MOBIUS FOUNDATION

THE TIGERS' TRIUMPH

Celebrating 50 Years of Conservation

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MOBIUS FOUNDATION

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FOREWORD

Dear reader,

Through this book, you will discover the challenges faced, the triumphs achieved, and the lessons learned in our quest to save the tiger from the brink of extinction. You will gain a deep appreciation for the delicate balance between conservation and sustainable development, recognizing the indispensable role that local communities, policymakers, scientists, and conservationists play in this remarkable journey.

Moving forward, it's imperative that environmentally conscious people be made a part of India's conservation initiatives. The concept of 'Tiger Bonds' may alleviate the financial challenges facing our tiger reserves and give the tiger enthusiasts an opportunity to be a stakeholder in the re-wilding of India's natural world.

Pradip Burman

Mr. Pradip Burman,
Chairman, Mobius Foundation

MESSAGES

The Tigers' Triumph by Mobius Foundation is not just a celebration of a magnificent species but a testament to our collective commitment to environmental sustainability.

Project Tiger, launched in 1973, has been instrumental in saving Bengal Tigers and preserving their ecosystems. Over five decades, Tiger Reserves have increased, leading to a significant rebound in the tiger population in India.

I commend the Mobius Foundation for hosting the 'Tiger Talk' event, bringing together luminaries and experts in the field of tiger conservation. The unique concept of 'Tiger Bonds' introduced during the event, reflects an innovative approach to financing tiger conservation in India.

As we look toward the future, it is essential to address the evolving challenges and secure sustainable funding for conservation initiatives. Let's persist in working collaboratively to ensure a harmonious coexistence between humanity and the majestic creatures that share our planet.

Dr. S.P. Yadav,
Additional Director General of Forests (Project Tiger & Elephant)
and Member Secretary, NTCA

MESSAGES

On this momentous occasion of celebrating the 50th anniversary of Project Tiger, I would like to convey my heartfelt appreciation for the monumental strides made in tiger conservation. The 'Tiger Talk' event organized by Mobius Foundation stands as a testament to the dedication and passion of those involved in this vital cause.

During the event, experts in tiger conservation shared their invaluable insights, enriching our understanding of the challenges faced in the past and illuminating a path forward. Their wisdom and experience have undoubtedly contributed to our collective efforts to protect and preserve these majestic creatures.

In the 'Tiger's Way Forward' segment, the discussion around the financial constraints confronting conservation efforts, sheds light on a critical aspect. The proposal of innovative solutions like Tiger Bonds, which align the interests of green investors with the urgent need for tiger-focused conservation, presents a promising avenue to address this challenge.

Conservation is not an individual endeavour but a collaborative one. It is through our collective commitment and determination that we can ensure the resounding roar of the tiger continues to echo through our forests, representing the triumph of conservation. Let us come together, united in purpose, to safeguard these incredible felines and their natural habitats for generations to come.

Mr. Praveen Garg, IAS (Retd.),
President, Mobius Foundation

©Ajay Juneja - Photographed at Ranthambore Tiger Reserve, Rajasthan

INTRODUCTION

It's late afternoon and the sun is casting a mellow golden light over the rugged jungle-scape in Madhya Pradesh's Panna National Park. The silence is broken by the harsh cough-like sound from a troupe of langur monkeys high up on the trees. These alarm calls are then taken up by a herd of spotted deer, echoed by a nearby peacock.

The sense of excitement and anticipation is palpable in the safari jeep, when suddenly the forest guide whispers dramatically, "Tiger, voh dekho nikal gaya!"

Cameras at the ready, the hectic clicking of multiple shutters adds to the soundtrack, as tourists scramble to capture the magnificent sight for posterity.

This scene was unimaginable not too long ago. Back in 2008, Panna's tigers had become extinct, setting off alarm bells for forest officials, conservationists and wildlife enthusiasts alike, because this was the second instance of a complete tiger eradication in a protected area – in 2006, The Sariska Tiger Reserve in Rajasthan was another Tiger Reserve to report a zero-tiger presence primarily due to rampant poaching, followed by Panna.

That's when Project Tiger stepped in by successfully reintroducing tigers to both the parks and re-wilding them in Panna.

India's flagship conservation initiative, Project Tiger, is today a proud 50 years old. To celebrate its jubilee year, Mobius Foundation, a Delhi based not-for-profit organisation, hosted 'Tiger Talk: A Roaring Dialogue on Tiger Conservation' on August 4, 2023.

