4TH CYCLE OF MANAGEMENT EFFECTIVENESS EVALUATION OF TIGER RESERVES IN INDIA 2018




Nilanjan Chatterjee

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Ministry of Environment,
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MESSAGE

India is one of the few countries that has successfully not only assessed its tiger conservation efforts through the globally accepted management effectiveness framework, but has also replicated the exercise for four times which has provided valuable insights to policy makers, conservationists and academia as to what strategies work best for ensuring long term tiger survival.

The criteria adopted for conducting the Management Effectiveness Evaluation has been adapted to Indian conditions from the IUCNs World Commission on Protected Areas framework for assessing the management effectiveness.

In spite of all resource constraints, India has been able to manage its Tiger Reserves effectively as is reflected in the fact that none of them fall in the poor management category. This is indeed a moment to pride for our field personnel in Tiger Reserves, the Chief Wildlife Wardens, Wildlife Institute of India and the National Tiger Conservation Authority and I exhort them to continue striving for safeguarding our wilderness resources in general and tiger populations in particular.



Shri Prakash Javadekar

Hon'ble Minister of Environment, Forest and Climate Change, Government of India

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The Team
Wildlife Institute of India

Dehradun
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ABBREVIATIONS

Word	Abbreviations
ACF	Assistant Conservator of Forests
Ajeevika-NRLM	Ajeevika-National Rural Livelihood Mission
APCCF	Additional Principal Chief Conservator of Forests
APCs	Anti-Poaching Camps
APO	Annual Plan of Operation
BCRLIP	Biodiversity Conservation and Rural Livelihood Improvement Project
BO	Beat Officer
BR	Biosphere Reserve
BSF	Border Security Force
BSI	Botanical Survey of India
C2C	Category 2 Centre
CAMPA	Compensatory Afforestation and Management Planning Authority
CBD	Convention on Biological Diversity
CBET	Community-based Ecotourism
CCF	Chief Conservator of Forests
CF	Conservator of Forests
CRPF	Central Reserve Police Force
CTH	Core/ Critical Tiger Habitat
CWLW	Chief Wildlife Warden
DCF	Deputy Conservator of Forests
DFO	Divisional Forest Officer
DGF	Director General of Forests
EDC	Eco-Development Committee
E-Eye	Electronic Eye
EPT	Elephant Proof Trench
ESZ	Eco-Sensitive Zone
FD	Field Director/ Fixed Deposit
FDC	Forest Development Corporation
FG	Forest Guard
FRA	Forest Rights Acts
FW	Forest Watcher
GBM WLS	Gundla Brahmeswaram Wildlife Sanctuary
GIS	Geographical Information System
GO	Government Order
GOI	Government of India
GPS	Global Positioning System
GPSPDA	Global Positioning System Personal Digital Assistant
HoFF	Head of Forest Force
HRD	Human Resource Development
HWC	Human-Wildlife Conflict
IBA	Important Bird Area
IEDP	India Eco-development Project
IIFM	Indian Institute of Forest Management
ITDA	Integrated Tribal Development Agency
IUCN	International Union for Conservation of Nature and Natural Resources
JFMC	Joint Forest Management Committee
KV	Kilo Volt
LAC	Local Advisory Committee
LoC	Letter of Credit
LPG	Liquid Petroleum Gas
LTM	Lion Tailed Macaque
LWE	Left Wing Extremism
MEE	Management Effectiveness Evaluation

MNREGA	Mahatma Gandhi National Rural Employment Guarantee Scheme
MoEFCC	Ministry of Environment, Forest and Climate Change
MoU	Memorandum of Understanding
MS	Member Secretary
M-STrIPES	Monitoring System for Tigers, Intensive Protection and Ecological Status
MV	Motor Vehicle
NABARD	National Bank for Agriculture and Rural Development
NGI	Non-Governmental Institute
NGO	Non-Governmental Organisation
NGS	National Geographic Society
NGSDP	National Green Skill Development Programme
NH	National Highway
NIC	Nature Interpretation Centre
NP	National Park
NTCA	National Tiger Conservation Authority
NTFP	Non Timber Forest Produce
NWFP	Non Wood Forest Produce
PA	Protected Area/ Protection Assistant
PAO	Pay and Accounts Office
PCCF	Principal Chief Conservator of Forests
PCCF(WL)	Principal Chief Conservator of Forests (Wildlife)
PDF	Park Development Fund
PRT	Primary Response Team
PT	Project Tiger
PWD	Public Works Department
REC	Regional Expert Committee
RET	Rare, Endangered and Threatened Species
RKVY	Rashtriya Krishi Vikas Yojana
RO	Range Office
RWD	Rural Works Department
SBM	Swachh Bharat Mission
SFRI	State Forest Research Institute
SIDCUL	State Industrial Development Corporation of Uttarakhand Limited
SOG	Special Operation Group/Standard Operating Guidelines
SOP	Standard Operating Procedure
SSB	Sashastra Seema Bal
STPF	Special Tiger Protection Force
SWOT	Strength Weakness Opportunity Threats
TCF	Tiger Conservation Foundation
TCP	Tiger Conservation Plan
TR	Tiger Reserve
UAV	Unmanned Aerial Vehicle
VES	Vertical Electrical Sounding
VFC	Village Forest Committee
VHF	Very High Frequency
VSS	Van Sanrakshan Samitis
WB	World Bank
WCCB	Wildlife Crime Control Bureau
WCPA	World Commission on Protected Areas
WCT	Wildlife Conservation Trust
WHS	World Heritage Site
WII	Wildlife Institute of India
WLPA	Wildlife (Protection) Act, 1972
WLS	Wildlife Sanctuary
WT	Wireless Tower/ Watch Tower
WTI	Wildlife Trust of India
WWF	World Wide Fund for Nature
ZSI	Zoological Survey of India





Bilal Habib

INTRODUCTION

1.1 The Tiger and its conservation

1.2 Project Tiger and establishment of Tiger Reserves

1.3 Constitution of National Tiger Conservation Authority (NTCA)



1.4 Evaluation of Tiger Reserves in India through MEE Process

1.5 Management Effectiveness Evaluation (MEE) Process in India





Bilal Habib

THE TIGER AND ITS CONSERVATION

1.1

The tiger is a unique animal, which plays a pivotal role in maintaining the health and diversity of an ecosystem. Being a top predator, it maintains the ecological balance and food chain. The tiger is a global conservation icon, because of its ecological, religious, cultural, aesthetic and social values. In the 1970s and even today, India has been home to the majority of the world's wild tigers. In the late 1960s, wildlife officials became aware that poaching of tigers and prey and loss of habitat were leading to precipitous drops in the number of tigers in the wild.

The tiger *Panthera tigris* is an icon for conservation across forested systems of Asia. Tigers were once widespread across Asia, with a distributional range spanning 30 present-day countries, stretching across a vast region (latitudes 53°52' N to 8°51' N and longitudes 46°42' E to 134°24' E) (Karanth and Nichols 2017). After modern humans colonized Asia, forest clearance for shifting cultivation, followed by settled agriculture and livestock raising, squeezed tiger habitats. Expanding human settlement brought tigers under great pressure. In the escalating conflict with people over land and livestock, tigers were systematically hunted out. Finally, with the advent of steel traps and snares and later firearms, explosives, and chemical poisons, hunters virtually extirpated tigers from most agricultural tracts (Karanth 2001). Major threats to tigers are poaching driven by an illegal international demand for tiger parts and products, depletion of tiger prey caused by illegal wild meat consumption, and habitat loss due to the ever-increasing demand for forested lands.

