INDIA

Tiger Estimate 2010

March 2011

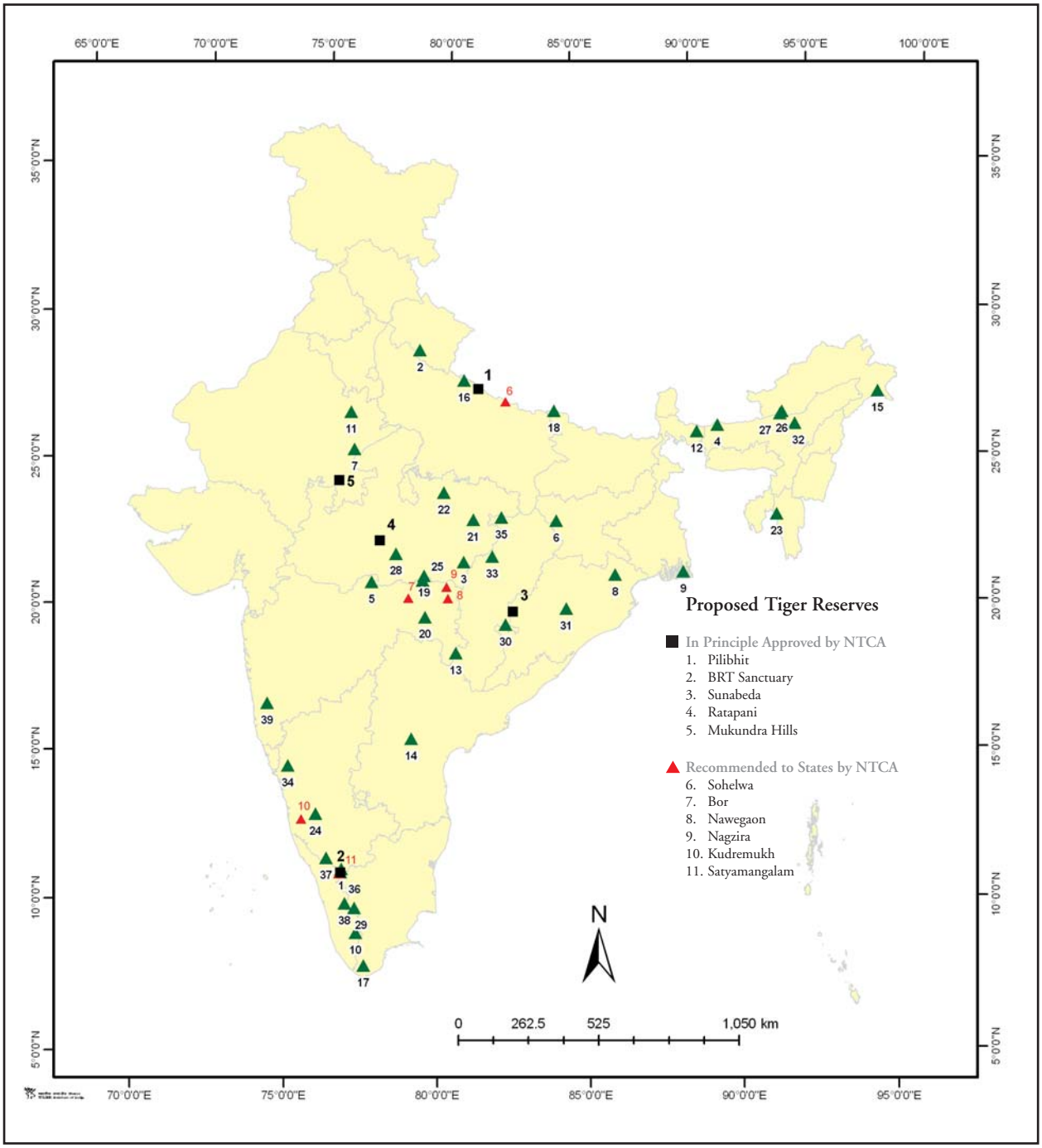
National Tiger Conservation Authority

सत्यमेव जयते

Ministry of Environment and Forests
GOVERNMENT OF INDIA

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

Tiger Reserves in India



Existing Tiger Reserves

1 Bandipur **2** Corbett **3** Kanha **4** Manas **5** Melghat **6** Palamau **7** Ranthambore **8** Simlipal **9** Sunderban **10** Periyar **11** Sariska **12** Buxa **13** Indravati **14** Nagarjuna Sagar **15** Namdapha **16** Dudhwa **17** Kalakkad-Mundanthurai **18** Valmiki **19** Pench-MP **20** Tadoba Andheri **21** Bandhavgarh **22** Panna **23** Dampa **24** Bhadra **25** Pench-MH **26** Pakke **27** Nameri **28** Satpura **29** Anamalai (Indira Gandhi) **30** Udanti-Sitanadi **31** Satkosia **32** Kaziranga **33** Achanakmar **34** Dandeli-Anshi **35** Sanjay Dubri **36** Mudumalai **37** Nagarhole (Rajiv Gandhi) **38** Parambikulam **39** Sahyadri

Contents

Foreword

Conserving the tiger is our national imperative. By doing so, we save not only a magnificent species and our national animal, but we also end up protecting and regenerating our forest ecosystems and its tremendous wealth of biodiversity.

Monitoring tiger populations is a crucial component of evaluating the efficacy of our tiger conservation efforts, launched under the personal leadership of Shrimati Indira Gandhi in April 1973. I am pleased therefore to introduce to you this booklet containing the results of the All India Tiger Estimation exercise for the year 2010. The National Tiger Conservation Authority and independent technical experts and institutions have evaluated the population status of tigers in all the tiger reserve states using robust scientific techniques. This booklet is a summary and concise presentation in an easy-to-understand and visually appealing format.

The entire survey and research work that has gone into the 2010 estimation will soon be put into the public domain.

Jairam Ramesh
Minister of State (Independent Charge)