With a view to spread awareness about tiger conservation and finding long-term solutions towards environmental sustainability, the fascinating panel discussion and interaction saw luminaries from the field of tiger conservation: Dr. M.K. Ranjitsinh, IAS (Retd.) as chief guest, Dr. S.P. Yadav, Additional Director-General, Project Tiger, and Member Secretary, National Tiger Conservation Authority (NTCA), Dr. Sejal Worah, Programme Director, World Wildlife Fund for Nature (WWF) and Shri Praveen Garg, IAS (Retd.), President, Mobius Foundation, who has formerly served with the Ministry of Environment, Forest and Climate Change as well as the Ministry of Finance, India, among others.

Top (L-R): Dr. S.P. Yadav, Mr. Pradip Burman, Mr. Abhilash Khandekar, Mr. Praveen Garg.

Bottom: Venue, Bikaner House, New Delhi

©Ajay Juneja - Photographed at Corbett Tiger Reserve, Uttarakhand

Project Tiger was set up in 1973, under the newly promulgated Wildlife Protection Act (WLPA). It identified nine national parks and wildlife sanctuaries and notified them as Tiger Reserves, including India's oldest – Corbett National Park.

At the turn of the 20th century, India was home to 20,000 - 40,000 tigers. By 1970 this figure had shrunk drastically to under 2000 due to unchecked hunting. Drastic intervention was needed if the tiger was to survive.

An apex predator, the tiger, also called the Royal Bengal Tiger, is often referred to as an "umbrella species", which means that if the tiger and its habitat is protected, the trickle down effect is the protection of every other species of flora and fauna.

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

Under Project Tiger, the big cat's presence grew slowly but steadily. By the early 2000s there were 28 Tiger Reserves and in 2002, the population had grown to a respectable 3700. But later, in the first nationwide assessment conducted in 2006, there was a shocking revelation: Tiger numbers had dramatically fallen to an all-time low of 1411, due to the Sariska debacle, closely followed by a repeat in Panna and overall reduction in numbers elsewhere. Decisive action was vital. The two episodes put the spotlight firmly on tiger conservation, leading to the establishment of the National Tiger Conservation Authority (NTCA), tasked with the management of all tiger habitats and the commissioning of all India tiger estimates using a scientific methodology.
At Mobius Foundation's 'Tiger Talk', Dr. M.K. Ranjitsinh, the prime architect of Project Tiger, revealed the appalling state of affairs 50 years ago.

"In those days, there were no national conservation laws; only some hunting laws. Different states applied their own loose levels of enforcement, so poaching was rampant. That's when, for the first time, the Wild Life Protection Act was enacted, with very stringent penalties."

Today, India's 54 Tiger Reserves provide a safe haven for over 3500 majestic Bengal Tigers as per the latest Tiger Census Report, released by Prime Minister Narendra Modi in April 2023 at an event marking Project Tiger's golden jubilee.

Top left: Dr. M.K. Ranjitsinh Jhala, Author, Chairman Emeritus of the Wildlife Trust of India.

Top right: Guests at the Tiger Talk.

Bottom: Ms. Jessica Gill, Senior Research Associate, Mobius Foundation, emceeing the event.

©Ajay Juneja - Photographed at Panna Tiger Reserve, Madhya Pradesh

Coincidentally, as the Prime Minister remarked, India has completed 75 years of independence; with a 75% increase in tiger numbers that account for 75% of the world's tiger population. In fact, India has become the global leader in tiger conservation amongst the 13 countries that host a tiger population; and most follow India's conservation practices and methodology.

A tiger census is carried out every four years, but prior to 2006 the methods employed provided only rough estimates. The tiger's footprints or pug marks were often either missed out entirely or counted multiple times, leading to either underestimating or overestimating tiger numbers. The Tiger Task Force set up by the NTCA after the Sariska wipeout, now employs highly developed scientific methodology. Dr. S. P. Yadav explained:

"Tiger stripes are like human fingerprints – they never change. India has been divided into a grid where pairs of automatic cameras are placed at intervals of two square-kilometres to take photographs every time a tiger moves in front of it, creating an exhaustive biometric or Aadhaar-like data base of each individual tiger."

In addition to camera-traffic data, tiger scats or droppings are also collected for DNA analysis in low-density tiger parks, creating yet another empirical resource.

Top: Dr. S.P. Yadav, Additional Director-General Project Tiger and Member Secretary, NTCA with other panelists.