PROJECT TIGER AND ESTABLISHMENT OF TIGER RESERVES

1.2

India is one of the seventeenth mega bio-diverse countries of the world, home to about 8% of the global biodiversity in about 2.4% of the world landmass. Managing this diversity is an enormous challenge and responsibility, increasingly made difficult due various prevailing threats and issues. Thus, to provide a conservation blanket on India's biodiversity, a legislation called Indian Wildlife (Protection) Act, 1972 came into force. This act is an umbrella legislation for wildlife enforcement in India.

After a year of the Wildlife (Protection) Act 1972, the Government of India had launched India's Project Tiger to protect the Tiger and preserve its landscape in 1973. The "Project Tiger", a pioneering conservation initiative of the Government of India, aims to harness this role of the tiger along with the tiger's charisma to garner resources and public support for conserving representative ecosystems. Securing natural systems along with their functions would ensure that their inherent values, goods and services are available for future generations of Indians. The Government of India has used the charismatic nature of the tiger to promote conservation of biodiversity, ecosystem functions, goods and services by launching Project Tiger in 1973. Initially, Project Tiger was conceived for six years, from April 1973 to March 1979. Its objective was "to ensure the maintenance of a viable population of the tiger in India and to preserve, for all times, such areas as part of our national heritage for the benefit, education and enjoyment of future generations".

After conceiving the Project Tiger, initially 9 Tiger Reserves had been setup in the country, *viz.* Manas, Palamau, Similipal, Corbett, Ranthambore, Kanha, Melghat, Bandipur and Sundarban Tiger Reserves. There are 3 phases of Project Tiger advised by Tiger Task Force, *viz.*, Phase One from



1972 to 1980; Phase Two from 1980 to 1990 and Phase Three from 1990 to 2000. Presently, the number of Tiger Reserves increased from 9 to 50 in the country. These 50 Tiger Reserves are spread in 18 States of the country covering 72,749 sqkm., which is 2.21% of the geographical area of our country.

Tiger Reserve Network in India is the best conservation model in the world, providing preeminent habitat for biodiversity conservation and human wellbeing. They are prime destinations for nature-based tourism due to their unique biological, natural, cultural features. In the South Asian context, particularly India, there is probably no greater flagship species for conservation than the tiger.

CONSTITUTION OF NATIONAL TIGER CONSERVATION AUTHORITY (NTCA)

1.3

Government of India has included the constitution of National Tiger Conservation Authority (NTCA) in the latest amendment of Wildlife (Protection) Act 1972, in 2006 as Chapter IV B. There are two remarkable inclusions made by Government of India with the amendment of Wildlife (Protection) Act, 1972 in 2006, *viz*, the constitution of NTCA and constitution of the Wildlife Crime Control Bureau. In December 2004, the nation was shocked to know that tigers may have disappeared from the Sariska Tiger Reserve in Rajasthan. What had happened there? The task of assessment of disappearance of Tigers from Sariska assigned to a high level committee called the Tiger Task Force which laid the detailed report 'Joining the Dots' (Project Tiger 2005). This tragedy also triggered the Govt. of India to establish the NTCA. Since then, the NTCA functions as a statutory body under the Ministry of Environment, Forest and Climate Change, Govt. of India for conservation and management of Tigers and Tiger habitats in the country.

EVALUATION OF TIGER RESERVES IN INDIA THROUGH MEE PROCESS

1.4

Survival of tigers is dependent on conservation and management efforts. To gauge the success of conservation efforts as well as to guide management inputs, it is important to assess the effectiveness of management of Tiger Reserves. The disappearance of tigers in Sariska Tiger Reserve may be looked upon as a tragedy, but we viewed it as an opportunity. After the Tiger crisis, the highest Office in the country that is the Prime Minister's Office (PMO), issued a directive to the Office of Comptroller and Auditor General (C&AG) of India and the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India to conduct an independent audit and place the report in the Parliament. On behalf of the MoEFCC, Wildlife Institute of India conducted a meeting with a high-level committee from the C&AG Office. In that meeting, it was realised that we need a separate kind of audit for our Tiger Reserves. With subsequent discussions, it was agreed to develop a kind of 'independent evaluation' procedure to evaluate Tiger Reserves of the country. Then with technical guidance of Australian experts, a management effectiveness evaluation (MEE) module was developed using the global IUCN World Commission of Protected Areas (WCPA) framework.

MEE Framework includes consideration of design issues, the adequacy and appropriateness of management systems and processes and the delivery of protected area objectives including conservation of values. Protected areas management effectiveness evaluation has been conducted in many countries using range of methodologies/ approaches emanating from the global MEE framework. These approaches vary considerably in their scale, depth, duration and data collection methods (Ervin, J. 2003). Evaluating and improving the effectiveness of protected area management has become a priority throughout the conservation community.

MANAGEMENT EFFECTIVENESS EVALUATIONS (MEE) PROCESS IN INDIA

1.5

India is amongst the selected countries in the world that have institutionalized the MEE Process. India had made a beginning in evaluating the management effectiveness of its World Heritage Sites, National Parks, Wildlife Sanctuaries and Tiger Reserves in 2006 (Mathur 2008). Three Natural World Heritage sites in South Asia, namely Keoladeo National Park, Rajasthan, Kaziranga National Park, Assam and Chitwan National Park, Nepal were evaluated in 2002-2007 as part of the IUCN-UNESCO 'Enhancing Our Heritage' project. The MEE of national parks and wildlife sanctuaries was initiated in 2006 and till 2018, 330 sites have been evaluated. Further the process of evaluation is ongoing for a list of 146 National Parks and Wildlife Sanctuaries in the country during 2018-19. This list also includes the 25 PAs, which were first evaluated in 2005-06, and now under repeat cycle of evaluation. Under India's Project Tiger, management effectiveness assessment of Tiger Reserves (TRs) was conducted, four repeat cycles of evaluation of Tiger Reserves Network have been made after every four years from 2006 to 2018 in India. This process is the most significant approach for tiger conservation and associated landscape connectivity conservation and management. First cycle included 28 TRs in 2006, second cycle included 39 TRs in 2010, third cycle included 43 TRs in 2014 and fourth cycle included 50 TRs in 2018. The abstract of MEE exercises conducted in India are given in Table 1.1.

