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She is deeply passionate about wildlife conservation and has authored a significant work on the distribution of tigers in India.

Her book delves into the importance of wildlife corridors and their crucial role in maintaining the metapopulation of tigers, offering valuable insights for the preservation of this endangered species across its natural habitats.

STRIPE UNBROKEN: SUSTAINING INDIA'S WILDERNESS

Yashika Choudhary



STRIPES UNBROKEN: SUSTAINING INDIA'S WILDERNESS



**CENTRAL ACADEMY FOR STATE FOREST SERVICE
COIMBATORE**

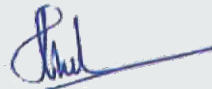
2024

Foreword

In recent years, the significance of tiger conservation has become paramount, not only for safeguarding this iconic species but also for maintaining the integrity of our ecosystems. This book explores the distribution of tigers in India, with a particular focus on wildlife corridors and their role in preserving tiger metapopulations. These corridors act as crucial lifelines, enabling tigers to move between isolated habitats, thus ensuring genetic diversity and resilience in the face of habitat fragmentation.

This work provides valuable insights into tiger ecology and the strategic planning necessary for conservation. Through comprehensive research and analysis, the book sheds light on the spatial dynamics of tiger populations and offers practical information for those involved in wildlife management and policy development.

At the Central Academy for State Forest Service (CASFOS) in Coimbatore, our commitment is to prepare dedicated forest officers to face the evolving challenges in conservation. This publication is a reflection of that mission, and I am confident that it will serve as an important resource for forest professionals, conservationists, and scholars.



V. Thirunavukarasu, IFS
APCCF & Principal, CASFOS Coimbatore.

Preface

The tiger has long been a symbol of strength, grace, and wilderness in India's rich and diverse natural heritage. Its roar echoes through ancient forests, grasslands, and dense mangroves, reminding us of the wilderness that still endures. Yet, behind this iconic creature's majesty lies a fragile existence, one that is deeply intertwined with the integrity of its habitat and the corridors that link isolated populations. This book, *Stripes Unbroken: Sustaining India's Wilderness*, explores the profound significance of these corridors in ensuring the survival of tiger metapopulations across the subcontinent.

Over the past decades, the Indian subcontinent has witnessed rapid economic development, urbanization, and deforestation, all of which have led to habitat fragmentation. In this fractured landscape, wildlife corridors—those slender, often unseen pathways that connect one forested area to another—have become critical to the survival of many species, including the tiger. Without these vital links, isolated tiger populations risk becoming genetically impoverished and vulnerable to local extinctions.

In *Stripes Unbroken*, I delve into the current distribution of tigers across India, examining how these magnificent creatures navigate a world shaped by both natural and human forces. I hope this book inspires readers to look beyond the statistics and headlines, to see the intricate web of life that sustains the tiger's stripes unbroken. By securing these corridors, we are not only ensuring the future of one of the world's most iconic species, but also preserving the delicate balance of our ecosystems for generations to come.

Stripes Unbroken is both a celebration of India's wilderness and a plea for its continued protection. I invite you to join me on this journey, to explore the landscapes that the tiger calls home, and to reflect on our role in sustaining the wilderness that defines India's natural legacy.

Yashika Choudhary
Officer Trainee, 2022-24 SFS Batch -II

Acknowledgement

I am deeply grateful to the remarkable individuals who have been the guiding lights in my dual journey as a forester and writer. At the outset, I owe profound thanks to our Principal, Shri V. Thirunavukarasu, IFS, whose unwavering encouragement and belief in me have been a steadfast source of inspiration. His leadership has imparted the true essence of what it means to be a forest officer, embedding in me the values of dedication and responsibility.

My heartfelt appreciation goes to our Course Director, Shri Anisha Kalkoor, M, IFS whose wisdom and passion for wildlife management kindled my commitment to conservation. His insights laid the groundwork for this endeavour and fuelled my desire to understand the nuances of forest ecosystems.

I am immensely indebted to my esteemed faculties, whose expertise and guidance have enriched my knowledge and reshaped my perspective on forest conservation. Their mentorship has been instrumental in preparing me to address the pressing challenges facing our natural world.

A special note of gratitude to my fellow trainee ACFs, whose camaraderie and shared experiences have been a wellspring of inspiration, both in my writing and professional growth. Their encouragement has been a pillar of strength, making this journey all the more rewarding.

Lastly, I would like to acknowledge the dedicated forest officers whose tireless commitment to preserving our natural heritage is nothing short of inspiring.

To each of one them, I convey my thanks for their invaluable contributions that have shaped this journey in ways words alone cannot capture.

With heartfelt appreciation
Yashika Choudhary

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1. Introduction

India is one of the most biodiverse regions and is home to a large variety of wildlife. It is one of the 17 megadiverse countries and includes three of the world's 36 biodiversity hotspots – the Western Ghats, the Eastern Himalayas, and the Indo-Burma hotspot. Tigers, as apex predators and charismatic megafauna, hold a crucial role in maintaining the ecological balance of their habitats. In India, these majestic creatures are not only a symbol of national pride but also a critical component of the country's rich biodiversity. With its vast and varied landscapes, India supports the largest population of wild tigers in the world, making it a focal point for global conservation efforts.

This publication deals with the status and distribution of tigers across various landscapes in India, tiger metapopulation in the country, major corridors connecting important wildlife habitats, protected areas, tiger reserves etc., and the importance of these wildlife corridors in sustaining the tiger metapopulation in the country.

In 1973, Project Tiger was launched with the goal of harnessing the tiger's ecological importance and charismatic appeal to generate public support and mobilize resources for the conservation of key ecosystems. Since its establishment, the initiative has grown significantly, expanding from its original nine tiger reserves, which covered an area of 18,278 square kilometres, to a network of 53 reserves encompassing 75,796 square kilometres in 2022 - about 2.3% of India's total land area. India currently harbours almost 75% of the world's wild tiger population. As tigers inhabit diverse habitats across a vast geographical expanse in India, the tiger-bearing habitats have

been categorized 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
- 5) The Sundarbans.



Figure: Map showing Tiger reserves in India

2. Distribution of Tigers in India

Tigers in India are distributed across various regions, primarily within protected areas such as national parks, tiger reserves, and wildlife sanctuaries. Their distribution is categorized into five major landscapes:

1. **Shivalik-Gangetic Plains:** This region includes states like Uttarakhand, Uttar Pradesh, and parts of Bihar. Famous tiger reserves in this region include Corbett and Dudhwa.
2. **Central India and Eastern Ghats:** This region includes states like Madhya Pradesh, Maharashtra, Chhattisgarh, and Odisha. Well-known reserves here are Kanha, Bandhavgarh, Pench, and Tadoba.
3. **Western Ghats:** Covering states such as Karnataka, Kerala, and Tamil Nadu, this area has reserves like Bandipur, Nagarhole, and Periyar.
4. **Sundarbans:** Located in the coastal mangrove forests of West Bengal, the Sundarbans are unique for their population of Bengal tigers adapted to the estuarine environment.
5. **Northeast Hills and Brahmaputra Plains:** This region includes states like Assam, Arunachal Pradesh, and parts of Meghalaya. The famous Kaziranga and Manas reserves are located here.

India has seen successful in tiger conservation efforts, particularly through Project Tiger, with the current tiger population estimated to be over 3,000. However, habitat fragmentation and human-wildlife conflict remain a challenge. 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 approximately 5,83,278 sq. kms of forests in the tiger states, only one-third are in relatively healthy 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.