Environment & Forests
Government of India

28th March, 2011

I. Why Should We Save The Tiger?

- The existing 39 tiger reserves represent around one-third of our high density forest area.
- More than 350 rivers originate from tiger reserves. Tiger reserves also sequester carbon, provide oxygen and slowly release ground water to regulate floods.
- As top predators, tigers shape the community structure of ecosystems. Tigers prevent over-grazing of the ecosystem by limiting herbivore numbers, and maintain ecological integrity.
- Tigers are solitary and have large home ranges. By this virtue tigers are excellent umbrella species as they provide space for a variety of other species to flourish.
- A powerful cultural mascot of India, a symbol of myth, mystery and imagination. If we lose the tiger, we will indeed lose an integral part of our identity as a nation.

II. 2010 Assessment Methodology

The All India Tiger Estimation exercise is one of the most crucial components of our national tiger conservation efforts. Since 2006, this monitoring exercise is being undertaken every four years. This report presents the results of the 2010 National Tiger Assessment, undertaken through a best-in-class scientific process. This presents an estimate of India's current tiger population and a broader assessment of our tiger landscapes. This monitoring exercise was carried out between December 2009 and December 2010. The three phases of the tiger estimation procedure are as follows:

- **Phase 1:** Field data collected at the beat-level (i.e. the primary patrolling unit) by trained personnel using a standardised protocol.
- **Phase 2:** Analysis of habitat status of tiger forests using satellite data.
- **Phase 3:** Camera trapping was the primary method used, where individual tigers were identified from photographs based on their unique stripe patterns. This information was analysed using a well established scientific framework. Camera trapping was carried out by teams of wildlife biologists and local forest personnel.