Table 1.1: *Abstract of MEE Exercises conducted in India*

S. No.	Type of Approach	Application in India
1.	In-depth, Evidence based assessment WORLD HERITAGE SITES	03 World Heritage Sites (WHS) (2003-2008) Keoladeo WHS, Rajasthan, India Kaziranga WHS, Assam, India Chitwan WHS, Nepal
2.	Rapid Expert-based scorecard NATIONAL PARKS AND WILDLIFE SANCTUARIES	MEE of 125 PAs from 2006-2014: report published in 2015 MEE of 80 PAs in 2015-2017: report published in 2017 MEE of 125 PAs in 2017-18: report published in 2018 MEE of 146 PAs in 2018-19: initiated in October 2018
3.	Comprehensive system-wide, Peer-based assessment TIGER RESERVES NETWORK	MEE of 28 Tiger Reserves in 2006 MEE of 39 Tiger Reserves in 2010 MEE of 43 Tiger Reserves in 2014 MEE of 50 Tiger Reserves in 2018





Shantanu Sharma

PROCESS AND METHODOLOGY, 2018

2.1 Introduction

2.2 What is management effectiveness assessment?

2.3 Why do we need evaluation or/ and assessment?

2.4 The framework for assessing management effectiveness

2.5 Description of Tiger Reserves included in MEE Process 2018



2.6 Methodology of current MEE exercise for Tiger Reserves in India, 2018

2.7 Assessment criteria for Tiger Reserves in India, 2018

2.8 Score Card

2.9 Additional Criteria on Climate Change and Carbon Capture

02





PROCESS AND METHODOLOGY, 2018

Shantanu Sharma

INTRODUCTION

2.1

Protected Areas (PAs) are the cornerstone of most conservation strategies around the world as they are in India. So far, 2,36,204 terrestrial and inland water protected areas have been established worldwide, with terrestrial protected areas covering about 15% of global land and marine PAs covering almost 7% of the global ocean (UNEP-WCMC, IUCN and NGS 2018).

In India, under the Wildlife (Protection) Act, 1972, four legal categories of Protected Areas (PAs) have been recognised *viz*. National Parks, Wildlife Sanctuaries, Conservation Reserves and Community Reserves. Currently, there are 870 Protected Areas (104 National Parks, 551 Wildlife Sanctuaries, 88 Conservation Reserves and 127 Community Reserves) covering 165,158 sq. km. or 5.02% of the country's geographical area. Fifty Tiger Reserves have been notified which includes more than 90 National Parks and Wildlife Sanctuaries of the country. The Tiger Reserve notification is an additional layer of protection for PAs.

Assessing the effectiveness of management and using the results for adaptive management is at the core of good PA management. Assessments enable managers and stakeholders to reflect on their experience, allocate resources efficiently and plan for effective management in relation to potential threats and opportunities (Hockings et al. 2007). Evaluating the effectiveness of the management of these sites is one important way of ensuring that the investment of time and effort in establishing and managing PAs is delivering the benefits that society seeks.

WHAT IS MANAGEMENT EFFECTIVENESS ASSESSMENT

2.2

Assessment of management effectiveness has emerged as a key tool for PA managers and is increasingly being required by Governments and International Bodies. For example, the Convention on Biological Diversity (CBD) Programme of Work for Protected Areas calls on all State Parties to continue to expand and institutionalize management effectiveness assessments to work towards assessing 60% of the total area of PAs using various national and regional tools and report the results into the global database on management effectiveness maintained by the World Conservation Monitoring Centre of the United Nations Environment Programme (WCMC UNEP) (http://www.cbd.int/decision/cop/?id=12297). Evaluation of management effectiveness is generally carried out by assessing a series of criteria (represented by carefully selected indicators) against agreed objectives or standards.

Protected area (PA) management effectiveness evaluation (MEE) is defined as the assessment of how well PAs are being managed-primarily, whether they are protecting their values and achieving the goals and objectives agreed upon. The term 'management effectiveness' reflects three main themes of PA management:

- Design issues relating to both individual sites and PA systems
- The adequacy and appropriateness of management systems and processes
- Delivery of the objectives of PAs, including conservation of values.



WHY DO WE NEED EVALUATION OR/ AND ASSESSMENT?

2.3

Government of India included the constitution of National Tiger Conservation Authority (NTCA) in the latest amendment of Wildlife (Protection) Act 1972, in 2006 as Chapter IV B. There are two remarkable inclusions made by Government of India with the amendment of Wildlife (Protection) Act, 1972 in 2006, *viz*, the constitution of NTCA and constitution of the Wildlife Crime Control Bureau. In December 2004, the nation was shocked to know that tigers may have disappeared from the Sariska Tiger Reserve in Rajasthan. What had happened there? The task of assessment of disappearance of Tigers from Sariska assigned to a high level committee called the Tiger Task Force which laid the detailed report 'Joining the Dots' (Project Tiger 2005). This tragedy also triggered the Govt. of India to establish the NTCA. Since then, the NTCA functions as a statutory body under the Ministry of Environment, Forest and Climate Change, Govt. of India for conservation and management of Tigers and Tiger habitats in the country.

The need to evaluate PA management effectiveness has become increasingly well recognised internationally over the past one and a half decades. In both developed and developing countries it has been seen that declaration of PAs does not always result in adequate protection (Hockings and Phillips 1999, Hockings et al. 2000, Ervin 2003). Evaluation is necessary because PAs face many threats. However, evaluation is not simply a way of looking for problems; it is as important to identify when things are going well. Assessment of management effectiveness should include both issues within and/or beyond the control of individual managers. This approach facilitates a range of responses to threats and deficiencies in management, from site-based actions to broad political and policy reviews (Hockings et al. 2000).

There are many reasons why people want to assess management effectiveness (Hockings et al. 2000). These different purposes may require different assessment systems and varying degrees of detail. Funding bodies, policy makers and conservation lobbyists may use the results to highlight problems and to set priorities, or management agencies may use them to promote better management policies and practices. Managers may wish to use the results of evaluations to improve their performance or to report on achievements to senior managers, the Government or external stakeholders (Hockings et al. 2006). Local communities and other stakeholders, including civil society, need to establish how far their interests are being taken into account. The increased emphasis on evaluation is in part due to changes in society, especially the increased demand for accountability, transparency and demonstrated 'value for money' (Hockings et al. 2006).

Broadly speaking, MEE can:

- Enable and support an adaptive approach to management
- Assist in effective resource allocation
- Promote accountability and transparency
- Help involve the community and build constituencies
- Promote the values of PAs.

In addition to these substantive benefits, the process of assessing management effectiveness can also deliver a number of procedural benefits. Improved communication and cooperation between managers and other stakeholders is a common outcome of evaluation processes. Managers also have an opportunity to 'step back' from the day-to-day concerns of their jobs and consider the issues and challenges that they face in a new light. Many managers have commented that they have derived the major benefits during the process rather than from any formal report written at the end of the exercise (Hockings et al. 2006).

In practice, evaluation results are usually used in more than one way. Information used by managers to improve their own performance (adaptive management) can also be drawn on for reporting (accountability) or can be used to improve the way funds and other resources are allocated either within a single reserve or across a PA system (resource allocation). Whatever purposes it may serve, evaluation should be seen primarily as a tool to assist managers in their work, not as a system for watching and punishing managers for inadequate performance. Evaluation must be used positively to support managers and be seen as a normal part of the process of management. Nonetheless, funding agencies, NGOs and others have a legitimate right to know whether a PA is achieving its stated objectives, and it should be recognised that evaluation findings would inevitably also be used for advocacy. Recent experiences around the world have demonstrated that involving external stakeholders in the assessment process and transparent sharing of the results of assessment can help build cooperation and support for PAs (Hockings et al. 2006).

In recent years, there has been a growing concern amongst PA professionals and the public that many PAs are failing to achieve their objectives and, in some cases, are actually losing the values for which they were established (Hockings et al. 2008). As a result, improving the effectiveness of PA management has become a priority throughout the conservation community. One important step in this process is the carrying out of an assessment of the current status and management of the PA to understand better what is and what is not working, and to plan any necessary changes as efficiently as possible (Hockings et al. 2008).

