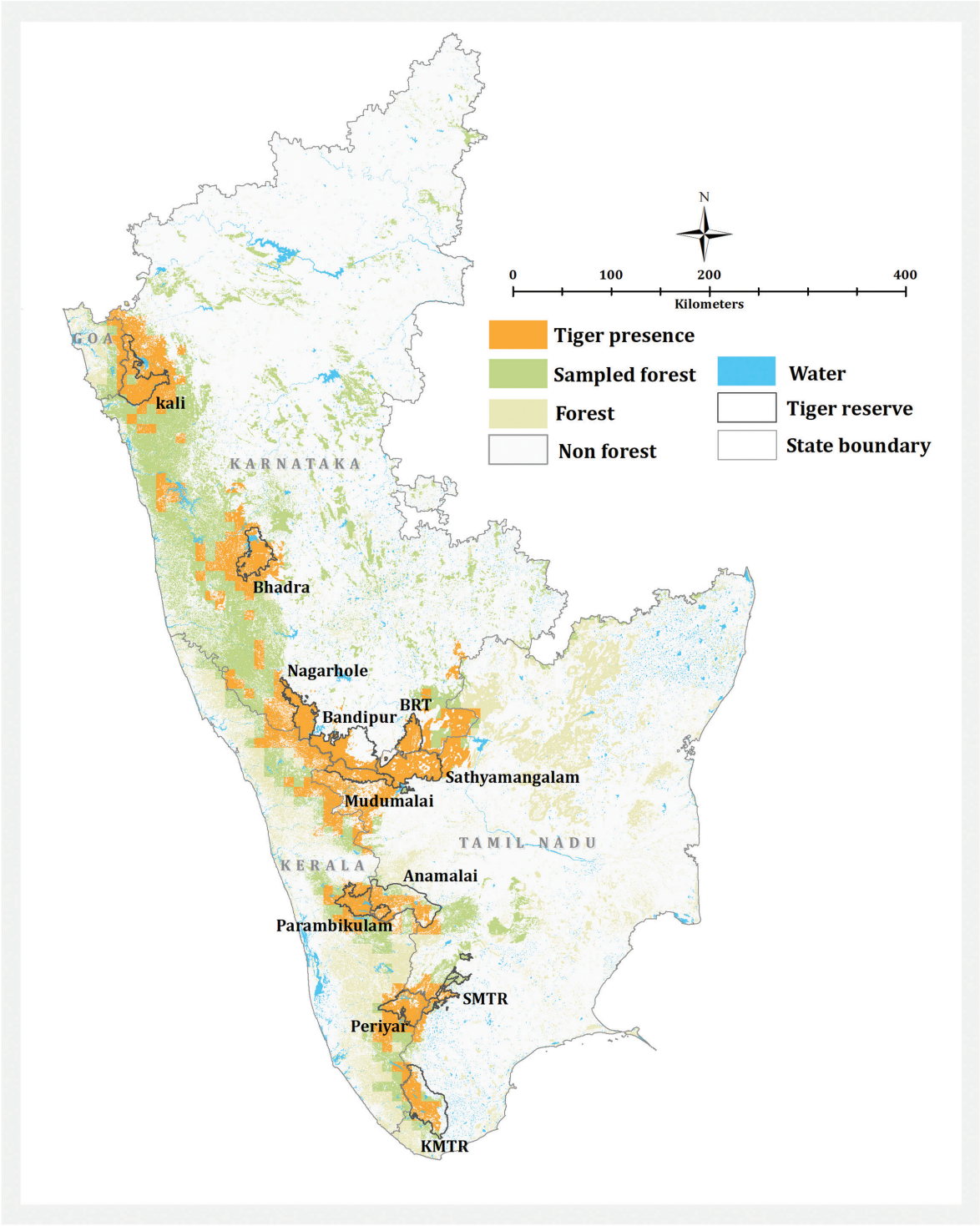
The Western Ghats is a continuous range of hills that runs parallel to the Arabian Sea coast for about 1600 km, covering an area of about 1,40,000 km^2. It spans six states in India and contains 12 Tiger Reserves, 20 National Parks, and 68 Wildlife Sanctuaries. The Western Ghats are a biodiversity hotspot and home to many endemic plant and animal species, including endangered species like the lion-tailed macaque, the Malabar giant squirrel, and the Nilgiri tahr. The region is also a vital source of water for many major Indian rivers, and local communities rely on its forests for food, fuel, and medicinal plants. Despite its UNESCO World Heritage Site status, the Western Ghats face several environmental challenges, such as deforestation, habitat loss, and climate change, that threaten the survival of many species and the overall ecological balance of the region.