Bottom left: Forest workers use plaster of Paris to cast a paw print of a Bengal tiger on the Mahananda river bed, on the outskirts of Siliguri.

Bottom right: Audience members at the talk.

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

With a robust monitoring mechanism in place in all tiger reserves, the conservation focus has now shifted to the tigers that live in buffer and unprotected terrain.
Dr. Yadav has coined a unique term for them: 'Below Poverty Line Tigers' (BPL).

"Tigers living within the protected zones have plenty of resources, financial and otherwise, dedicated to their protection. They are 'rich' tigers. Now BPL tigers need our attention," he elaborated.

Interestingly, a new phenomenon has also been observed – the existence of "urban tigers", something not witnessed before. For instance, Bhopal, the capital of Madhya Pradesh has roughly 18 tigers residing within 3-4 km of the city's municipal limits. These "Bhopal Tigers", as they are now known, have habituated themselves quite comfortably to an urban habitat. Close monitoring has so far eliminated man-animal conflict of any kind.

Top left: Mr. Pradip Burman felicitating Dr. S.P. Yadav.

Top right, bottom: Dignitaries at the Tiger Talk.

©Ajay Juneja - Photographed at Corbett Tiger Reserve, Uttarakhand

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"TYGER TYGER BURNING BRIGHT..."

At the top of the food chain – the tiger is true gentleman of the jungle. Sleek, solitary and at times deadly, the tiger has a mystical aura about it.

Scientifically known as *Panthera tigris tigris*, the tiger is one of the largest carnivore mammals existing today.

Tigers make a substantial contribution to ecology not just as flag-bearers of conservation but also as an umbrella species, being the top predator at the top of the food chain. They are nocturnal and become active during the night; however, when undisturbed, they are seen to be active during daytime as well. Tigers are solitary animals and spend most of their time alone. The largest members of the cat family, they are instantly recognizable due to their striking orange/yellow coat with black stripes. In the wild, these stripes help them in camouflaging with the green and brown hues of the forest and blending into their environment.

The big cat is known for its stealth as they primarily stalk and ambush their prey. To hunt, tigers stalk their prey to get as close to it as possible without being seen, then launch a swift attack by sinking their teeth into the animal's neck. Their canine teeth have pressure-sensing nerves, and it instinctively knows where to deliver the fatal bite.

An adult tiger, measured from its nose to the tip of its tail, can be between 1.8 and 3 metres long, weigh up to 300 kg and is capable of eating more than 36 kilograms of meat in a single sitting.

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

No two tigers have the same markings, and like fingerprints, their stripes are unique to each individual.

They mark their territory in a variety of ways, urinating, scratching trees, and defecating to let other tigers know that the space is occupied.

Male tigers come to discern when a female is ready to mate by the scent of her urine. Tigers have a range of vocalizations that they use to communicate with other tigers, including roars and hisses, and a male and female will call to find each other. After mating, female tigers have a gestation period of about 100 days before giving birth to 2-4 cubs.

Tigers used to have a much larger range but human activities, loss of habitat, deforestation and activities such as poaching have resulted in dwindling tiger populations. The IUCN categorizes tigers as endangered and lists illegal poaching as the main threat to the species.

They are mainly poached for their body parts and fur, which are much in demand in the global illegal wildlife trade. Tiger bones are used in traditional Asian medicine, and similar markets seek tiger skin, teeth and other body parts.

In addition to poaching, tiger habitats are under threat from increasing human and non-forestry activities in the vicinity of tiger conservation areas.

Tiger attacks on humans and livestock also bring the big cats into conflict with people, who kill them in retaliation.

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

After almost a century of decline, the overall wild tiger numbers are stabilizing and showing some increasing trend.

About 5,574 tigers remain in the wild, as per the Global Tiger Forum reports.

Coordinated efforts towards conservation and advancements in monitoring strategies have resulted in the increased numbers indicating a 75 per cent increase in numbers since 2010. Much more work, however, needs to be done to protect this charismatic megafauna species if we are to secure its future in the wild.

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

"...IN THE FORESTS OF THE NIGHT..."

The 'Tiger Talk' session also highlighted the challenges, both past and present, that Project Tiger and other conservation efforts face. As Mr. Burman pointed out,

"Flash floods and wild fires as witnessed in Europe and elsewhere are due to human actions which are destroying the planet. That is why I took it upon myself to do something about the sustainability of this planet. As I see it, the biggest challenge to sustainability is population."