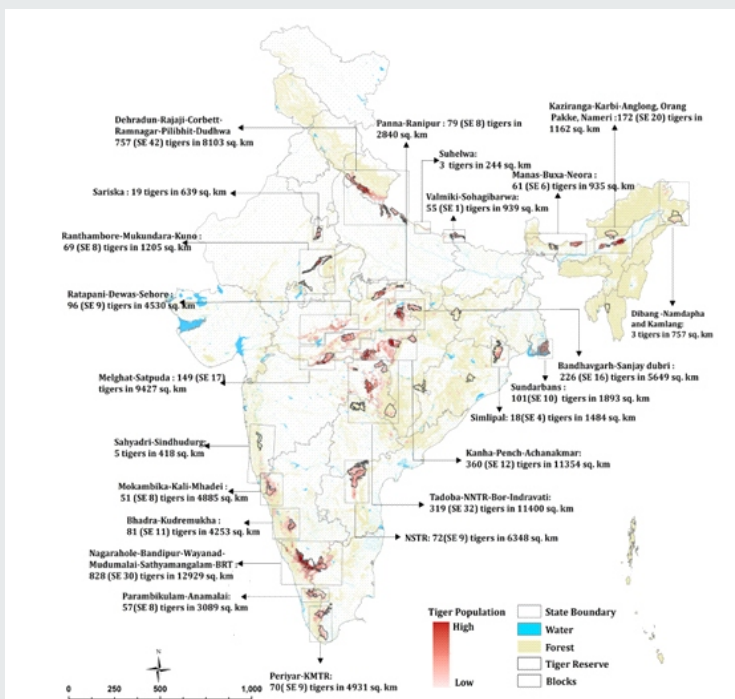


Figure: Distribution of tiger population density across India

The large variation in population numbers across reserves shows the different levels of success in tiger conservation.

2.1 The Shivalik Hills and Gangetic Plains landscape

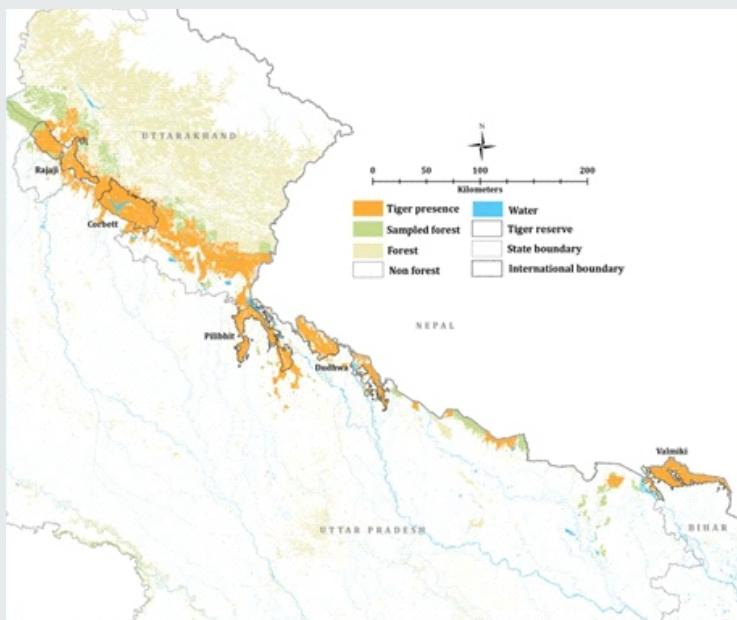


Figure: Tiger distribution in Shivalik hills and Gangetic Plains landscape.

Reference: Status of Tigers publication by NTCA

The Shivalik Hills and Gangetic Plains landscape in India is vital for tiger conservation, encompassing key reserves like Corbett, Rajaji, Pilibhit, Dudhwa, and Valmiki. These areas represent the rich biodiversity of the Bhabar and Terai regions, home to endangered species like the Barasingha, one-horned rhinoceros, Bengal florican, and more. The region faces threats from human activities, including habitat loss and infrastructure projects.

Several cross-border corridors connect reserves in Uttar Pradesh and Bihar with forests in Nepal, making international cooperation crucial for tiger conservation. The landscape has three distinct geological zones: the Shivaliks, the Bhabar tract,

and the Terai plains, supporting high densities of tigers and prey. Recent studies have expanded the known tiger distribution, with sightings in areas like Suhelwa and Himachal Pradesh. Conservation efforts include reintroductions of tigers, as seen in Western Rajaji, and a focus on preserving corridors to maintain a meta-population across the India-Nepal Terai region. Suhelwa and Sohagibarwa Wildlife Sanctuaries require prey and habitat restoration to secure tiger populations. In 2022, 804 unique tigers were recorded across 193 grids, highlighting the landscape's critical role in tiger conservation. In recent years, the tiger population in the Forest Divisions (territorial forests) of the Shivalik Hills and Gangetic Plains landscape has seen a significant rise. Territorial forests refer to forested areas that are not specifically designated as tiger reserves but are still part of the tiger's habitat. These increases have been documented in new regions, including the Suhelwa Wildlife Sanctuary (WLS) in Uttar Pradesh and areas northwest of the Yamuna River in Himachal Pradesh, where photographic evidence of tigers has been captured. This indicates an expansion of tiger presence beyond traditional protected areas.

For the long-term survival of these new tiger populations, certain actions are necessary. One of the key steps is to supplement and repopulate the Shivalik Forest Division in Uttar Pradesh and Kalesar Wildlife Sanctuary in Haryana. These areas have the potential to support tigers, but they need enhanced protection and habitat management to sustain growing populations. Additionally, increasing protection in Suhelwa is crucial, as this area has shown signs of tiger recovery but needs further efforts to ensure stability.

The Valmiki Tiger Reserve, which harbours a genetically unique population of tigers, also requires special attention. However, this landscape faces significant challenges, particularly due to the fragmentation of habitats. One critical issue is the

corridor between the western and eastern parts of Rajaji Tiger Reserve. This corridor is crucial for the movement of large animals like tigers and elephants, but recent linear infrastructure projects have severely affected it. Road expansions have made this corridor functionally extinct for the movement of large carnivores and elephants, reducing its effectiveness as a wildlife passage. To address this, the adoption of green infrastructure-such as wildlife crossings, underpasses, or eco-bridges-can help restore connectivity and allow for safer animal movement across fragmented habitats.

2.2 The Central Indian Highlands and Eastern Ghats landscape:

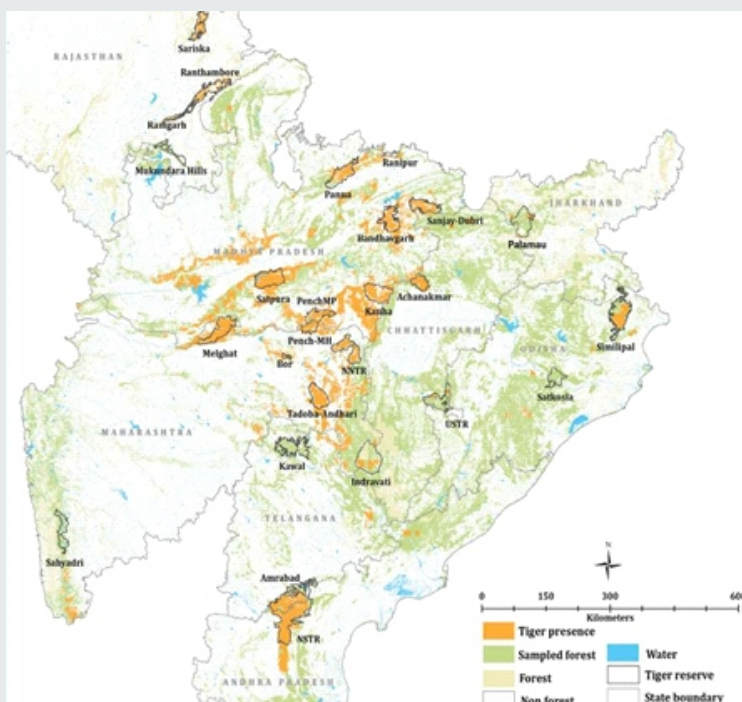


Figure: Tiger distribution in Central India and Eastern ghats landscape
Reference: Status of Tigers publication by NTCA