Majority of the tiger populations remain stable and some have declined, a significant reduction of tiger occupancy has been observed throughout the landscape (**Fig. 3.1**). Extensive camera trapping has been

done in this landscape. Colonization of tigers in the northern Western Ghats indicated good connectivity across the landscape, from Nilgiri cluster (Nagarahole-Wayanad-Bandipura-Mudumalai-Sathyamangalam-BRT Hills) to Anshi Dandeli.

In 2022 tiger signs were detected in 400 grids **(Fig 3.1)** having 824 unique tigers photo-captured **(Table 2)**.

Figure 3.1: Tiger distribution in Western Ghats landscape in 2022



Conclusion

The Nilgiri cluster (i.e., Nagarahole to BRT Hills) in the Western Ghats landscape is the largest tiger population in the world, and has contributed significantly to colonisation of tigers in neighbouring areas (Jhala et al. 2020). However, the recent most data depicts a declining trend in the tiger occupancy in the entire Western Ghats (barring a few areas, e.g., Anshi Dandeli). While the tiger populations inside the PAs remains stable (e.g., Mudumalai, Periyar) or has increased (e.g., Bandipur, Nagarahole), the tiger occupancy outside the PAs has declined. Siginficant declines were observed in Wayanad landscape and in BRT Hills. Although the tiger occupancy has increased in the Anshi-Dandeli landscape (eastern part), it has declined in the border areas of Goa and Karnataka (Mollem-Mhadei-Anshi Dandeli complex). A major decline in tiger occupancy has been observed in the Mookambika-Sharavathi-Sirsi landscape, status quo is maintained in Bhadra landscape. Decline in tiger occupancy was also observed outside the PA boundary of Anamalai-Parambikulam complex. Although the tiger populations in the Periyar landscape remained stable, the tiger occupancy has declined outside Periyar. Local extinctions of tiger populations were observed in Sirsi, Kanyakumari, and Srivilliputhur. The connectivity of protected areas along the Western Ghats is some of the best in the country. However, with increasing human foot print and development, there is an increase in the interface between humans and wildlife. While wildlife in human dominated landscape is a cultural part of the Western Ghats, there is increasing tension between humans and megaherbivores & carnivores. There is utmost need to address this issue if we are to retain one of the worlds biodiversity hotspots. The other major concerns in Western Ghats is the spread of invasives in large tracts of protected areas. It is necessary to contain this spread, to ensure the survival of native flora and subsequently reduce the impact it has on flora, fauna, soil and habitat as a whole.

4. North East Hills and Brahmaputra Plains Landscape

The North East region of India is ecologically significant due to its rich and diverse array of wildlife, with many species that are unique to the region. The region's high level of endemism and contribution to the conservation of genetic diversity make it ecologically significant. The region is also culturally and aesthetically important, with several indigenous communities and natural beauty that inspires people. However, the region is facing threats such as habitat loss, poaching, and human-wildlife conflict, which require more efforts from the government and non-governmental organizations for long-term conservation.

The region is home to several populations of tigers, which are threatened by habitat loss, fragmentation and poaching. The traditional hunting practices left large tracts of forests virtually devoid of wildlife. To provide suitable habitats for tigers and other wildlife several Tiger Reserves have been established in North East India, such as Kaziranga, Manas, Orang, Pakke, Nameri, Namdhapa, Kamlang, Dampa, and Buxa, of which only Kaziranga and Manas harbour substantial tiger populations. Despite the establishment of these protected areas, these tiger populations continue to face threats, and efforts are needed to address these threats, including strengthening protected area management, intensifying anti-poaching measures, and tackling the underlying cause of human-wildlife conflict.