Based on the tiger numbers recorded in sampled sites, an estimate for other contiguous tiger-occupied landscapes, was made. For this, additional information such as tiger signs, prey availability, habitat conditions and human disturbance was used. *Thus, the final estimates provide a comprehensive and statistically robust result for the whole country.*

III. Salient Features of 2010 Assessment

- Forest personnel involved in data collection: *~4,76,000*
- Number of forest beats sampled in Phase I: *29,772*
- Total distance walked in Phase I: *~6,25,000* km
- More than *27,300* man-days of researchers
- Total camera traps used: *~800*
- Total area camera-trapped: *~10,500* sq. km.
- Number of individual tigers camera trapped: *550*
- Total cost: Rs. *9.1* crore

IV. Tiger Population Estimates

The same scientifically robust methods were consistently used in 2006 and 2010. This enabled comparison of results from both estimation exercises and in understanding the trend in tiger numbers.

The results were collated for the larger landscapes within which individual tiger reserves fall. The Tables below provide detailed information of these landscape complexes.

Table 1: Population Estimate of Tigers in 2006 and 2010

Landscape Complex	Tiger Estimate (2006)			Tiger Estimate (2010)		
	Lower limit[2]	Population estimate[1]	Upper limit[2]	Lower limit[2]	Population estimate[1]	Upper limit[2]
Shivalik-Gangetic Plains	259	297	335	320	353	388
Central India and Eastern Ghats	486	601	718	569	601	651
Western Ghats	336	412	487	500	534	568
North East Hills and Brahmaputra Flood Plains	84	100	118	118	148[3]	178
Sunderbans	Not assessed			64	70	90
Total	1165	**1411**	1657	1571	**1706**	1875

[1] Population estimate is a reliable statistical estimate of the tiger population number.

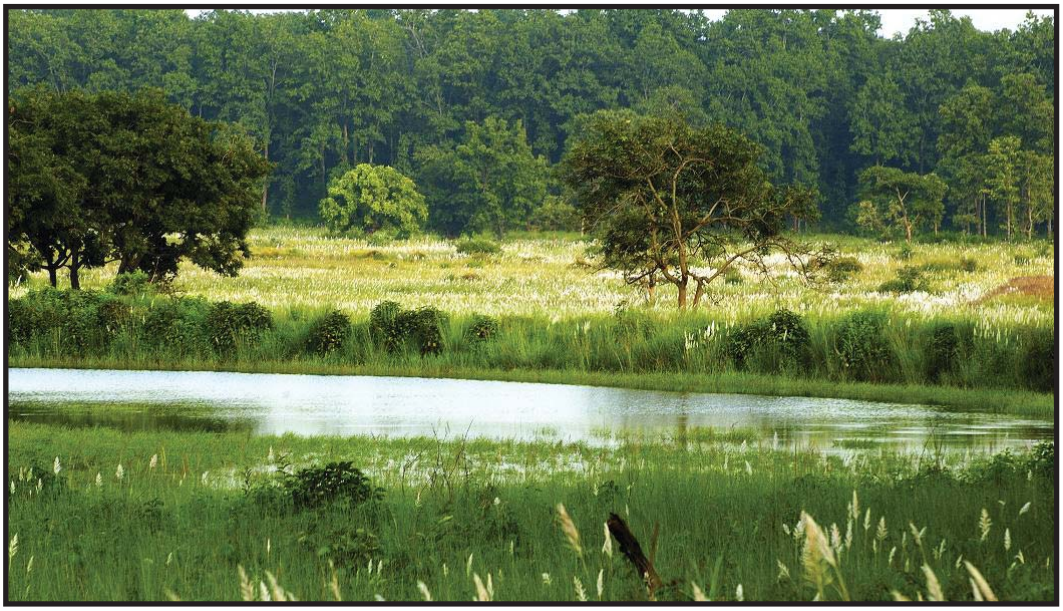
[2] The numbers in the "Upper limit" and "Lower limit" column show the range of these estimates.