Civilisations from time immemorial have hunted animals. In the beginning it was simply for food and sustenance. When our hunter-gatherer ancestors began to turn settlers, forests were cleared to create agricultural tracts, gradually leading to the establishment of villages, towns and eventually the vast megapolises that exist today. Hunting moved away from being an activity of necessity and survival, to becoming one of pleasure reserved mostly for royalty and the aristocracy. Tribal communities still maintained their agrarian way of life supplemented with a little for the pot – mostly herbivores. This was true around the globe, but India was unique – except for the vast African continent, nowhere was such a rich biodiversity seen in one country, boasting a multitude of flora and fauna.

Clockwise: Mr. Pradip Burman, Chairman, Mobius Foundation, felicitating Dr. Ranjitsinh; addressing the audience; conversing with guests.

©Priyansha Singh - Photographed at Sariska Tiger Reserve, Rajasthan

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

A tiger shoot is the ultimate goal for the hunter. Besides the thrill of besting the elusive king of the jungle, there is the self-gratification gained from acquiring both a reputation for bravery and manliness as well as a magnificent trophy at the end.

Indian history is replete with well-documented accounts of hunting expeditions, depicted in our art, architecture, and literature.

However, hunting reached its zenith, or rather nadir, during the British Raj. Local *maharajas*, *rajas*, *and nawabs*, organized tiger shoots not only for their personal pleasure but mostly to curry favor with their new masters, the *gora sahibs*.

In times of political uncertainty, no price was too high for these rulers to ensure their continued survival in the new regime; and going on *shikaar* or tiger shoots had a very special cachet, with the tiger, unwittingly becoming the favoured currency.

The lure of accumulating trophies that could be sent back to England became so intense, that it was immortalised in the short story, *Mrs. Packletide's Tiger* written in 1912, by the famous British satirist H.H. Munro under his pen-name Saki.

There are innumerable accounts of big-bag shoots. Tigers were prolific and numbered nearly 100,000 in the Indian subcontinet in the 19th century. At the turn of the 20th century, they had reduced to 20,000 - 40,000, with a fairly even distribution.

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

Recently, an Indian Forest Service officer tweeted a Raj-era document that puts on record that the British bag in the year 1879 alone was 1,579 tigers.

East India Company officer James Outram's personal record between 1825 and 1834 is 191 tigers, 15 leopards, and countless other big animals. Since the killing was mostly for fun, it was also referred to as 'game'. Outram was to go on to become a General and fought in the battle of 1857.

Closer to home, the last *Maharaja* of Surguja, which is in modern-day Chhattisgarh has the dubious distinction of having personally shot 1710 Bengal Tigers until 1957.

By the 1970s, tiger distribution across the country had become pretty sparse, so when the first 9 tiger reserves were notified, it was in areas that still carried a relatively dense tiger population – most of which were in east and central India. Among these was Jim Corbett National Park, the country and Asia's first designated wildlife reserve.

Located in the hilly state of Uttarakhand, Corbett Park has undergone many transformations since its creation in 1936. It was initially called Hailey National Park, named after the governor of the erstwhile United Provinces. Nearly a decade after India's independence, in 1956, the park was renamed Corbett National Park in honour of the legendary hunter-turned-naturalist Jim Corbett. From the year of its creation, the ruling British administration had completely banned hunting and timber felling. Limited wood for domestic consumption was the only activity permitted to the local community.

Under the careful surveillance of Project Tiger, while there was a steady growth in tiger numbers, the Sariska and Panna episodes showed up some gaping holes in the census methodology.
In 2008, the NTCA adopted the Management Effectiveness Evaluation (MEE) module with the technical help of international
MEE experts. In order to gauge the efficacy of conservation efforts and to steer management inputs, it is essential to evaluate tiger reserve management.

Drawn up under the aegis of the International Union for Conservation of Nature and Natural Resources (IUCN), the MEE model has up to 33 criteria and indicators to assess all tiger reserves.

This substantive module ranges from financial and manpower resources and their allocation, monitoring and documentation, community and stakeholder involvement to visitor experience and information dissemination. Every tiger reserve has to submit a self-assessment report which is then ranked by the NTCA.

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After 2008, Panna became the focus of conservation efforts – not just for the reintroduction of tigers but later on for the successful rewilding of the striped feline star.

In 2009, two females were translocated from Bandhavgarh and Kanha National Parks, both in Madhya Pradesh, in order to balance the skewed gender ratio. By the time they were moved in, it was discovered that the last resident male had disappeared.