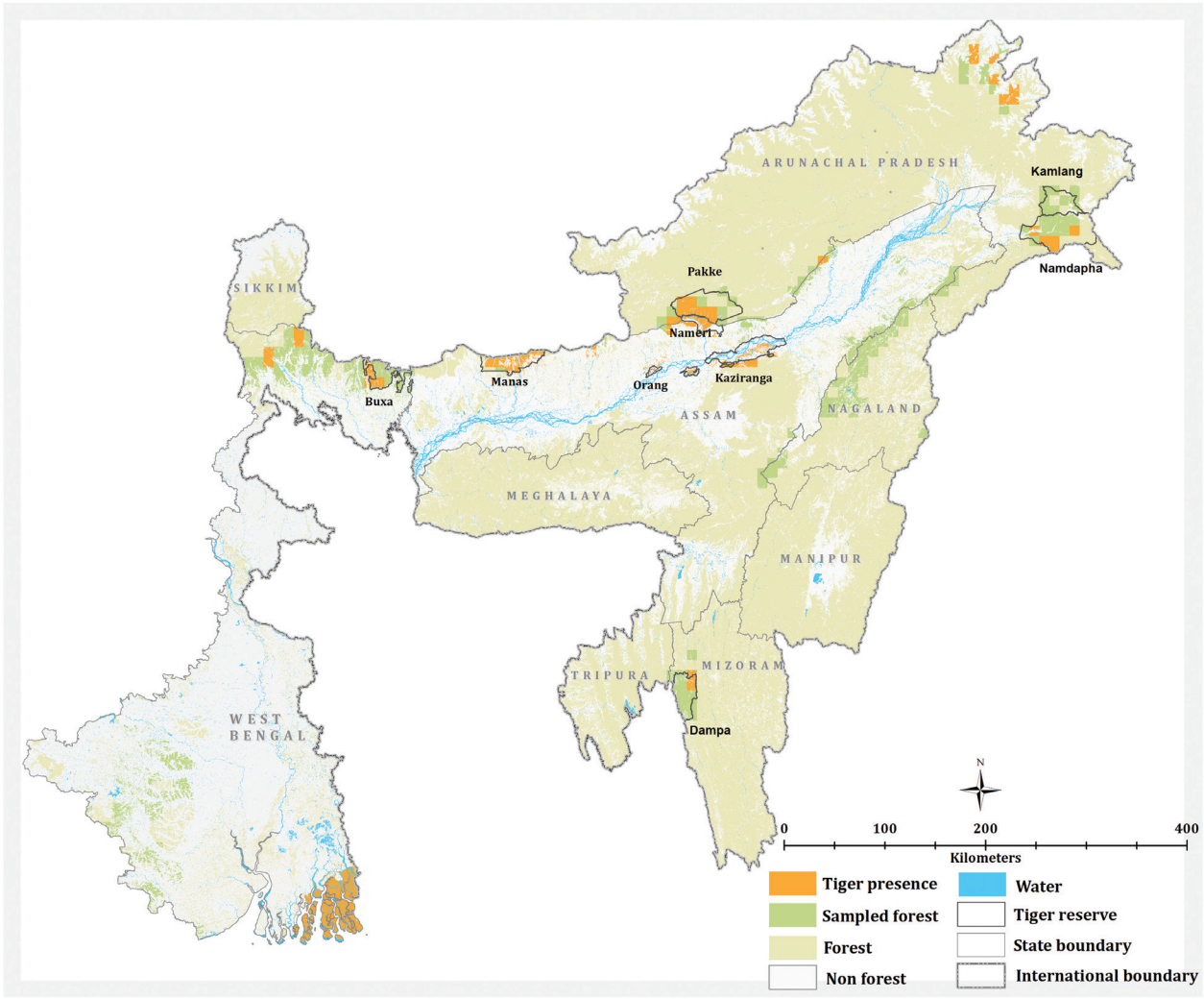
The eastern part of India is a biodiversity hotspot, including the North Bengal dooars, flood plains of Brahmaputra, and North Eastern hill ranges, spread across nine states. The region has a high forest cover,

with Mizoram, Arunachal Pradesh, Meghalaya, Manipur, and Nagaland having the highest percentage. The landscape has experienced extensive change in land-use patterns in the past, leading to a severe loss of natural habitat. However, there are several protected areas, reserve forests, sacred groves, and wetlands that act as a refuge for endangered and endemic species. The landscape represents diverse habitats associated with wide altitudinal and climatic variation and has the richest floral diversity in the country. The region is also an "Endemic Bird Area" and includes two important tiger conservation units. A recent study found that the population of northeast tigers is the most distinct among the Bengal tiger populations.