The Central Indian Highlands and Eastern Ghats landscape is a crucial region for tiger conservation in India, rich in history and wildlife. Historically inhabited since the Stone Age, this landscape is culturally and ecologically significant. While tiger populations have been successfully conserved here, the region also experiences the highest levels of human-tiger conflict, which requires effective management policies. Green infrastructure investments, such as wildlife crossings, have been implemented to reduce the impact of roads on tiger habitats.

Geographically, the region includes parts of Rajasthan, the central Indian plateau, and the Eastern Ghats in Telangana, Andhra Pradesh, and Odisha, bordered by the Aravalli, Satpura, Chota Nagpur Plateau, and Odisha Hills. Although the Eastern Ghats were historically connected to the Central Indian forests, much of this continuity has been lost due to habitat fragmentation.

The landscape has around half of India's tiger reserves, providing a diverse range of habitats, from moist to dry deciduous forests. It has been a successful site for the reintroduction of large mammals like tigers (Panna, Sariska), gaur (Bandhavgarh), and barasingha (Satpuda, Bandhavgarh). Recently, cheetahs were introduced to Kuno National Park, and Gandhisagar and Nauradehi Wildlife Sanctuaries have been identified for future relocations.

This region is also home to many scheduled tribes who depend on forest resources, while some of the best tiger habitats in India are located here. Despite successes in conservation, mining remains a major threat to the region's biodiversity. The landscape contains five biosphere reserves, hosts the largest population of tigers, and has the largest tiger-occupied forests in the country.

To improve tiger conservation, the landscape is divided into 13 smaller areas, including Sariska, Ranthambore-Kuno,

Panna, Bandhavgarh, Kanha-Pench, and Tadoba, among others. These zones are essential for ensuring tiger connectivity and survival.

In 2022, 1,049 grids showed tiger activity, with 1,161 unique tigers' photo-captured, highlighting the region's critical role in India's tiger conservation efforts. Despite the challenges, this landscape remains a focal point for wildlife protection in India.

Tigers have expanded into new territorial areas in Madhya Pradesh and Maharashtra that were unoccupied in 2018, particularly in Maharashtra's and Madhya Pradesh's forest divisions. This expansion requires urgent attention to manage potential human-tiger conflicts. The Ranthambhore tiger population has contributed to tiger distribution in the semi-arid landscapes of western India, including areas like Dholpur, Kuno-Shivpuri, and Ramgarh Visdhari. However, tiger occupancy has declined in Jharkhand, Odisha, Chhattisgarh, and Telangana due to various challenges. With efforts in prey augmentation, habitat restoration, and better protection, tiger populations in these states could recover.

Tigers have been locally wiped out from Kawal Tiger Reserve (Telangana), Satkosia (Odisha), and Sahyadri Tiger Reserve (Maharashtra). Simlipal's genetically unique tiger population is of high conservation priority. The region faces threats like habitat encroachment, poaching, forest fires, mining, and linear infrastructure development. Mining activities require urgent mitigation measures and rehabilitation. An example of successful intervention is the eco-friendly mitigation structures on NH-44 between the Kanha-Pench wildlife corridors, which helps preserve habitat connectivity.

2.3.The Western Ghats:

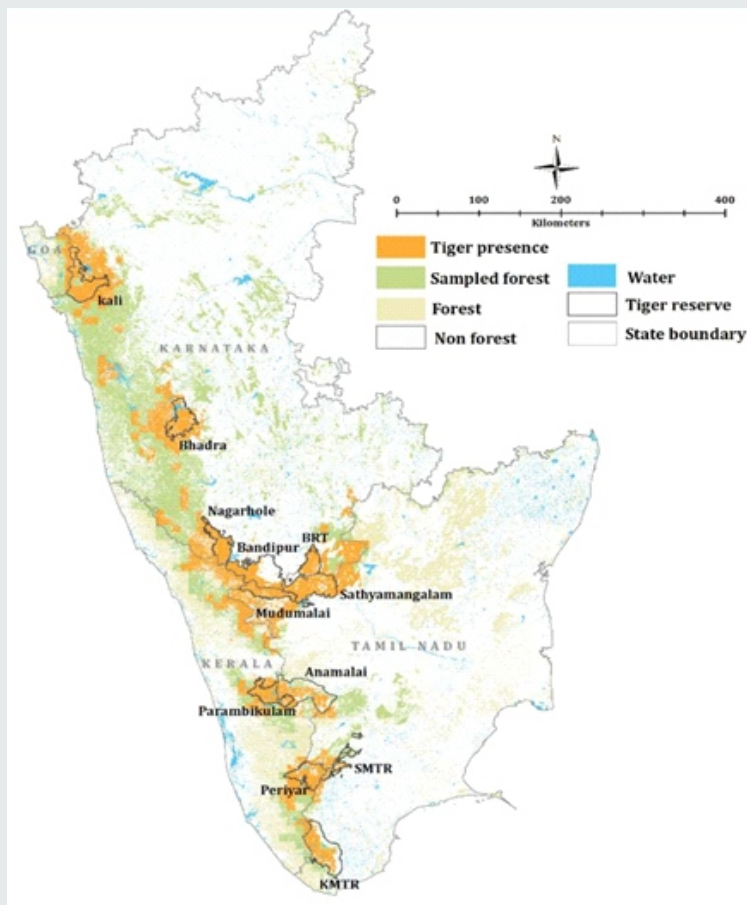


Figure: Tiger distribution in Western ghats landscape.

Reference: Status of Tigers publication by NTCA

The Western Ghats in India, stretching approximately 1,600 km along the Arabian Sea coast, is a vital region renowned for its diverse ecosystems and rich biodiversity. This mountain range covers about 140,000 km² and encompasses 12 Tiger Reserves, 20 National Parks, and 68 Wildlife Sanctuaries. It is home to

numerous endemic species such as the lion-tailed macaque, the Malabar giant squirrel, and the Nilgiri thar. The region is also crucial for water sources, as it feeds many major Indian rivers, and supports local communities that depend on its forests for food, fuel, and medicinal plants.

Despite its UNESCO World Heritage Site status, the Western Ghats face significant conservation challenges. These include deforestation, habitat loss, climate change, and human activities like poaching, illegal wildlife trade, and human-wildlife conflict. These issues threaten the survival of many species and the overall ecological balance of the region.

To address these challenges, various conservation initiatives are underway, such as habitat restoration, anti-poaching efforts, and strategies to manage human-wildlife conflict. Monitoring efforts, including extensive camera trapping, have revealed that tiger populations in the Western Ghats are experiencing a reduction in occupancy, although connectivity across the landscape remains strong.

In 2022, tiger signs were detected in 400 grids, and 824 unique tigers were photo-captured. These findings highlight both the progress and ongoing needs in the conservation of this critical biodiversity hotspot.