However, assessments should not primarily be about reporting on or judging the managers and/or frontline staff (Mathur et al. 2011). As important as reporting requirements are, assessment of management effectiveness should primarily be used to assist managers to work as effectively as possible. Monitoring threats and activities affecting a PA and using the results to manage challenges, threats and pressures are increasingly being seen as being at the core of good site management (Mathur et al. 2011). Assessments help managers and stakeholders reflect on their experience, allocate resources efficiently and plan for effective management in relation to potential threats and opportunities (Hockings et al. 2008).



THE FRAMEWORK FOR ASSESSING MANAGEMENT EFFECTIVENESS

2.4

Evaluation of PA management effectiveness did not gain real momentum until after the issue was highlighted at the 1992 World Parks Congress, in Caracas, Venezuela. Since then, more than 40 methodologies have been developed and applied to the assessment of the management effectiveness of PAs (Leverington et al. 2008). International organisations, such as IUCN and the WCPA, the World Bank, the Global Environment Facility and NGOs such as WWF and the Nature Conservancy are working with PAs, have taken a lead in both promoting the importance of management effectiveness as an issue and in providing the technical development and support needed to underpin this effort.

The precise methodology used to assess effectiveness differs between PAs and depends on factors such as the time and resources available, the importance of the site, data quality and stakeholder pressures. The differing situations and needs for PAs thus, require different methods of assessment. As a result, a number of assessment tools have been developed to guide and record changes in management practices.

A uniform theme has been provided to these assessments by the IUCN World Commission on Protected Areas (WCPA) Framework for Assessing the Management Effectiveness of Protected Areas (see Figure 2.1 and Table 2.1 for more information), which aims both to give overall guidance in the development of assessment systems and to encourage basic standards for assessment and reporting.

The WCPA Framework for Assessing Management Effectiveness is a system for designing PA management effectiveness evaluations with six elements: context, planning, inputs, processes, outputs and outcomes. It is not a methodology but is a guide for developing assessment systems.

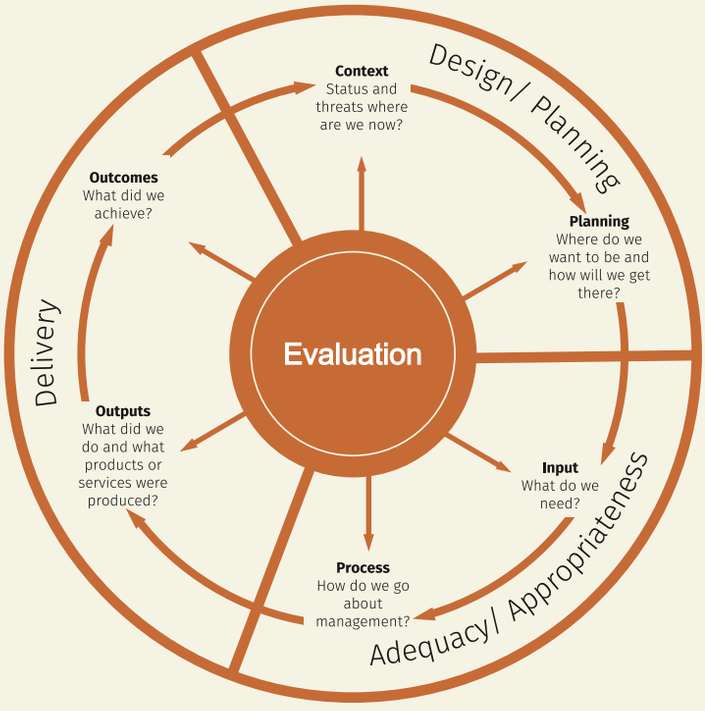


Figure 2.1: *The WCPA Framework for Assessing Management Effectiveness*

The WCPA Framework sees management as a process or cycle with six distinct stages, or elements:

- *It begins with establishing the context of existing values and threats,*
- *progresses through planning and*
- *allocation of resources (inputs)*
- *as a result of management actions (process) and*
- *eventually produces goods and services (outputs)*
- *that result in impacts or outcomes.*

Table 2.1. Summary of the WCPA Framework (Stolton et al. 2007)

Elements of evaluation	Explanation	Criteria that are assessed	Focus of evaluation
Context	Where are we now? Assessment of importance, threats and policy environment	• Significance • Threats • Vulnerability • National context • Partners	Status
Planning	Where do we want to be? Assessment of protected area design and planning	• Protected area legislation and policy • Protected area system design • Reserve design • Management planning	Appropriateness
Input	What do we need? Assessment of resources needed to carry out management	• Resourcing of agency • Resourcing of site	Resources
Processes	How do we go about it? Assessment of the way in which management is conducted	• Suitability of management processes	Efficiency and appropriateness
Outputs	What were the results? Assessment of the implementation of management programmes and actions; delivery of products and services	• Results of management actions • Services and products	Effectiveness
Outcomes	What did we achieve? Assessment of the outcomes and the extent to which they achieved objectives	• Impacts: effects of management in relation to objectives	Effectiveness and appropriateness