Forested area of southern West Bengal is also sampled during the cycle. However, this area is close to eastern ghat and central Indian landscape and connected to forested part of northern Odisha. Tiger occupied habitat has increased in the landscape after recent photographic evidences of tiger from Buxa tiger reserve, Neora valley national park and Mahananda wildlife sanctuary of West Bengal. After several years, tiger was photo-captured in Nampdapha tiger reserve, Arunachal Pradesh (in 2023) and Dampa tiger reserve, Mizoram (in 2021). However, the recovery of tiger population in north eastern hills is slow and it needs attention for community benefits and protection (Jhala *et al.* 2021).

Tiger signs were detected in 75 grids sampled **(Fig 4.1)**, and 194 tigers were photo-captured **(Table 2)**.

Figure 4.1: Tiger distribution in the North East Hills and Brahmaputra Flood Plains landscape in 2022



Conclusion

Although, more than half of the landscape has forest cover according to ISFR 2021, wildlife richness is limited to very few protected areas. Despite having habitat connectivity, many of the protected areas and forested areas are devoid of tigers. Better protection and augmentation of prey in protected areas like Nameri, Buxa, Namdhapa and Kamlang could help in increase of the tiger population. Ecological monitoring of wildlife resource and habitat is limited to few patches in the landscape owing to the inaccessible terrain, dearth of trained frontline staff, and logistics. However, ecological monitoring outside protected areas is necessary to evaluate and delineate the wildlife corridors to maintain genetic diversity of megafauna in this landscape, and to plan and mitigate the effect of development activities. Rapid development of linear infrastructures and several hydro-electric projects could potentially disturb the exiting corridors and natural habitats and further alter the genepool. The northeastern-hill populations are genetically unique and should be the top most priority of conservation action in the country due to their low population size and genetically unique lineage. Conservation planning and execution is needed to ensure ecologically viable economic development. As this landscape share an enormous border length with neighboring countries, trans-boundary tiger conservation strategies will help sustain those isolated populations.