The Nilgiri cluster, spanning from Nagarahole to BRT Hills in the Western Ghats, houses the world's largest tiger population and has been crucial in tiger colonization across neighboring areas. Despite this, recent data indicate a decline in tiger occupancy throughout much of the Western Ghats, except for some regions like Anshi-Dandeli. While tiger populations within protected areas (PAs) such as Mudumalai and Periyar remain stable or have increased, those outside PAs, including Wayanad and BRT Hills, have seen significant declines.

In the eastern part of the Western Ghats, tiger occupancy has risen in Anshi-Dandeli, but it has dropped in the border areas of Goa and Karnataka. The Mookambika-Sharavathi-Sirsi landscape has experienced a major decline, and there is also a notable decrease in tiger occupancy outside the Anamalai-Parambikulam complex and in Sirsi, Kanyakumari, and Srivilliputhur. While connectivity between protected areas in the Western Ghats is among the best in India, the increasing human footprint and development are creating more interactions between humans and wildlife, leading to rising tensions with megaherbivores and carnivores.

2.4 North East Hills and Brahmaputra Plains Landscape:

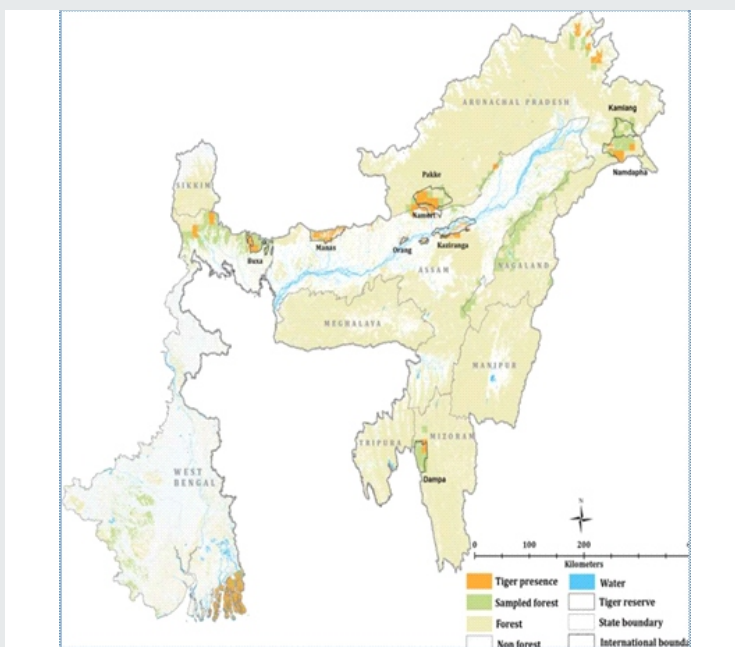


Figure: Tiger distribution in North East Hills and Brahmaputra Plains Landscape.

Reference: Status of Tigers publication by NTCA

The North East region of India is ecologically significant due to its rich biodiversity, with numerous unique species and a high level of endemism. However, it faces substantial conservation challenges, including habitat loss, poaching, and human-wildlife conflicts, which threaten its ecological balance and require concerted efforts from both governmental and non-governmental organizations.

The North East is home to several tiger populations, although their numbers are threatened by habitat loss, fragmentation, and poaching. Historically, traditional hunting practices led to significant reductions in wildlife populations and habitat availability. To mitigate these threats, Tiger Reserves have been established in the regions, including Kaziranga, Manas, Orang, Pakke, Nameri, Namdhapa, Kamlang, Dampa, and Buxa. Despite these protections, only Kaziranga and Manas support substantial tiger populations. The tigers in these reserves continue to face significant threats, underscoring the need for enhanced protected area management, intensified anti-poaching measures, and strategies to address human-wildlife conflicts.

The eastern part of India, which includes North Bengal doars, the floodplains of the Brahmaputra, and the North Eastern hill ranges, is a biodiversity hotspot spanning nine states. This region boasts high forest cover, especially in Mizoram, Arunachal Pradesh, Meghalaya, Manipur, and Nagaland. However, extensive land-use changes in the past have led to severe habitat loss. Despite this, several protected areas, reserve forests, sacred groves, and wetlands serve as critical refuges for endangered and endemic species. The region is notable for its diverse habitats and floral richness, and it is recognized as an "Endemic Bird Area." The tiger populations in this area are among the most distinct of the Bengal tiger populations.

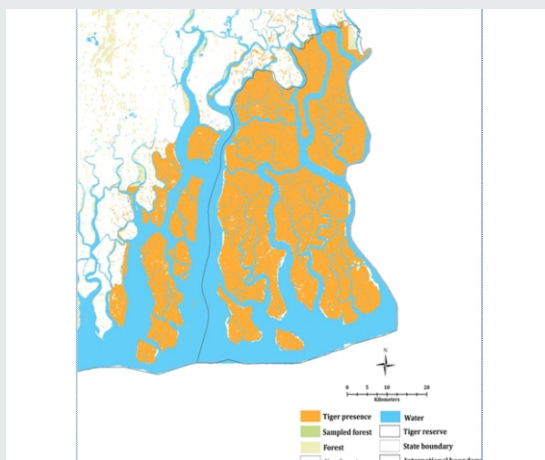
Recent efforts have shown some positive signs of recovery. Notable recent sightings include tigers in Buxa Tiger Reserve,

Neora Valley National Park, and Mahananda Wildlife Sanctuary in West Bengal. Despite these improvements, recovery of the tiger population in the North Eastern hills remains slow and requires continued attention to ensure community benefits and effective protection.

Although over half of North East India's landscape is forested, tiger populations are largely restricted to a few protected areas like Kaziranga and Manas. Many reserves, including Nameri and Buxa, lack sufficient tigers due to limited prey and inadequate protection. Monitoring wildlife and habitats is hindered by difficult terrain and limited resources.

The rapid development of infrastructure and hydroelectric projects threatens wildlife corridors and genetic diversity. The unique and endangered tiger populations in the region require focused conservation efforts and cross-border strategies to ensure their survival and maintain ecological balance.

2.5 The Sundarbans:



*Figure: Tiger distribution in the Sunderbans landscape.
Reference: Status of Tigers publication by NTCA.*

The Sundarbans, the world's largest contiguous mangrove forest located in the Bay of Bengal at the confluence of the Brahmaputra, Ganges, and Meghna rivers, is crucial for tiger conservation. This unique ecosystem, spanning around 10,000 km² with 42% in Indian territory, is a UNESCO World Heritage Site and a global biodiversity hotspot. It supports tigers with distinct smaller sizes adapted to the mangrove environment, along with other wildlife like the fishing cat, leopard cat, spotted deer, wild pig, and rhesus macaque.

The region faces significant threats, including habitat loss due to deforestation, sea-level rise, and human encroachment, alongside poaching and illegal wildlife trade. Despite efforts by the Indian government, including the establishment of the Sundarbans Tiger Reserve, challenges remain. The reserve's conservation strategies involve anti-poaching patrols, habitat management, and community engagement.

In 2022, tigers were detected in 41 grids, with 100 unique tigers photo-captured. These ongoing efforts highlight the importance of preserving this critical habitat and its unique tiger population amidst evolving challenges.

The Sundarbans, a global biodiversity hotspot and the world's largest mangrove forest, is highly vulnerable to climate change and sea-level rise due to its unique deltaic location.