DESCRIPTION OF TIGER RESERVES INCLUDED IN MEE PROCESS, 2018

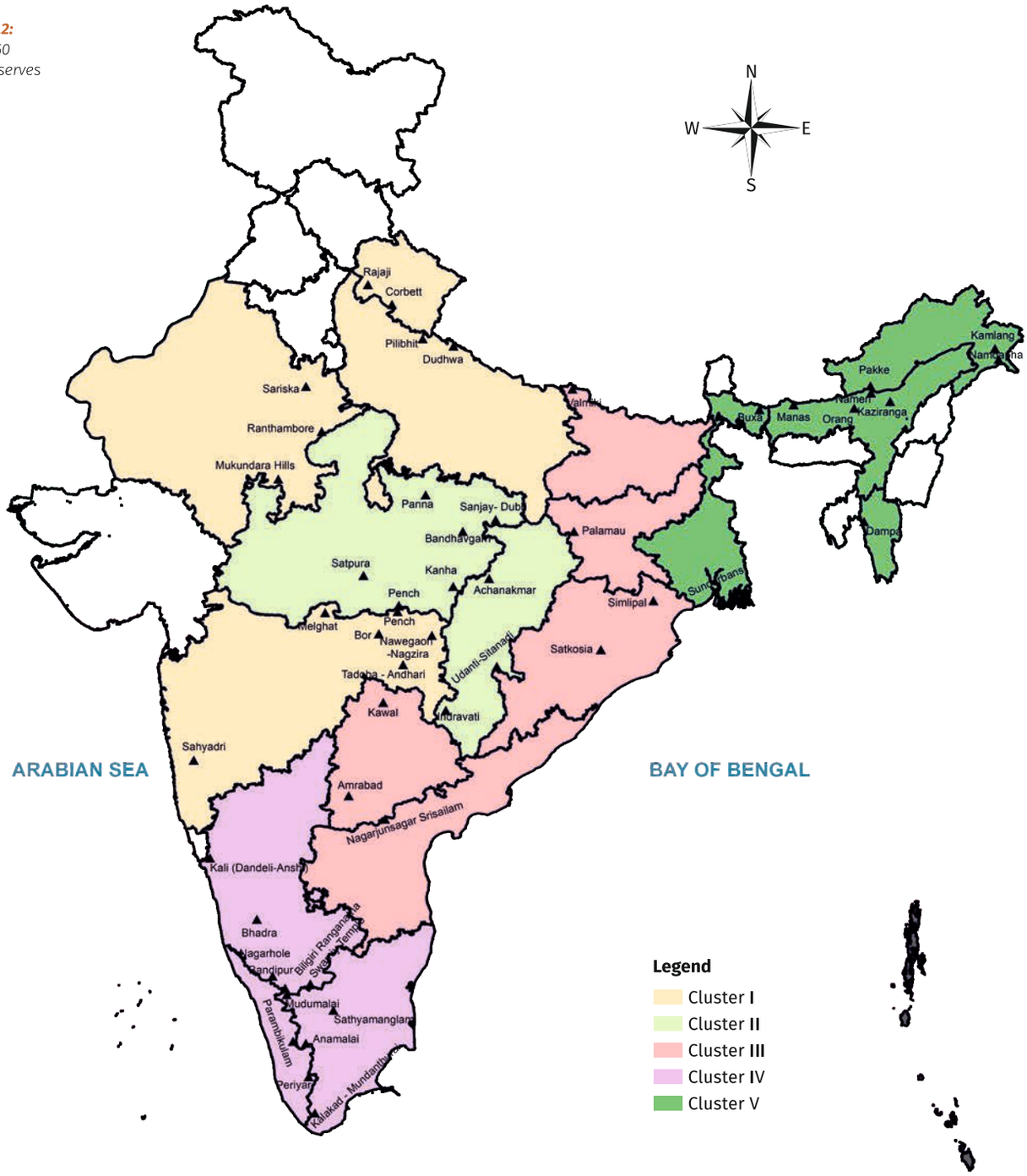
2.5

The present study made in 50 Tiger Reserves, covering a total of 72749.02 sq. km. area, of which 40145.30 sq. km. as core and 32603.72 sq. km. as buffer, spread in 18 States in India (https://projecttiger.nic.in) (Figure 2.2). The National Tiger Conservation Authority under Ministry of Environment, Forest and Climate Change, Government of India, setup in 2006, is a statutory body, who looks after the management and designation of Tiger Reserves in India. These Tiger Reserves includes all forms of biomes from temperate to tropical and all forms of habitats ranging from forestland, plateaus, grassland, marshland, wetlands and mangroves. These 50 Tiger Reserves were divided into five landscape clusters (Table 2.2) for management, conservation and evaluation. India is home to four Global Biodiversity Hotspots, among which 3 Hotspots includes 22 Tiger Reserves of the country (Table 2.3). All the Tiger Reserves are also recognised as



Important Bird Areas (IBAs) (Birdlife International 2005). UNESCO World Heritage Convention has recognized 8 Natural World Heritage Sites in India, among which 4 sites includes 14 Tiger Reserves of the country *viz.*, 11 Tiger Reserves of Cluster IV (as Western Ghats Natural World Site), 3 Tiger Reserves of Cluster V (as Manas and Kaziranga Tiger Reserves in Assam and Sundarban Tiger Reserve in West Bengal). India has established a network of 18 Biosphere Reserves under UNESCO Man and Biosphere Reserve Programme, among which 7 Biosphere Reserves are also the part of various Tiger Reserves (Table 2.4). Corbett is one of the oldest and first National Parks of the country established in 1936 as Hailey National Park is also included in Tiger Reserve Network evaluation exercise.

Figure 2.2:
Map of 50 Tiger Reserves in India



Disclaimer:
Based upon Survey of India Map with the permission of the Surveyor General of India

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Table 2.2: Landscape Clusters of Tiger Reserves

Cluster Number	Cluster Name	States & No. of Tiger Reserves	No. of Tiger Reserves	Name of the Tiger Reserves
I	Shivalik- Gangetic Plain Landscape Complex, Central Indian Landscape Complex, Eastern Ghats Landscape Complex and Western Ghats Landscape Complex	Uttar Pradesh (n=2), Uttarakhand (n=2), Maharashtra (n=6) and Rajasthan (n=3)	13	Dudhwa, Pilibhit, Corbett, Rajaji, Sariska, Ranthambhore, Mukundara Hills, Melghat, Pench, Tadoba-Andhari, Sahyadri, Bor and Nawegaon-Nagzira
II	Central Indian Landscape Complex and Eastern Ghats Landscape Complex	Madhya Pradesh (=6) and Chhattisgarh (n=3)	9	Bandhavgarh, Satpura, Kanha, Panna, Pench, Sanjay -Dubri, Udanti-Sitanadi, Indravati and Achanakmar
III	Shivalik- Gangetic Plain Landscape Complex, Central Indian Landscape Complex and Eastern Ghats Landscape Complex	Odisha (n=2), Bihar (n=1) Jharkhand (n=1), Andhra Pradesh (n=1) and Telangana (n=2)	7	Similipal, Satkosia, Valmiki, Palamau, Nagarjunasagar Srisailam, Kawal and Amrabad
IV	Western Ghats Landscape Complex	Karnataka (5), Kerala (n=2) and Tamil Nadu (n=4)	11	Bandipur, Nagarhole, Bhadra, Biligiri Ranganatha Swamy Temple, Kali (Dandeli-Anshi), Periyar, Parambikulam, Sathyamangalam, Mudumalai, Anamalai and Kalakad-Mundanthurai
V	North-eastern Mountains and Brahmaputra Floodplains	Assam (n=4), Arunachal Pradesh (n=3), West Bengal (n=2) and Mizoram (n=1)	10	Orang, Nameri, Manas, Kaziranga, Pakke, Namdapha, Kamlang, Buxa, Sundarbans and Dampa
	Total	**5 Clusters**	**18 States**	**50 Tiger Reserves**

Table 2.3: List of Tiger Reserves and Global Biodiversity Hotspots

Name of Global Biodiversity Hotspot	Name of Tiger Reserves
1. The Himalaya	1. Corbett, 2. Rajaji
2.The Western Ghats	3. Sahyadri, 4. Bandipur, 5. Nagarhole, 6. Bhadra, 7. Biligiri Ranganatha Swamy Temple, 8. Kali (Dandeli-Anshi), 9. Periyar, 10. Parambikulam, 11. Sathyamangalam, 12. Mudumalai, 13. Anamalai and 14. Kalakad-Mundanthurai
3. The Northeast	15. Orang, 16. Nameri, 17. Manas, 18. Kaziranga, 19. Pakke, 20. Namdapha, 21. Kamlang and 22. Dampa



Table 2.4: *List of Tiger Reserves also designated as Biosphere Reserve*

S. No.	Name of Tiger Reserve Cluster	Name of associated Biosphere Reserve	Location (States)
1.	Western Ghats Tiger Reserves	Nilgiri	Part of Wayanad, Nagarhole, Bandipur and Mudumalai, Nilambur, Silent Valley and Siruvani hills (Tamil Nadu, Kerala and Karnataka).
2.	Manas Tiger Reserve	Manas	Part of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamprup and Darang districts (Assam).
3.	Sundarban Tiger Reserve	Sundarbans	Part of delta of Ganges and Brahamaputra river systems (West Bengal).
4.	Similipal Tiger Reserve	Simlipal	Part of Mayurbhanj district (Odisha).
5.	Achanakmar Tiger Reserve	Achanakamar - Amarkantak	Covers parts of Anupur and Dindori districts of Madhya Pradesh and parts of Bilaspur districts of Chhattisgarh State.
6.	Panna Tiger Reserve	Panna	Part of Panna and Chhattarpur districts in Madhya Pradesh.