5. Sundarbans Landscape

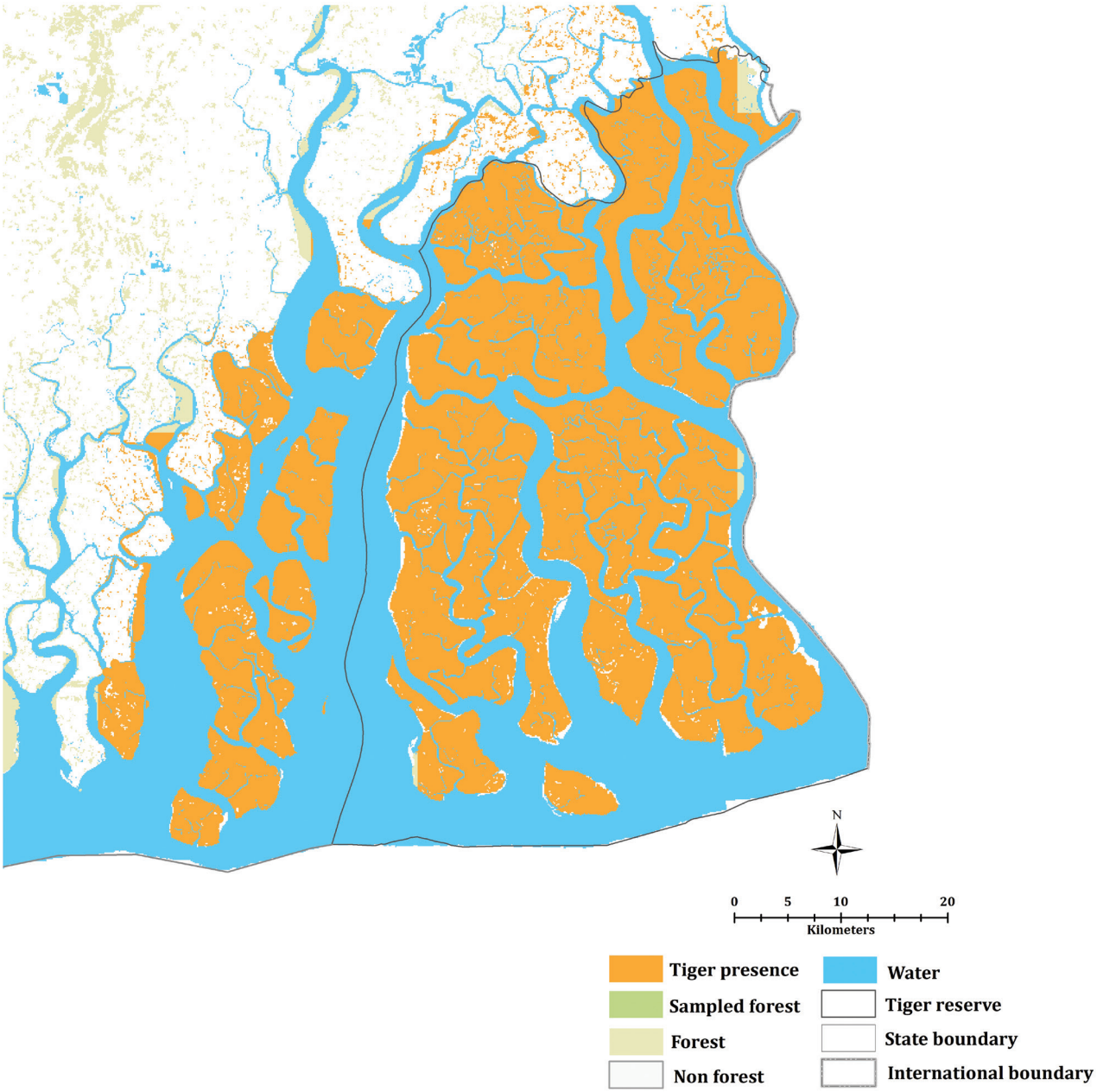
The Sundarbans tigers are recognized for their unique physical attributes, characterized by smaller size and ability to survive in the mangrove ecosystem. Situated in the Bay of Bengal, the Indian Sundarbans is a vast mangrove forest that is home to a diverse array of wildlife. Throughout its history, the region has encountered multiple threats, including deforestation, hunting, and poaching. Despite the conservation efforts undertaken by the Indian government, the Sundarbans confronts various challenges, such as habitat loss and degradation due to human encroachment and sea-level rise, as well as poaching and illegal wildlife trade. To preserve the Bengal tiger population in the region, the establishment of the Sundarban Tiger Reserve stands out as a crucial initiative. The reserve has implemented a range of measures, including anti-poaching patrols, habitat management, and community engagement, aimed at safeguarding the tiger population. Nevertheless, the Bengal tiger in the Indian Sundarbans.

The Sundarbans is the world's largest and contiguous mangrove forest, located at the confluence of the Brahmaputra, Ganges, and Meghna rivers in India and Bangladesh. It is home to tigers and is a globally recognized priority for tiger conservation. The entire landscape covers around 10,000 km^2, with only 42% of mangrove habitat being within Indian territory. The Sundarbans is also recognized as a wetland of global importance and a UNESCO World Heritage Site. This unique ecosystem is sensitive to changes in siltation and salinity.This landscape is a global biodiversity hotspot (Danda et al 2017) and also an Important Bird Area (Islam and Rahmani 2004). Other than tigers, fishing cat and leopard cat are also found here. Spotted

deer, wild pig, and rhesus macaque form the major prey species of the tiger.

In 2022, tigers were detected in 41 grids **(Fig 5.1)** and 100 unique tigers were photo captured **(Table 2)**.

Figure 5.1: Tiger distribution in the Sunderbans landscape in 2022.