The region experiences significant annual accretion and erosion, adding to its environmental challenges. Located near the metropolitan area of Kolkata, the reserve is bordered by numerous forest villages whose agrarian communities heavily rely on the area's natural resources for their livelihoods.

The Sundarbans' tigers are distinct from those in Peninsular India, adapted to an amphibious lifestyle within this mangrove ecosystem. Their population is restricted to the available

mangrove habitat, making them particularly susceptible to threats from increasing human activities, such as fishing, timber extraction, and the expansion of waterways.

To protect this unique landscape and its tiger population, trans-boundary co-operation and knowledge sharing between India and Bangladesh are essential. Collaborative efforts are crucial to maintaining the ecological integrity of the Sundarbans and addressing the impacts of both environmental and human-induced changes.

3. Metapopulation of Tigers

A metapopulation refers to a group of spatially separated populations of the same species that interact through migration and gene flow.

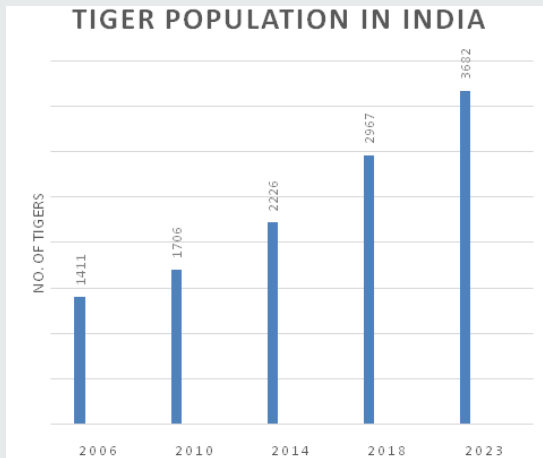


Figure: Graph depicting growth in tiger population over the years.

As per the 5th cycle of the All India Tiger Estimation 2022 (usually done in cycles of four years) summary report, India has a minimum of 3,167 tigers and is now home to more than 70% of the world's wild tiger population. Further data analysis using the latest statistical models for camera-trapped and non-camera-trapped tiger presence areas estimates the upper limit of the tiger population at 3,925, with an average number of 3,682 tigers, reflecting a commendable annual growth rate of 6.1%. This remarkable conservation feat has been achieved due to the pioneering initiatives undertaken by the National Tiger Conservation Authority, Government of India, in collaboration with State Governments.

4. Wildlife Corridors

Wildlife corridors are crucial for the conservation of tigers in India, as they allow for the movement of tigers and other wildlife between fragmented habitats. These corridors are essential for maintaining genetic diversity, ensuring access to resources, and facilitating natural behaviours such as migration and dispersal. Areas linking one tiger reserve or protected area with another tiger reserve or protected area are not diverted for ecologically unsustainable uses, except in public interest and with approval of the National Board for Wildlife and on advice of the National Tiger Conservation Authority as per Section 38 O (1) (g) of the Wildlife (Protection) Act, 1972.

Section 38 O (1) (g): Protection of Wildlife Corridors

Purpose: This provision ensures that areas linking tiger reserves or other protected areas are preserved from ecologically harmful activities. It aims to maintain critical wildlife corridors that allow for the movement of animals between different habitats.

Implementation: Any proposed diversion of these linking areas for development or other uses must be approved by the National Board for Wildlife (NBWL), based on recommendations from the National Tiger Conservation Authority (NTCA). This safeguards the ecological integrity of these corridors, ensuring they continue to function as pathways for wildlife.

Connecting Tiger Populations for Long-term Conservation” developed by NTCA and WII, identifies 32 major tiger corridors across India.

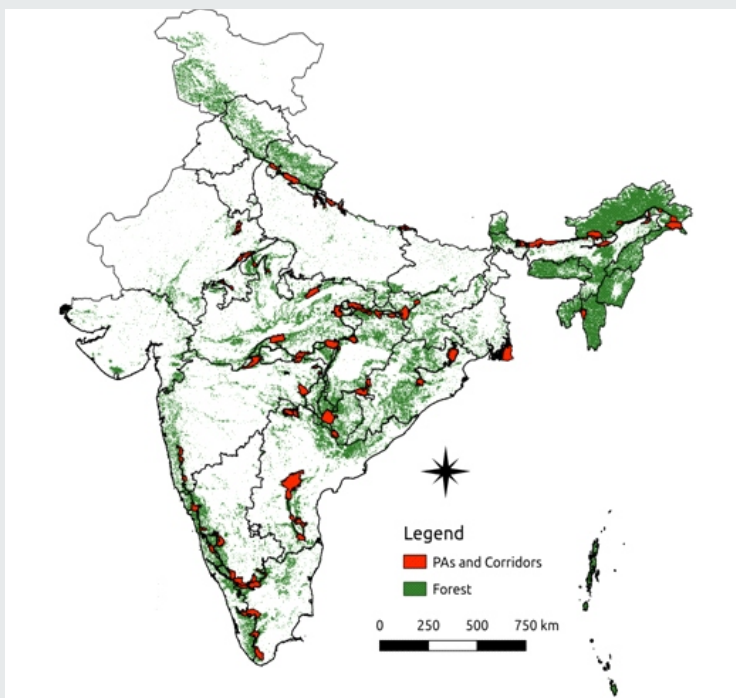


Figure: map showing protected areas, corridors and forests in India

Reference: Connecting tiger population for long term conservation - NTCA and WII

Major tiger corridors of India across different landscapes have been described below: -

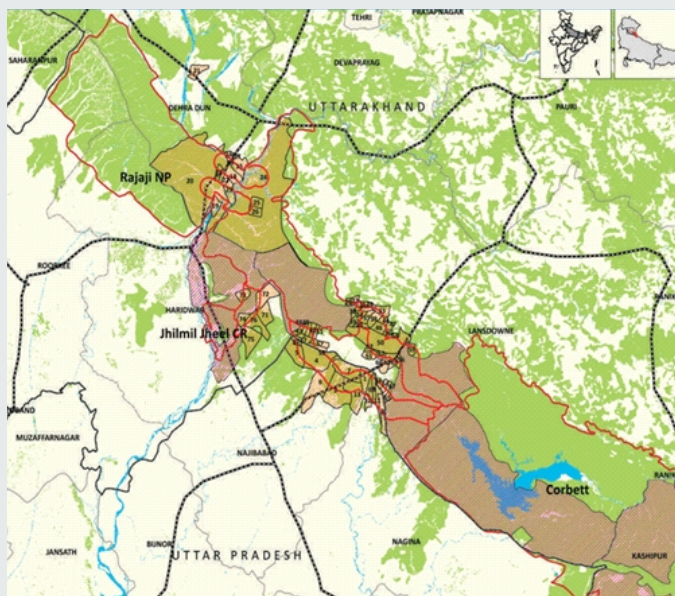
4.1 The Shivalik Hills and Gangetic Plains landscape:

I) The Rajaji-Corbett Corridor:

It is a vital ecological link between Rajaji National Park and Corbett Tiger Reserve, facilitating the movement of tigers and other wildlife, and ensuring genetic diversity and habitat continuity. However, it faces significant challenges from human activities and infrastructure development. Addressing these challenges through effective management, community

engagement, and wildlife-friendly practices is essential for maintaining the corridor's ecological integrity and supporting the region's biodiversity.

The Rajaji-Corbett Corridor connects Rajaji National Park in the north with Corbett Tiger Reserve in the south. The corridor extends through the Shivalik Hills, linking these two protected areas and ensuring a continuous habitat for wildlife.