METHODOLOGY OF CURRENT MEE EXERCISE FOR TIGER RESERVES IN INDIA, 2018

2.6

The precise methodology used to assess effectiveness differs between PAs and depends on factors such as the time and resources available, the importance of the site, data quality and stakeholder pressures. Over the several years, numerous assessment systems have been developed, most based at least to some extent on the WCPA Framework. WCPA Framework is not a methodology but is a guide for developing assessment systems. They vary from simple questionnaire-type approaches suitable for individual PAs, through workshop-style approaches aimed at whole PA systems, to detailed monitoring systems. The approach described here is a fairly detailed monitoring and evaluation system, suitable for sites of particular importance (Hockings et al. 2008).

The detailed monitoring system has been developed based on the six elements of WCPA Framework. A total of 32 'Headline Indicators' have been customized suitable in Indian context of evaluation, Context (5 indicators), Planning (7 indicators), Input (5 indicators), Process (6 indicators), Outputs (4 indicators) and Outcomes (5 indicators) (Table 2.5). Considering the growing importance of addressing issues relating to climate change, carbon capture, preventing carbon loss and encouraging further carbon capture in TRs, two additional criteria were developed. These criteria have not been included in the formal process of MEE of TRs, but the information gathered will be used to sensitize the conservation community about the significance of these issues and to plan the next steps for addressing them. Each 'Headline Indicator' had four possible answers, 'poor', 'fair', 'good' and 'very good'. The evaluation team was only allowed to choose one answer and each answer was assigned a score from 2.5 to 10, a score of 2.5 represented the worst management effectiveness and rated as 'poor'; a

score of 5 represented average management effectiveness and rated as 'fair'; a score of 7.5 represented the below optimal management effectiveness and rated as 'good', whereas a score of 10 represented the optimal management effectiveness and rated as 'very good'. The scores of all 32 'Headline Indicators' pooled together for 50 Tiger Reserves and a percentage rating has been calculated for each Tiger Reserve as per actual performance of evaluation. This interpretation classifies the results into four categories based on the percentage of maximum possible score: <=40% rated as 'Poor'; 41-59% rated as 'Fair'; 60-74% rated as 'Good'; >=75 rated as 'Very Good'.

Table 2.5: *Summary of assessment criteria for MEE of Tiger Reserves in India*

Elements Name	Overall Theme	Element No.	Headline Indicators
Context	Status	1.1	Identification of values
		1.2	Assessment of threats
		1.3	Biotic interference in Core Area
		1.4	Compliance of statutory requirements
		1.5	Unified control under Field Director
Planning	Appropriateness	2.1	Tiger Conservation Plan
		2.2	Safeguarding of biodiversity values
		2.3	Stakeholder participation
		2.4	Habitat restoration
		2.5	Effective protection strategy
		2.6	Mitigation of human-wildlife conflicts
		2.7	Integration of landscape
Input	Resources	3.1	Adequacy of manpower deployment
		3.2	Adequacy of physical infrastructure
		3.3	Adequacy of Central Government Funding
		3.4	Adequacy of State Government Funding
		3.5	NGO resource contribution
Process	Efficiency and appropriateness	4.1	Adequacy of trained manpower resources
		4.2	Frontline Staff Performance Evaluation
		4.3	Effectiveness of Public Participation
		4.4	Process of complaint handling
		4.5	Livelihood support to local communities
		4.6	Village relocation planning
Outputs	Effectiveness	5.1	Dissemination of information to Public
		5.2	Management of visitor facilities
		5.3	Evaluation of research/monitoring trends
		5.4	Adequacy of infrastructure maintenance & funds
Outcomes	Effectiveness and appropriateness	6.1	Population trends of endangered species
		6.2	Population trends of tiger
		6.3	Threat abatement
		6.4	Appropriateness of Visitor management
		6.5	Local Community support
Assessment Criteria for addressing issues relating to Climate Change & Carbon capture in the Tiger Reserves		1.	Additional Criteria on Climate Change: Is the TR being consciously managed to adapt to climate change?
		2.	Additional Criteria on Climate Change: Is the TR being consciously managed to prevent carbon loss and to encourage further carbon capture?



In the beginning of the evaluation process, the five independent regional expert committees (REC) were constituted for 5 different clusters in five landscapes to cover the evaluation of 50 Tiger Reserves of the country and ensure the credibility of MEE exercise (Table 2.6). Each team comprises a Chairman and 2 Members having experience for more than 10-20 years especially in the field of Tiger Reserve Management. Each team also comprised of one faculty member from Wildlife Institute of India (WII) to provide the technical backstopping to the MEE process (Table 2.6). After constitution of committee, an inception workshop had been organized to explain the MEE process and to discuss the course of action for field visit for evaluation. After this workshop, each team was assigned a certain number of Tiger Reserves to conduct field visit. Each team conducted field visit for 4 days to each Tiger Reserve, which included the interaction with the Field Director and frontline staff, meeting with various stakeholders, discussion with dependent local communities, perusal of official records and documents etc. After completing the field visit, each team had to sent a detailed report based on 32 'Headline Indicators' and brief summary of assessment in 3 heads, a) Management Strengths, b) Management Weaknesses and c) Immediate Actionable Points. The reports sent by the MEE team had also been subjected to review internally by in-house experts on Tiger Reserve Management in the country. After the preparation of draft final report, an interaction meeting had been organized to discuss the outcomes between the Field Directors of Tiger Reserve and MEE team. At the end, a dissemination workshop was organized to announce the results in the public domain.

The detailed filled in questionnaire and report card filled for each Tiger Reserve in specific MEE Assessment Criteria Form for 50 Tiger Reserve is included in a CD enclosed with this report. The brief summary report or Chairman's report for each Tiger Reserve written in 3 heads, management strengths, management weaknesses and immediate actionable points are presented in chapter 4 of this report.

Table 2.6: *The Independent Regional Expert Committee for MEE of Fourth Cycle of Tiger Reserves in India, 2018*

Landscape Cluster	Chairperson	Member	WII Faculty Member
I	Shri Suhas Kumar, IFS, Former PCCF, Govt. of Madhya Pradesh	Dr. Samir K. Sinha Coordinator and Regional Head, Wildlife Trust of India, Noida	Dr. A.K. Bhardwaj, IFS, Former PCCF (HoFF) & CWLW Kerala and Senior Professional Fellow WII/ Shri Vinod DK, IFS, Scientist D, on deputation to UNESCO C2C, WII
II	Shri Yogesh, IFS, Former PCCF and CWLW Govt. of Arunachal Pradesh	Dr. Dipankar Ghose, Director, Species and Landscapes Division, WWF-India	Shri Ajay Srivastav, IFS, On deputation, Scientist G, WII
III	Shri R.N. Mehrotra, IFS, Former PCCF and HoFF, Government of Rajasthan	Dr. Joseph Vattakaven Consultant WWF-Tigers Alive Initiative/ Shri Prasanjeet Navgire, Law & Enforcement Officer, Wildlife Conservation Trust, Mumbai	Dr. Manoj Nair, IFS, on deputation, Scientist-F, UNESCO C2C, WII/ Dr. Nasim Ahmad Ansari, Project Scientist, WII
IV	Shri B.K. Patnaik, IFS, Former PCCF(WL) and CWLW, Government of Odisha	Dr. Rathin Barman, Deputy Director, Wildlife Trust of India	Dr. Sonali Ghosh, IFS, Deputy Director, Ministry of Drinking Water and Sanitation/ Shri Salvador Lyngdoh, Scientist- D, WII
V	Shri B.K. Singh, IFS, Former PCCF and HoFF Government of Karnataka	Dr. Yashveer Bhatnagar, Scientist, Nature Conservation Foundation, Karnataka/ Dr. D.S. Srivastava, Former Professor, Patna University, Patna	Dr. Pratap Singh, IFS, on deputation, Scientist-G, WII

For assessment of each of the six elements of the MEE framework, 32 criteria (headline indicators) were identified. Explanatory notes, wherever needed, were provided to guide the assessment process. The scores, along with observations (remarks), provide a better understanding of the situation in the field.