Two new male tigers were subsequently brought to Panna – one from Pench National Park. After just 10 days, the Pench male (fitted with a GPS collar) was found to be moving southwards back towards Pench. This was the first recorded incidence of a "homing instinct" observed in wild tigers.

After persistent efforts, 50 days later the big cat was tranquilised and released back in Panna to result in a successful breeding population with multiple litters.

In 2011, an orphaned female tiger cub that had been hand reared for almost two years was reintroduced to the wild, taught hunting skills by a resident male tiger, it gave birth to two cubs which were raised to healthy adulthood. This was an exciting new chapter in Panna's history as the first successful rewilding experiment.

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

However mere growth in numbers is not the only indicator of successful conservation efforts. One of the key findings thrown up by the MEE model has been the systematic evaluation of the integrity and quality of tiger habitats.

Conservationists outside the government, however, point out areas of concern notwithstanding the success. The worries range from the so-called "fortress model of conservation" which by its nature is exclusive and limits community participation in tiger protection; to the skewed distribution of tigers and the securing of tiger corridors as most have degraded, forming islands, like for instance in Ranthambore National Park in Rajasthan.

Many tiger reserves especially in the eastern part of the country, like Palamau and Similipal (from the original nine tiger reserves) host numbers in single digits at best or only itinerant populations at worst. Others are beginning to exceed their carrying capacity causing tigers to move out of protected areas, resulting in increasing man-animal conflict. Dr. Sejal Worah highlighted,

"Managing the human-animal interface is going to be the primary challenge for India. If we don't focus on this we are going to lose whatever gains we have made. Antagonism towards tigers will increase, and people will start pushing back."

Top left: Mr. Pradip Burman felicitating Dr. Sejal Worah, Programme Director, World Wildlife Fund for Nature.

Top right: Ms. Jessica Gill addressing the audience.

Bottom: Audience members at the event.

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

THE TIGER'S WAY FORWARD

If the past posed challenges, the future has its own set of problems. Raising funds, and their timely allocation and disbursement, is a continuing issue. The budget allocated for Project Tiger in 2018-19 was Rs 350 crore, but was reduced to Rs 220 crore in 2022-23, when it was merged with Project Elephant. One way to address this shortfall is the creation of Tiger Bonds. Mr. Praveen Garg, President, Mobius Foundation, explained his unique concept,

"Tiger Bonds are the manifestation of the coexistence of economy and ecology. It was clear to me that tiger conservation needed to consider the fiscal position of the government, so achieving the much needed quantum jump in tiger conservation was done by tapping into financial markets through instruments like tiger bonds."

The growing awareness of Environmental Social and Corporate Governance (ESG) among the investment community and countries to fulfil their need for Nationally Determined Contributions (NDCs) has led to the search for alternative approaches to financing environmental management.

Top left: Mr. Praveen Garg, President, Mobius Foundation, formerly with MoEFCC and Ministry of Finance, Government of India.

Top right: Mr. Pradip Burman felicitating Mr. Praveen Garg.

Bottom: Panelists at the Tiger Talk.

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

Flowchart illustrating two channels by which finances are pumped into tiger reserves – 1. initiated through the reserves themselves or 2. via the bond markets

Simply put, Tiger Bonds will match green investors with tiger-focused conservation through criteria-based project finance. Bond proceeds will be directed towards pre-specified conservation efforts in tiger reserves, encouraging investors to make green investments.

These will function much like the government-issued Green Bonds that are debt-security instruments with the caveat that proceeds are used only for green initiatives.

Increasing tiger numbers means creating more tiger habitats. This entails relocating and rehabilitating communities. With compensation at nearly Rs. 15 lakh per adult, this turns out to be an expensive proposition; And with funds shrinking, creating innovative financial solutions and instruments like Tiger Bonds becomes imperative.

Growing infrastructural demands also need to be addressed. Our road networks are ever rising so smart infrastructure with smart roads that offer more animal corridors for safe passage are the need of the hour. Many tiger reserves are short-staffed and tiger poaching for skin and body parts remains a problem.

Conservation efforts need to incentivise local communities residing near "tiger towns" where the economy is mostly dependent on tiger tourism. Making them partners and stakeholders can reduce the temptation to poach for profit.