*Figure: Map showing Corbett – Dudhwa Corridor.
Reference: Connecting tiger population for
long term conservation by NTCA and WII.*

ii) Corbett - Dudhwa Corridor:

The Corbett-Dudhwa Corridor spans approximately 150 kilometres (93 miles) and serves as a crucial wildlife link between the two reserves. The corridor traverses a range of landscapes, including forests, grasslands, and agricultural areas. The corridor

is under pressure from agricultural activities, which can lead to the conversion of natural habitats into farmland. This reduces the amount of available space for wildlife movement and can fragment the habitat, making it more difficult for animals to traverse.

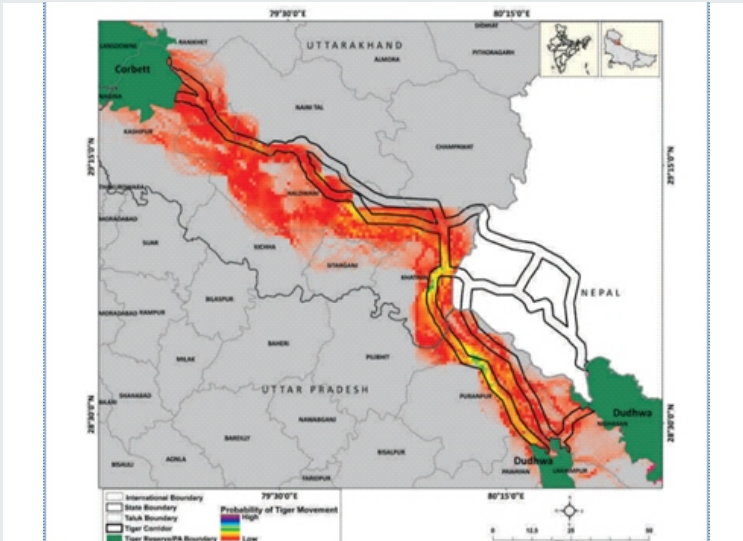


Figure: Map showing Corbett - Dudhwa Corridor.

Reference: Connecting tiger population for long term conservation by NTCA and WII.

iii) Dudhwa-Kishangarh-Katerniaghat Corridor:

The Dudhwa-Kishangarh-Katerniaghat Corridor connects Dudhwa National Park with Katerniaghat Wildlife Sanctuary through Kishangarh Forest, creating a vital wildlife linkage across the Terai landscape. The corridor spans approximately 100-150 kilometers (62-93 miles). Besides tigers, the corridor facilitates the movement of other species such as elephants and various herbivores. This connectivity is important for maintaining ecological processes and species

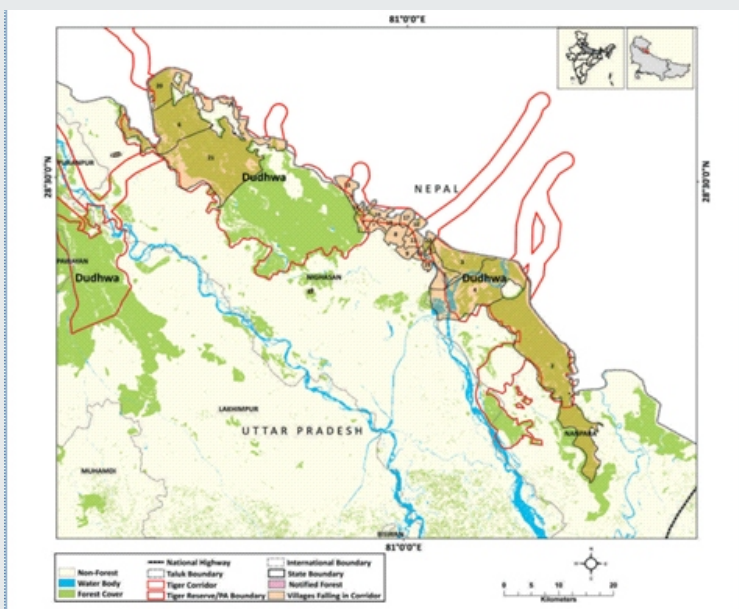


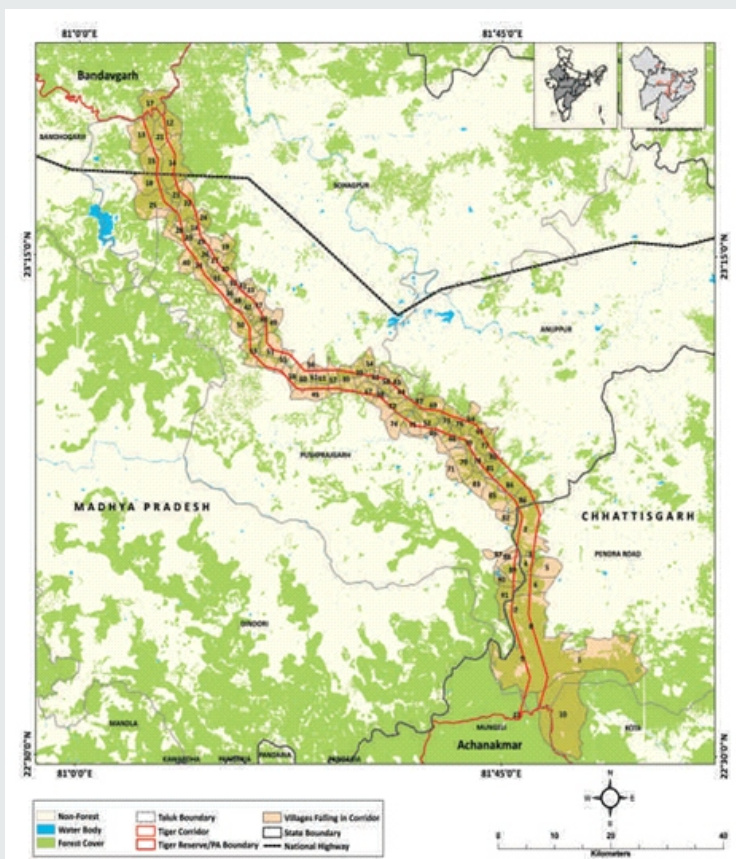
Figure: Map showing Dudhwa-Kishangarh-Katerniaghat Corridor. Reference: Connecting tiger population for long term conservation by NTCA and WII.

4.2 The Central India and Eastern Ghats landscape:

i) Bandhavgarh-Achanakmar Corridor:

The Bandhavgarh-Achanakmar Corridor connects Bandhavgarh Tiger Reserve with Achanakmar Tiger Reserve, spanning a distance of approximately 100-150 kilometres (62-93 miles). This corridor passes through the states of Madhya Pradesh and Chhattisgarh. The corridor connects Kanha-Pench population with Bandhavgarh Sanjay Dubri populations.

The communities living in vicinities are known for their poaching tendencies. Further due to availability of coal in this landscape matrix there is ever present pressure from infrastructure development associated with coal mining.