Conclusion

The unique geographic location of Sundarbans makes it vulnerable to climate change and submergence from sea level rise. Also the deltaic region faces a substantial amount of accretion and erosion every year. Sundarban is one of the global biodiversity hotspot close to a metropolitan area, Kolkata. The north-west side of the tiger reserve is bordered by numerous forest villages, and largely belongs to agrarian community. These villagers are highly dependent on the natural resources of the landscape for their livelihood. The tigers of Sundarban are morphologically different from Peninsular India, and live an amphibious life in these mangrove system. Due to the uniqueness of the landscape, geographical extent of the tiger population is limited to the available mangrove habitat. The ever increasing biotic interference in the form of livelihood forest explorations, fishing, palm and timber extractions, and growing national and international waterways make this landscape and the tiger population vulnerable. Trans-boundary cooperation and knowledge sharing between India and Bangladesh are important to maintain ecological integrity of the landscape.

APPENDIX 1

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10	Madhya Pradesh	Sh. Alok Kumar, Sh. J.S. Chouhan
11	Maharashtra	Sh Mahip Gupta, Sh. Sunil Limaye
12	Mizoram	Sh. Pu Lalrammawii Sailo
13	Nagaland	Sh. Ved Pal, Sh. Satya Prakash Tripathi
14	Odisha	Sh. S. K. Popli, Sh. Shashi Paul
15	Rajasthan	Sh. Arindam Tomar, Sh. M.L Meena
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17	Telangana	Smt. R Sobha, Sh. Swargam Srinivas, Sh. Rakesh Mohan Dobriyal
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6	Goa	Sh. Jabestin A.
7	Jharkhand	Sh. Kumar Ashutosh
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14	Rajasthan	Sh. Sharda Pratap Singh, Sh. Nandlal Prajapat
15	Tamil Nadu	Smt. C.H. Padma, Sh. Akash Deep Baruah
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18	Uttarakhand	Sh. Ranjan K. Mishra
19	West Bengal	Sh. Piar Chand, Sh. Rajesh Kumar

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	Namdapha	Sh. Aduk Paron, Sh. Pekyom Ringu
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	Manas	Dr. Vaibhav C. Mathur
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Goa	--	Sh. Jabestin A., Sh. Anand Jhadhav, Sh. Prem Kumar, Sh. Aniket Gaonkar
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State	Tiger Reserve	Name
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	Melghat	Ms. Jayoti Banerjee
	Nawegaon Nagzira	Sh. Manikandan Ramanujam, Sh. Jayram Gouda
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	Tadoba Andhari	Sh. Jitendra Ramgaonkar
Mizoram	Dampa	Sh. C. Lalbiaka, Sh. Pu Zira
Odisha	Satkosia	Sh. Ashok Kumar, Sh. M. Yogajayanand
	Similipal	Sh. M. Yogajayanand, Sh. Ashok Kumar, Sh. Prakash Chand
Rajasthan	Mukundara Hills	Sh. Sedu Ram Yadav, Sh. Sharda Pratap Singh
	Ramgarh Visdhari	Sh. Sedu Ram Yadav, Sh. Sharda Pratap Singh
	Ranthambhore	Sh. T.C. Verma, Sh. Sedu Ram Yadav
	Sariska	Sh. Roop Narayan Meena
Tamil Nadu	Anamalai	Sh. I. Anwardeen, Sh. S. Ramasubramanian
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Uttar Pradesh	Dudhwa	Sh. Sanjay Kumar, Sh. B. Prabhakar
	Pilibhit	Sh. Lalit Kumar Verma
	Ranipur	Sh. S.N. Mishra
West Bengal	Buxa	Sh. Buddha Raj Sewa, Sh. Apurba Sen
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STATUS OF
TIGERS
2022

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2022

सत्यमेव जयते

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National Tiger Conservation Authority

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

GOVT. OF WEST BENGAL

GOVERNMENT OF ANDHRA PRADESH

ARUNACHAL PRADESH

অসম চৰকাৰ

GOVERNMENT OF ASSAM

छत्तीसगढ़ शासन

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GOVERNMENT OF JHARKHAND

FOREST DEPARTMENT
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