ASSESSMENT CRITERIA FOR TIGER RESERVES IN INDIA, 2018

2.7

CONTEXT

1.1

Are the values of the TR well documented, assessed and monitored?*

Assessment criteria+

Condition	*Category**	*(Tick ✓)*	*Reference document(s)*	*Remarks*
Values not systematically documented, assessed and monitored.	Poor			
Values generally identified but not systematically assessed and monitored	Fair			
Most values systematically identified, assessed and monitored.	Good			
All values systematically identified, assessed and monitored.	Very good			

+Values would also include geo-morphological historico-cultural, faunal and floral species.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

1.2

Are the threats to TR values well documented and assessed?*

Assessment criteria+

Condition	*Category**	*(Tick ✓)*	*Reference document(s)*	*Remarks*
Values not systematically documented, or assessed.	Poor			
Threats generally identified but not systematically assessed.	Fair			
Most threats systematically identified and assessed.	Good			
All threats systematically identified and assessed.	Very good			

+This assessment should be based on number, nature and extent of threats

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*



1.3

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
The 'Core Area' has extensive human and biotic interference.	Poor			
The 'Core Area' has some human and biotic interference.	Fair			
The 'Core Area' has little human and biotic interference.	Good			
The 'Core Area' has no human and biotic interference.	Very good			

Is the 'Core Area' of TR free from human and biotic interference?

+This assessment should be based on existence and the efforts made by TR management to address issues related to human settlements/ villages inside the core area; livestock grazing, cultivation, encroachments etc, resource extraction/ livelihood dependence of local communities and should reflect the overall interference due to all the above factors.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

1.4

Assessment criteria

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
None of the four SR, no compliance of Tripartite MoU and seven SOPs met	Poor			
Two of the four SR, 50% conditions of the Tripartite MoU and SOPs complied	Fair			
Three of the four SR, 75% conditions of the Tri-partite MoU and SOPs complied	Good			
All four SR, 100% conditions of the Tripartite MoU and SOPs complied	Very good			

Has the TR complied with the four Statutory+ Requirements (SR) along with Tripartite MoU and all (seven) Standard Operation Procedures (SOP)?

+Statutory requirements are (1) Legal delineation and notification of Core and Buffer Areas; (2) Establishment of Tiger Conservation Foundation; (3) Development of a Tiger Conservation Plan; and (4) Constitution of a State-level Steering Committee under the Chairmanship of the Chief Minister. TA refers agreement between Field Director, State Government and NTCA. The 7 SOPs are on (i) Straying of Tiger in human dominated landscape, (ii) Tiger Mortality and (iii) Disposal of Carcasses, (iv) Dealing with orphaned/abandoned tiger cubs and old injured/tigers, (v) Active Management towards rehabilitation of tigers from source areas at the landscape level, (vi) Dealing with tiger depredation on livestock and (vii) Interstate Coordination for Interstate TR. Interstate SOP (SOP No. vii) may not applicable to all Tiger Reserves and the team needs to assess accordingly.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

1.5

Assessment criteria

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Management of Core and Buffer of the TR are under different management	Poor			
Management of Core is under Field Director of TR but Buffer is under partial control	Fair			
Management of Core and Buffer is under full administrative control of the Field Director of TR	Good			
Management of Core and Buffer is under full administrative and financial control of the Field Director of TR	Very good			

Is the 'Core' and 'Buffer' of the Tiger Reserve under unified management of Field Director?

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

PLANNING

2.1

Assessment criteria

Status of Tiger Conservation Plan (TCP) +?

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
No TCP in place.	Poor			
TCP is under preparation	Fair			
TR has a relevant TCP	Good			
TR has a comprehensive and relevant TCP, duly approved by the NTCA	Very good			

+The scientific content and the participatory processes used in preparation of the TCP will be taken into account in assessing the quality of TCP.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

2.2

Assessment criteria+

Does the TR safeguards the threatened biodiversity values?

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
TR does not safeguard the threatened biodiversity values.	Poor			
TR safeguards a few threatened biodiversity values.	Fair			
TR safeguards a large number of threatened biodiversity values.	Good			
TR safeguards all threatened biodiversity values.	Very good			

+Remarks need to elaborate on the kind of safeguards and how they work or are intended to work

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

2.3

Assessment criteria+

Are stakeholders given an opportunity to participate in planning process?

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Little, if any opportunity for stakeholder participation in planning.	Poor			
Stakeholders participate in some planning.	Fair			
Stakeholders participate in most planning processes.	Good			
Stakeholders routinely and systematically participate in all planning processes.	Very good			

+The result of participation must show in the field and not merely reported as a routine exercise.

Score : 2.5; Fair: 5; Good: 7.5; Very Good: 10



2.4

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Habitat management programmes are entirely adhoc.	Poor			
Limited planning and monitoring programmes are in place for habitat management.	Fair			
Habitat management programmes are generally planned and monitored.	Good			
Habitat management programmes are thoroughly planned and monitored.	Very good			

Are habitat management programmes systematically planned, relevant and monitored, and contribute effectively to Tiger and other endangered species conservation?

+This assessment should be primarily based on habitat management programmes in relation to habitats for species that are threatened (IUCN categories), are habitat specialists, subjected to seasonal movements, wide ranging with emphasis on the breeding and rearing habitat and may include factors such as food, water, shelter (all connotations). Habitat structure, composition, unique patches of vegetation and sensitive sites, sources of water and their distribution are integral. Corridors within buffer zone are critically important. For example, all riparian habitats. Have these been addressed? Is their a planning process in place? The management practices dealing with invasive species such as Lantana sp., Mikania sp. etc. would be examined.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

2.5

Assessment criteria

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
TR has little or no PS and SA.	Poor			
TR has an adhoc PS and SA.	Fair			
TR has a generally relevant PS and SA but is not very effective.	Good			
TR has a comprehensive and very effective PS and SA.	Very good			

Does the TR has an effective Protection Strategy (PS)+ and Security Plan and Security Audit (SA) in place?

+This assessment takes inter-alia into account the nature of threats, the number and location of patrolling camps and foot and mobile patrolling, needs that relate to available manpower, terrain difficulties, practicability of area coverage, readiness to contain specific threats with necessary support and facilities. The constitution and functioning of Special Tiger Protection Force (STPF), Number of offences reported, arrests made, prosecution initiated and conviction achieved will be taken into account.

**Score: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

2.6

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Human-wildlife conflicts are significant but poorly addressed.	Poor			
TR has been able to mitigate few human-wildlife conflicts.	Fair			
TR has been able to mitigate many human-wildlife conflicts.	Good			
TR has been effective in mitigating all human-wildlife conflicts.	Very good			

Has the TR been effective in the mitigation of human-wildlife conflicts?