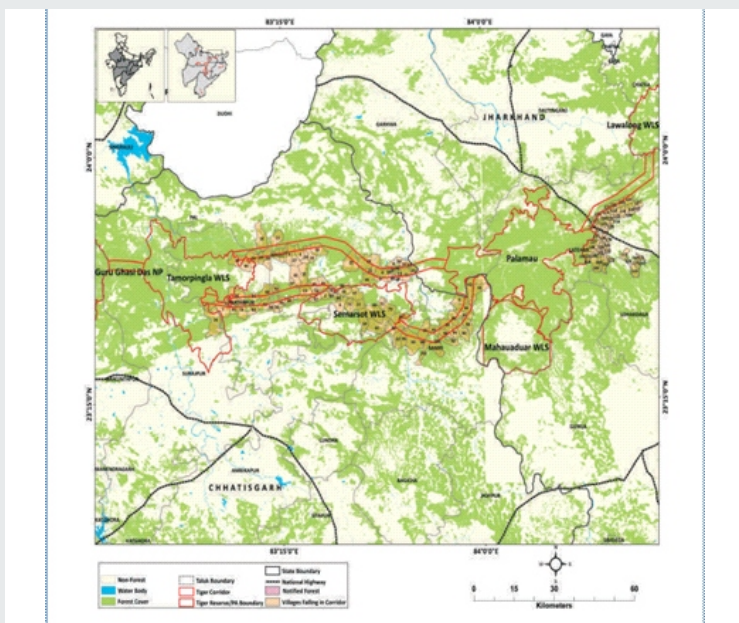
*Figure: Map showing BandhavgarhAchanakmar Corridor.
Reference: Connecting tiger population for long term conservation
by NTCA and WII.*

ii) **Guru Ghasi Das–Palamau–Lawalong Corridor:**

Sanjay TR and Guru Ghasi Das NP are a contiguous forest patch, this patch continuous further as Tamorpingla WLS. From Tamorpingla WLS two forested arms project eastwards and serve as corridors to connect with Palamau TR. This entire area is rich in minerals specially coal. Utmost care needs to be taken to ensure

that the corridor value of these habitats is not compromised while granting permissions for mineral extraction.

This habitat holds great potential for recovering tiger populations as currently they have low density of tigers but with management inputs and connection with Bandhavgarh source they can be revived. Sanjay TR has started showing recovery of tiger populations after being declared tiger reserve.



*Figure: Map showing Guru Ghasi Das- Palamau- Lawalong corridor.
Reference: Connecting tiger population for long term conservation
by NTCA and WII*

iii) **Kanha -Achanakmar Corridor:**

This corridor is vital for sustenance of the Achanakmar tiger population and for meta- population management of Pench-Kanha-Achanakmar tiger populations. The corridor is part of an intact forest patch between Kanha-Pench-Achanakmar. However,

Three state highways and railway lines intersect this corridor. The widening of these along with infrastructure development that accompanies such projects is major threat to this vital corridor habitat. If permissions are granted for such activities, then appropriate mitigation measures need to be put in place to safeguard the functionality of this corridor for tigers and other wildlife such as Gaur and Wild dog.

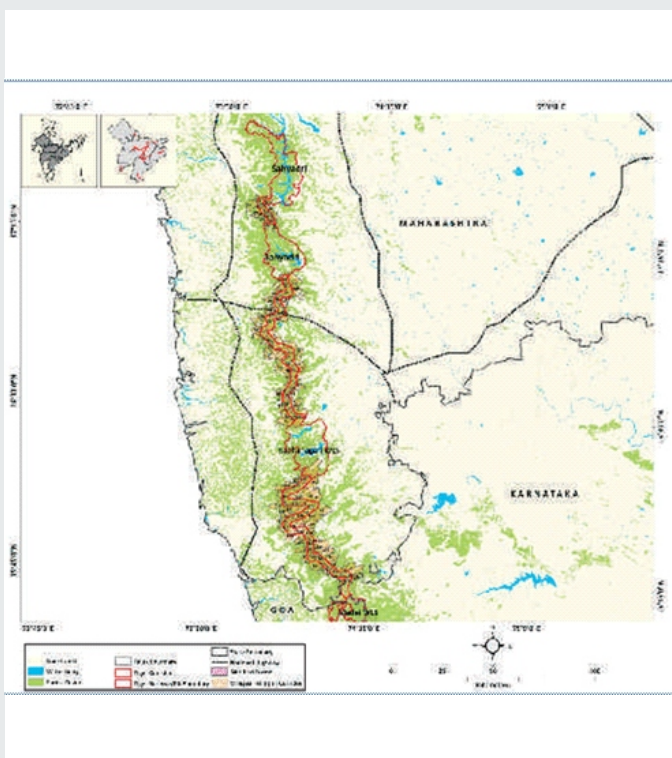


Figure: Map showing Kanha - Pench Corridor.

Reference: Connecting tiger population for long term conservation by NTCA and WII

v) Sahyadri–Radhanagari-Goa Corridor:

The tiger population of the Sahyadris was connected with that of Goa through the Radhanagari Wildlife Sanctuary and further southwards with that of Anshi-Dandeli in Karnataka through the ridge-top forests of the Western Ghats. Tiger numbers estimated for the Sahyadris (20-22 tigers within 560 sq.km) seem to be over estimates.



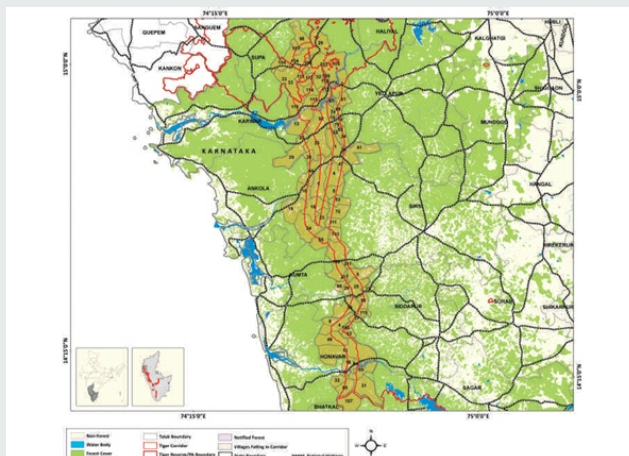
*Figure: Map showing Sahyadri- Radhanagari -Goa Corridor
Reference: Connecting tiger population for long term conservation
by NTCA and WII*

4.3 Western Ghats:

I) Anshi–Dandeli–Sharavathi Valley:

This complex consists of the protected areas of Mollam-Netravali, Anshi-Dandeli, Sharavathi Valley-Mookambika along with Reserved Forests of Haliyal and Yellapur. To the north, this complex is connected to the forests of Goa which continue to the Sahayadri Tiger Reserve in Maharashtra with sporadic records of tiger occupancy. While the forest connectivity between this complex and the southern Kudremukh- Bhadra complex is weak, interspersed by plantation and agricultural mosaics, evidence exists through camera trapped pictures to confirm movement of tigers between the two areas (Ullas Karanth, Pers. Com.). Tiger population in 2010 within this region was estimated to be between 36 and 42 tigers with occupancy in an area of 4,756 km², indicating a decline in tiger occupied area since 2006. This decline was observed in the forests connecting Anshi-Dandeli to forests of Goa in the north and to forests of Sharavathi Valley in the south.

Anshi and Dandeli are connected through contiguous forests, the least cost pathways (north of Ulavi settlement), formalizing this connectivity would secure these forests for the future. The corridor connectivity between Anshi-Dandeli and Sharavathi Valley is long and traverses through plantation and agriculture mosaics. However, the least cost pathway and Circuitscape flows minimizes passage through private lands and suggests the ideal corridor to connect the two major tiger landscapes of Karnataka. Two corridors, one from Anshi and another from Dandeli emerge from either side of the Kodasalli Reservoir and meet north of the Benne Hole falls. The bottlenecks for this corridor were at Jog Falls where a narrow strip of forest (1.5 km) remains as a connectivity. This connectivity, if formally recognized and restored would promote gene flow across major populations of the Western Ghats from Pune to Palakkad.