[3] Excluding the minimum population estimate of Buxa Tiger Reserve (12 tigers) based on genetic analysis conducted by the Centre for Cellular and Molecular Biology (CCMB).

Table 2: Trends in Tiger Populations between 2006 and 2010

Landscape complex	Increase	Stable	Decrease
Shivalik-Gangetic Plains	Uttarakhand	Bihar, Uttar Pradesh	-
Central Indian and Eastern Ghats	Maharashtra	Chattisgarh, Jharkhand, Rajasthan, Orissa	Madhya Pradesh, Andhra Pradesh
North East Hills and Brahmaputra Flood Plains*	Assam	Mizoram, North West Bengal	-
Western Ghats	Tamil Nadu, Karnataka	Kerala	-

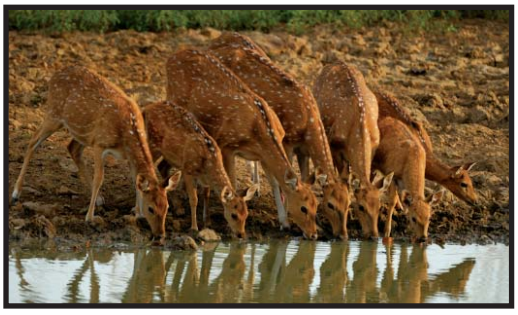
* Phase I data collection is ongoing in parts of Arunachal Pradesh



V. Innovations in 2010 National Tiger Assessment

The 2010 National Tiger Assessment has several innovations over previous assessments. These include:

- Partnerships with civil society organizations such as Wildlife Trust of India, Aaranyak, and World Wildlife Fund for Nature-India. Additional technical expertise from Centre for Cellular and Molecular Biology (CCMB).
- Local communities involved in data collection and analysis.
- Genetic analysis to estimate tiger populations from faecal samples.
- Along with tigers, co-predators, prey, and habitat quality assessed.
- Pioneering attempt to estimate tiger populations in Sunderbans Tiger Reserve (West Bengal) using satellite telemetry and sign surveys.
- First estimation of tiger population in Sahyadri Tiger Reserve (Maharashtra).



VI. New Findings of 2010 National Tiger Assessment

- Most tiger source sites continue to maintain viable tiger populations.
- Evidence of new areas populated by tigers, e.g. Kuno-Palpur Wildlife Sanctuary and Shivpuri National Park in Madhya Pradesh.
- New methodology for estimating population in Sunderbans.