Dr. Yadav was unhesitant while saying, *"The demand is not from within India but from countries like China and Vietnam, that use these body parts in their medicines and pharmacology."*

©Rajiv Sharma - Photographed at Panna Tiger Reserve, Madhya Pradesh

Source: Karnataka Forest Department

When asked about Project Tiger's objective for the next 50 years, Dr. Yadav added, *"The goal would be to have a viable and sustainable tiger population in tiger habitats based on a scientifically calculated carrying capacity."*

'Tiger Talk' also highlighted the dedication of Indian forest workers, who often have to function under the most extenuating circumstances and harshest of conditions. Dr. Worah, favourably compared the way Indian reserves are managed as opposed to countries like Malaysia,

"After years of working in tiger habitats in south-east Asia, my eyes have been completely opened. The knowledge, dedication and commitment displayed [in India] is second to none."

Conclusion

Tiger management strategies have to be based on a landscape level, encompassing the main Protected Areas, (Core and Buffer zones), animal corridors and forest areas outside the Protected Area Network. Equal emphasis should be given to the implementation of surveillance strategies in Eco-Sensitive Zones (ESZ) around the protected areas.

Effective conservation laws, increased financial support, and incentivizing local people's participation would definitely help future conservation prospects.

It is important to sustain tiger populations at key habitat locations but it is equally important to allow the species to survive over wider habitats for effective conservation and preservation.

TIGER RESERVES IN INDIA

	TIGER RESERVE	STATE	CORE AREA (km^2)	BUFFER AREA (km^2)	TOTAL AREA (km^2)
1	Nagarjunsagar Srisailam	Andhra Pradesh	2,595.72	700.59	3,296.31
2	Pakke	Arunachal Pradesh	683.45	515.00	1,198.45
3	Namdapha	Arunachal Pradesh	1,807.82	245.00	2,052.82
4	Kamlang	Arunachal Pradesh	671.00	112.00	783.00
5	Manas	Assam	526.22	2,310.88	2,837.10
6	Nameri	Assam	320	144.00	464.00
7	Orang	Assam	79.28	413.18	492.46
8	Kaziranga	Assam	625.58	548.00	1,173.58
9	Valmiki	Bihar	598.45	300.93	899.38
10	Indravati	Chhattisgarh	1,258.37	1,540.70	2,799.07
11	Udanti-Sitanadi	Chhattisgarh	851.09	991.45	1,842.54
12	Achanakmar	Chhattisgarh	626.19	287.82	914.02
13	Palamau	Jharkhand	414.08	715.85	1,129.93
14	Bhadra	Karnataka	492.46	571.83	1,064.29
15	Kali	Karnataka	814.88	282.63	1,097.51
16	Bandipur	Karnataka	872.24	584.06	1456.3
17	Nagarhole	Karnataka	643.35	562.41	1,205.76
18	Biligiri Ranganatha Swamy Temple	Karnataka	359.10	215.72	574.82
19	Parambikulam	Kerala	390.89	252.77	643.66
20	Periyar	Kerala	881.00	44.00	925.00
21	Kanha	Madhya Pradesh	917.43	1,134.36	2,051.79
22	Pench-MH	Madhya Pradesh	411.33	768.30	1,179.63
23	Panna	Madhya Pradesh	576.13	1,021.97	1,598.10
24	Satpura	Madhya Pradesh	1,339.26	794.04	2,133.31
25	Bandhavgarh	Madhya Pradesh	716.90	820.03	1,536.93

Source: NTCA

	TIGER RESERVE	STATE	CORE AREA (km²)	BUFFER AREA (km²)	TOTAL AREA (km²)
26	Sanjay-Dubri	Madhya Pradesh	812.57	861.93	1,674.50
27	Veerangana Durgavati	Madhya Pradesh	1414.006	–	1414.006
28	Sahyadri	Maharashtra	600.12	565.45	1,165.57
29	Melghat	Maharashtra	1,500.49	1,268.03	2,768.52
30	Tadoba-Andhari	Maharashtra	625.82	1,101.77	1,727.59
31	Navegaon-Nagzira	Maharashtra	653.67	1,241.27	1,894.94
32	Pench – MH	Maharashtra	257.26	483.96	741.22
33	Bor	Maharashtra	138.12	678.15	816.27
34	Dampa	Mizoram	500.00	488.00	988.00
35	Similipal	Odisha	1,194.75	1,555.25	2,750.00
36	Satkosia	Odisha	523.61	440.26	963.87
37	Ranthambore	Rajasthan	1,113.36	297.92	1,411.29
38	Mukundara	Rajasthan	417.17	342.82	759.99
39	Sariska	Rajasthan	881.11	332.23	1,213.34
40	Ramgarh Vishdhari	Rajasthan	481.9073	1019.9848	1501.8921
41	Kalakad Mundanthurai	Tamil Nadu	895.00	706.54	1,601.54
42	Anamalai	Tamil Nadu	958.59	521.28	1,479.87
43	Mudumalai	Tamil Nadu	321.00	367.59	688.59
44	Srivilliputhur-Megamalai	Tamil Nadu	641.86	374.70	1016.57
45	Sathyamangalam	Tamil Nadu	793.49	614.91	1,408.40
46	Amrabad	Telangana	2,166.37	445.02	2,611.39
47	Kawal	Telangana	892.23	1,123.21	2,015.44
48	Jim Corbett	Uttarakhand	821.99	466.32	1288.31
49	Rajaji	Uttarakhand	819.54	255.63	1075.17
50	Dudhwa	Uttar Pradesh	1,093.79	1,107.98	2,201.77
51	Pilibhit	Uttar Pradesh	602.79	127.45	730.25
52	Ranipur	Uttar Pradesh	230.31	299.0512	529.3612
-	Amangarh Buffer	Uttar Pradesh	–	80.60	80.60
53	Buxa	West Bengal	390.58	367.32	757.90
54	Sunderban	West Bengal	1,699.62	885.27	2,584.89