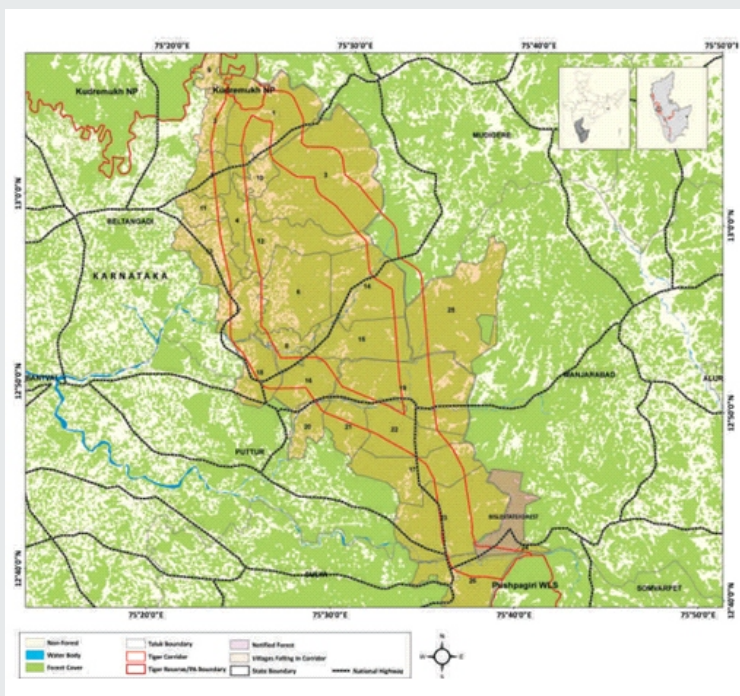


*Figure: Map showing Anshi–Dandeli–Sharavathi Valley
Reference: Connecting tiger population for long term conservation
by NTCA and WII*

ii) Kudremukh – Bhadra:

This complex comprises of the central part of the Western Ghats in Karnataka and includes Kudremukh National Park and Bhadra Tiger Reserve. Kudremukh National Park is a proposed Tiger Reserve site and occupies parts of Karkalataluka in Udupi, Belthangaditaluka in Dakshin Kannada and Mudigere, Sringeri and Koppataluka in Chikmagalur district. Immediately north of Kudremukh is Someshwara Wildlife Sanctuary while Shettihalli Wildlife Sanctuary is located north of Bhadra Tiger Reserve. While this region has relatively low abundance of tigers, the area holds good potential for tiger persistence. The area occupied by tigers and the estimated tiger population within this landscape showed a decline in 2010 compared to 2006. The loss in tiger occupancy was observed in the forests south of Bhadra (Chikmagalurataluka), and south-west of Kudremukh (Belthangaditaluka). To the south of this tiger complex is the

Nagarahole-Mudumalai-Wayanad complex, with small Protected Areas in-between such as Pushpagiri Wildlife Sanctuary and Talakaveri Wildlife Sanctuary connected with Brahmagiri Wildlife Sanctuary by Padinalknad and Kerti Reserved Forests. The intervening habitat matrix between the Protected Area complexes consist of plantations, agriculture and some scattered habitation along with other Reserved Forests such as Kabbinala, Kagneri and Kiribag. Connectivity between the Protected Areas within the Kudremukh-Bhadra complex is patchy.

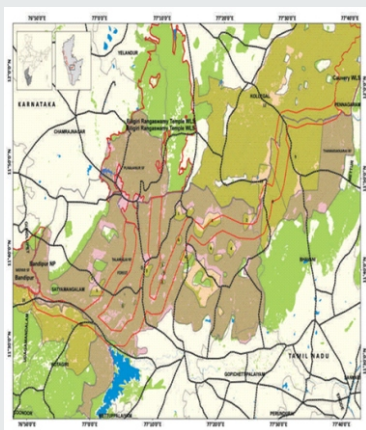


*Figure: Map showing Kudremukh – Bhadra corridor
Reference: Connecting tiger population for long term conservation
by NTCA and WII*

iii) Nagarhole–Bandipur–Mudumalai–Wayanad:

This landscape has the highest tiger population in India within a network of Protected Areas. This landscape encompasses Wayanad in Kerala, Nagarhole-Bandipur in Karnataka along the northern border with Mudumalai in Tamil Nadu and Cauvery Wildlife Sanctuary along Karnataka-Tamil Nadu border. This contiguous tiger population stretches across three states, viz., Karnataka (Nagarhole- Bandipur), Tamil Nadu (Mudumalai-Segurplateau-Moyar gorge- Sathyamangalam) and Kerala (Wayanad).

In 2010-11, tigers were also camera-trapped in the Segur plateau-Moyargorge-Sathyamangalam region in Tamil Nadu, providing evidence of resident tiger population as well as possible movement of individuals between this region and BRT Wildlife Sanctuary and onwards to Cauvery Wildlife Sanctuary. Connectivity between Bandipur, BRT and on to Cauvery Wildlife Sanctuary through the Moyar-Segur-Sathyamangalam forests (Tamil Nadu) shown by the least cost pathways needs to be ensured through interstate cooperation between Karnataka and Tamil Nadu.



*Figure: Map showing Nagarhole-Bandipur-Mudumalai-Wayanad.
Reference: Connecting tiger population for long term conservation
by NTCA and WII*

5. Importance of Corridors

The impacts of habitat fragmentation can be mitigated by preventing or reversing population isolation through connectivity conservation, which facilitates the accommodation of species to the shifts in their natural domains due to climate change and maintain their evolutionary potential. Wildlife conservation has emphasized on two primary strategies to promote connectivity.

The first focuses on conserving areas that facilitate movement; while the second focuses on restoring connectivity across areas that impede movement. Most connectivity analyses have focused on the former strategy where modelling and mapping areas important for movement are important. In the majority of conservation studies, it is observed that a corridor is a continuous remnant of habitat between otherwise isolated habitat patches.

Thus, a corridor is not merely an animal movement path, but also a conservation intervention (e.g., land protection, restoration, and management), when applied to a portion of the potential movement area between habitat patches, it achieves specific connectivity goals in landscapes that would otherwise be fragmented by urban, agricultural, or industrial land uses.

In the context of tiger conservation, rigorous assessment of habitat connectivity is critical to maintaining the metapopulation framework of this apex predator. Tigers (*Panthera tigris*) act as an umbrella species, meaning that their conservation ensures the protection of many other species that share their habitat. As a focal species, the tiger's ecological needs, such as large territories and continuous forest cover, make them a perfect target for habitat connectivity efforts, benefiting the entire ecosystem.

Tigers often exist as a metapopulation - a set of subpopulations that live in separate habitat patches but interact through migration. These subpopulations can be isolated by roads, urbanization, or other human activities, which fragment their habitat. Maintaining connectivity between these patches is critical to allow gene flow, reducing inbreeding and maintaining genetic diversity, facilitate the movement of individuals between patches, allowing for recolonization if one subpopulation goes extinct and provide access to larger areas for resources such as prey, mates, and suitable territories. Corridors and other forms of habitat connectivity are vital for sustaining tiger populations.

Corridors act as lifelines between these isolated populations, enabling tigers to move between forest patches and maintain genetic exchange, thus reducing these risks.

Reference

Connecting tiger population for long term conservation –
NTCA and WII

Status of tigers -NTCA

Status of tigers; Co-predators and prey in India – NTCA