Camera trap photographs of 2010 National Tiger Assessment

Moyar Segur, Tamil Nadu

Tadoba Tiger Reserve, Maharashtra

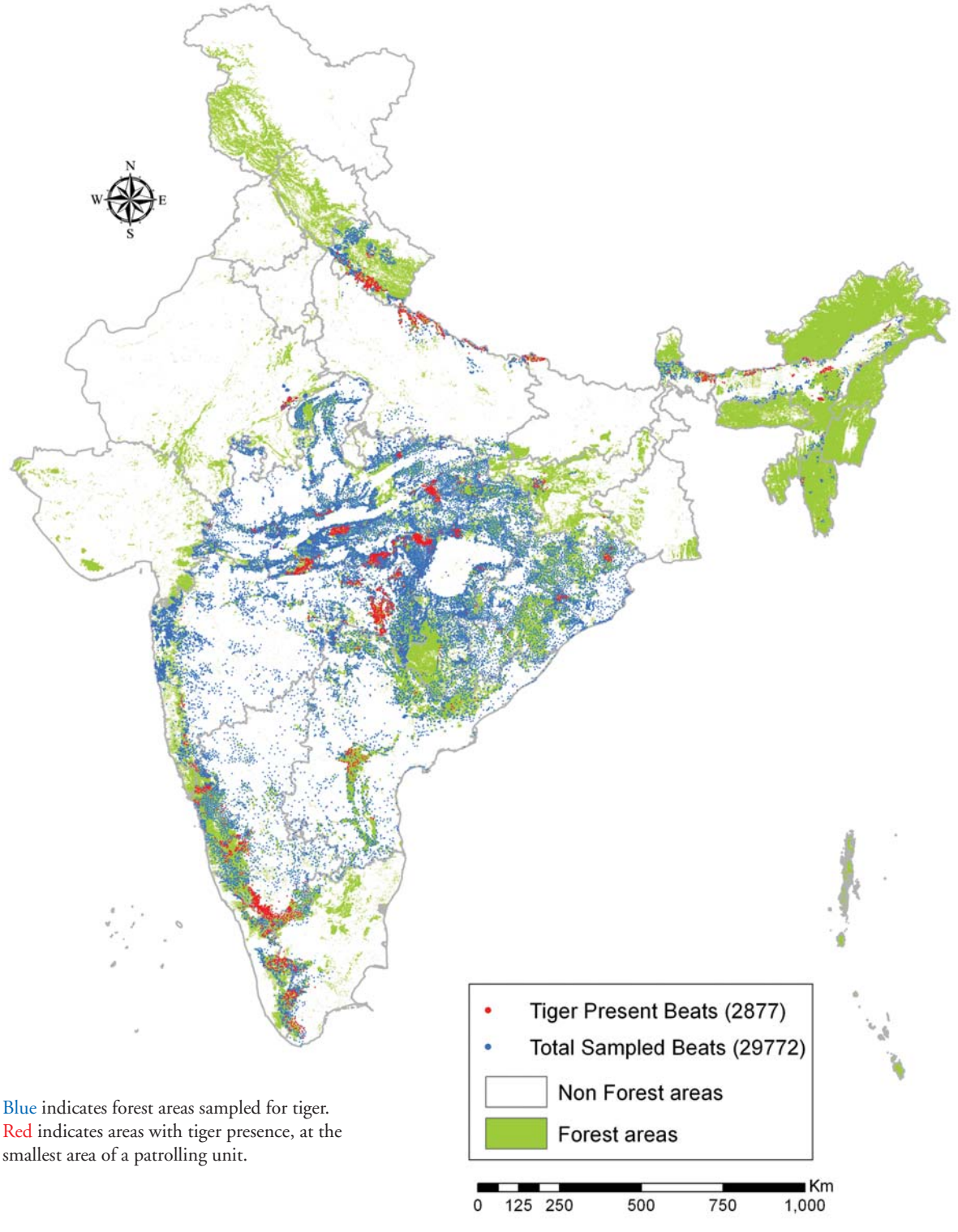
Bori-Satpura Tiger Reserve, Madhya Pradesh

Bandhavgarh Tiger Reserve, Madhya Pradesh

VII. A Final Word

Scientific robustness is the most important feature of the 2010 All India Tiger Population Estimation exercise. This holistic assessment uses tiger as a flagship species to assess status of co-predators, prey and habitat. The positive trends in tiger population estimates in source sites are encouraging. The fact that better protected tiger source sites have maintained viable tiger populations underscores the importance of strong managerial support. ***However, the area occupied by tigers outside protected areas has gone down considerably. This highlights the need for securing corridors for tigers to move between source sites.*** Five new Tiger Reserves have been given in principle approval in 2010 to provide an impetus to our national tiger conservation efforts. With the right support from the Government and citizens, we are confident that this positive trend will continue.

Map showing the extent and location of tiger habitats in India



Blue indicates forest areas sampled for tiger.
Red indicates areas with tiger presence, at the smallest area of a patrolling unit.

We are extremely grateful to the following people for sharing their excellent photographs for this important booklet:
Aditya Singh, Joydip and Suchandra Kundu, Kalyan Varma, Sudhir Mishra
Sanctuary photo library- Harshad Barve, Anish Andheria, Jayanth Sharma

WWF Aaranyak Wildlife Trust of India CCMB