Source: NTCA

TOTAL RESERVE AREA IN INDIA

77,210.836 km²

CORE: 42,913.376 km² | BUFFER: 34,297.46 km²

MAP OF TIGER RESERVES IN INDIA

Uttarakhand
- Rajaji
- Jim Corbett

Uttar Pradesh
- Pilibhit
- Dudhwa
- Ranipur

Bihar
- Valmiki

Jharkhand
- Palamau

Assam
- Manas
- Orang
- Nameri
- Kaziranga

Arunachal Pradesh
- Kamlang
- Namdapha
- Pakke

West Bengal
- Buxa
- Sunderban

Mizoram
- Dampa

Odisha
- Similipal
- Satkosia

Chhattisgarh
- Sanjay-Dubri
- Achanakmar
- Udanti-Sitanadi
- Indravati

Telangana
- Kawal
- Amrabad

Andhra Pradesh
- Nagarjunsagar -Srisailam

Tamil Nadu
- Sathyamangalam
- Mudumalai
- Anamalai
- Srivilliputhur-Megamalai
- Kalakad Mundanthurai

Rajasthan
- Sariska
- Ranthambore
- Ramgarh Vishdhari
- Mukundra Hills

Madhya Pradesh
- Panna
- Bandhavgarh
- Veerangana Durgavati
- Satpura
- Kanha
- Pench-MP

Maharashtra
- Pench-MH
- Melghat
- Navegaon-Nagzira
- Bor
- Tadoba-Andhari
- Sahyadri

Karnataka
- Kali
- Bhadra
- Biligiri Ranganatha Swamy Temple
- Bandipur
- Nagarhole

Kerala
- Parambikulam
- Periyar

Source: NTCA
Map is not to-scale and does not represent terrain
Reserves have been demarcated roughly

PROTECTED AREAS FOR TIGERS GLOBALLY

Key

- Extant population: Areas with confirmed tiger breeding activity within the last 10 years.
- Functionally extinct: No evidence of breeding has been detected since 2008.

	COUNTRY	NO. OF TIGER PROTECTED AREAS	NO. OF TIGERS
1	Bangladesh	1	114
2	Bhutan	10	103
3	Cambodia	6	0
4	China	8	>7
5	India	54	3682
6	Indonesia	7	371
7	Lao PDR	1	2
8	Malaysia	3	250
9	Myanmar	5	Data deficient
10	Nepal	5	235
11	Russia	10	433
12	Thailand	21	189
13	Vietnam	7	<5

Data Source: GTF
Image Source: IUCN 2014 - The IUCN Red List of Threatened Species

MANAGEMENT EFFECTIVENESS EVALUATION (MEE) OF TIGER RESERVES IN INDIA

Source: Management Effectiveness Evaluation of Tiger Reserves in India, Fifth Cycle, 2022

Some criteria that make up the evaluation:
1. Is the population of tigers showing a declining, stable or increasing trend?
2. Is the 'Core Area' of TR free from human and biotic interference?
3. Are local communities supportive of TR management?
4. Has the TR been effective in the mitigation of human-wildlife conflicts?
5. Are resources (vehicle, equipment, building etc.) adequate, well organized and managed with desired access?

	2006	2010	2014	2018	2022	
NO. OF NOTIFIED TRs	**28**	**39**	**43**	**50**	**51**	
Achanakmar	-	Fair	Fair	Good	Good	
Amrabad	-	-	-	Good	Very Good	↑
Anamalai	-	Very Good	Very Good	Very Good	Excellent	↑
Bandhavgarh	Good	Very Good	Good	Good	Very Good	↑
Bandipur	Good	Very Good	Very Good	Very Good	Excellent	↑
Bhadra	Good	Very Good	Good	Very Good	Excellent	↑
Biligiri Ranganatha Temple	-	-	Good	Good	Excellent	↑↑
Bor	-	-	-	Fair	Very Good	↑↑
Buxa	Good	Good	Good	Good	Good	
Corbett	Very Good	Good	Very Good	Very Good	Very Good	
Dampa	Good	Good	Good	Fair	Fair	
Dudhwa	Very Good	Good	Good	Good	Very Good	↑
Indravati	Poor	Poor	Fair	Fair	Fair	
Kalakad-Mundanthurai	Fair	Very Good	Very Good	Very Good	Very Good	
Kali (Dandeli-Anshi)	-	Very Good	Good	Very Good	Excellent	↑
Kamlang	-	-	-	Fair	Good	↑
Kanha	Very Good	Very Good	Very Good	Very Good	Excellent	↑
Kawal	-	-	Fair	Good	Good	
Kaziranga	-	Very Good	Good	Very Good	Very Good	
Manas	Fair	Good	Good	Good	Very Good	↑
Melghat	Very Good	Good	Very Good	Very Good	Very Good	
Mudumalai	-	Very Good	Very Good	Very Good	Excellent	↑
Mukundara Hill	-	-	Fair	Fair	Good	↑

	2006	2010	2014	2018	2022	
Nagarhole	Good	Good	Very Good	Very Good	Excellent	↑
Nagarjunsagar-Srisailam	Fair	Good	Good	Good	Very Good	↑
Namdapha	Fair	Fair	Fair	Fair	Fair	
Nameri	Good	Fair	Fair	Good	Fair	↓
Navegaon-Nagzira	-	-	-	Very Good	Very Good	
Orang	-	-	-	Good	Good	
Pakke	Fair	Good	Good	Good	Very Good	↑
Palamau	Very Good	Poor	Fair	Fair	Good	↑
Panna	Very Good	Very Good	Very Good	Very Good	Very Good	
Parambikulam	-	Very Good	Very Good	Very Good	Very Good	
Pench (MH)	Good	Good	Very Good	Very Good	Excellent	↑
Pench (MP)	Very Good	Very Good	Very Good	Very Good	Very Good	
Periyar	Good	Very Good	Very Good	Very Good	Excellent	↑
Pilibhit	-	-	-	Fair	Good	↑
Rajaji	-	-	-	Fair	Good	↑
Ranthambhore	Fair	Good	Good	Fair	Good	↑
Sahyadri	-	Fair	Good	Good	Very Good	↑
Sanjay-Dubri	-	Fair	Good	Good	Good	
Sariska	Poor	Fair	Good	Fair	Good	↑
Sathyamangalam	-	-	Good	Very Good	Very Good	
Satkosia	-	Poor	Fair	Good	Very Good	↑
Satpura	-	Very Good	Very Good	Very Good	Excellent	↑
Similipal	Very Good	Fair	Fair	Good	Excellent	↑↑
Srivilliputhur-Megamalai	-	-	-	-	Good	
Sundarbans	Very Good	Very Good	Very Good	Good	Very Good	↑
Tadoba-Andhari	Good	Good	Very Good	Very Good	Very Good	
Udanti-Sitanadi	-	Poor	Fair	Good	Fair	↓
Valmiki	Fair	Fair	Very Good	Very Good	Very Good	

IUCN's World Commission on Protected Areas (WCPA) provides a framework for assessing the management effectiveness of protected areas through 6 elements – Context, Planning, Input, Process, Output and Outcomes. For assessment of each of the 6 elements of the MEE Framework, 33 criteria have been developed. To make the scoring more objective, differential weightages have been assigned to different criteria. Each response is assigned a score from 2.5 to 10. The scores of all 33 criteria are pooled and a percentage rating is calculated for each Tiger Reserve. This interpretation classifies the results into 4 categories: 50-59% rated as 'Fair'; 60-74% rated as 'Good'; 75-89% rated as 'Very Good' and >= 90% rated as "Excellent".

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