+The assessment will take into account the number of incidences reported and payment of compensation made and its timeliness.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

2.7

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
TR not integrated into a wider network/ landscape.	Poor			
Some limited attempts to integrate the TR into a network/ landscape.	Fair			
TR is generally quite well integrated into a network/ landscape.	Good			
TR is fully integrated into a wider network/ landscape.	Very good			

Is the TR integrated into a wider ecological network/ landscape following the principles of the ecosystem approach?

+Assessment needs to consider the scope of opportunities on the landscape scale that exist. Consider whether any attempts have been made and what are these? Have all the important corridors been identified? What actions are planned/implemented for their security? Have the Forest Working Plans and Forest Development Corporation Plans within the identified landscapes taken cognizance of such new requirement? These should have been reflected in TCPs. Is there is any effort to rationalize landuse around TR? Is any effort being made to plan and use 'Smart Green Infrastructure'?

** Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

INPUT

3.1

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Few, personnel explicitly allocated but poorly supported for TR management.	Poor			
Some personnel explicitly allocated for TR management but not adequately supported and systematically linked to management objectives.	Fair			
Somepersonnel with fair support explicitly allocated towards achievement of specific TR management objectives.	Good			
Adequate personnel appropriately supported and explicitly allocated towards achievement of specific TR management objectives.	Very good			

Are personnel adequate, well organized and deployed with access to adequate resources in the Tiger Reserve (TR)?*

+This assessment should inter-alia be based on number of personnel allocated for attainment of TR objectives at the Range , Round, Beat and Patrolling camps levels or as relevant to the needs (sanctioned posts vis- a- vis existing personnel and needs beyond the sanctioned strengths. It is possible that posts have last been sanctioned several years back that do not now account for the current needs)

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*



3.2

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Few, if any, resources explicitly allocated for TR management.	Poor			
Some resources explicitly allocated for TR management but not systematically linked to management objectives.	Fair			
Some resources explicitly allocated towards achievement of specific TR management objectives.	Good			
Adequate resources explicitly allocated towards achievement of specific TR management objectives.	Very good			

Are resources (vehicle, equipment, building etc.) adequate, well organized and managed with desired access?

+ These form a variety of resources. These may be segregated into immovable (structures) and movable categories and each further may be considered under the essential and desirable categories. It is best to start with what are the minimum needs to attain each objective, what is available and manner of use/deployment. The proportions of the 'essentials' and 'desirables' along the importance gradient of objectives would serve as pointers for score categories. Specific remarks would be vitally important.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

3.3

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Resource allocation is adhoc, funds are inadequate and seldom released in time and not utilized.	Poor			
Some specific allocation for management of priority action. Funds are inadequate and there is some delay in release, partially utilized.	Fair			
Comprehensive planning and allocation that meets the most important objectives. Generally funds released with not much delay and mostly utilized.	Good			
Comprehensive planning and allocation of resources for attainment of most objectives. Funds generally released on-time and are fully utilized.	Very good			

Are financial resources other than those of the State linked to priority actions and are funds adequate, released timely and utilized?

+Obtain details of funds released by NTCA and their utilization by TR in the last 3 years and indicate them under 'Remarks'. This should also include Tiger Conservation Foundation. Further comment on the problems associated with fund allocations and their utilization too.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

3.4

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Resource allocation is adhoc, funds are inadequate and seldom released in time and not utilized.	Poor			
Some specific allocation for management of priority action. Funds are inadequate and there is some delay in release, partially utilized.	Fair			
Comprehensive planning and allocation that meets the most important objectives. Generally funds released with not much delay and mostly utilized.	Good			
Comprehensive planning and allocation of resources for attainment of most objectives. Funds generally released on-time and are fully utilized.	Very good			

Are financial resources from the State linked to priority action and funds adequate, timely released and utilized for the management of Tiger Reserve?

+Obtain details of funds released by State and their utilization by TR in the last 3 years and indicate them under 'Remarks'. Also comment on the problems associated with fund allocation and their utilization.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

3.5

Assessment criteria

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
NGOs contribute nothing for the management of the TR.	Poor			
NGOs make some contribution to management of the TR but opportunities for collaboration are not systematically explored.	Fair			
NGOs contributions are systematically sought and negotiated for the management of some TR level activities.	Good			
NGOs contributions are systematically sought and negotiated for the management of many TR level activities.	Very good			

What level of resources are provided by NGOs?

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*



PROCESS

4.1

Does the TR have manpower resources trained in wildlife conservation for effective TR management?

Assessment criteria+

Condition	*Category**	*(Tick ✓)*	*Reference document(s)*	*Remarks*
No trained officers and frontline staff in the TR.	Poor			
Some trained officers and few trained frontline staff, posted in the TR.	Fair			
All trained officers and and fair number of trained frontline staff posted in the TR.	Good			
All trained officers and most of the trained frontline staff is posted in the TR.	Very good			

+Indicate % of trained staff in various categories such as Diploma, Certificate Course, Vertical Integration training, MoEFCC sponsored trainings in wildlife management etc . The number and thematic areas of the 'Internal Training' programmes organized in the TR in the last 3 years may be taken into account. Has the TR prepared a 'Staff Development Plan'? Is it being implemented?

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

4.2

Is TR staff management performance linked to achievement of management objectives?

Assessment criteria

Condition	*Category**	*(Tick ✓)*	*Reference document(s)*	*Remarks*
No linkage between staff management performance and management objectives.	Poor			
Some linkage between staff management performance and management objectives, but not consistently or systematically assessed.	Fair			
Management performance for most staff is directly linked to achievement of relevant management objectives.	Good			
Management performance of all staff is directly linked to achievement of relevant management objectives.	Very good			

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

4.3

Is there effective public participation in TR management+ and does it show in making a difference?

Assessment criteria+

Condition	*Category**	*(Tick ✓)*	*Reference document(s)*	*Remarks*
Little or no public participation in TR management.	Poor			
Opportunistic public participation in some of the relevant aspects of TR management.	Fair			
Systematic public participation in most of the relevant aspects of TR management.	Good			
Comprehensive and systematic public participation in all important and relevant aspects of TR management.	Very good			

+The involvement of NGOs/ NGIs in population estimation may be taken into account)

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

4.4

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Ad-hoc approach to handling complaints.	Poor			
Complaints handling system operational but not responsive to individual issues and with limited follow up.	Fair			
Coordinated system logs and responds effectively to most complaints.	Good			
All complaints systematically logged in coordinated system and timely response provided with minimal repeat complaints.	Very good			

Is there a responsive system for handling complaints and comments+ about TR management?

+Does the TR maintains 'Suggestions Register'? What actions are taken to deal with suggestions?

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

4.5

Assessment criteria

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
No livelihood issues are addressed by TR management.	Poor			
Few livelihood issues are addressed by TR management.	Fair			
Substantial livelihood issues are addressed by TR management.	Good			
Livelihood issues of resource dependent communities especially of women are addressed effectively by TR managers.	Very good			

Does TR management addresses the livelihood issues+ of resource dependent communities, especially of women?

+The number of mandays generated in the last 3 years may be taken into account. Are funds received from District Agencies and other sources? Provide details of funds received in last 3 years.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

4.6

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
No planning and no implementation.	Poor			
Plans have been made but no implementation.	Fair			
Plans have been made and some implementation is in progress	Good			
Plans have been made and are being actively implemented/ no human habitation in the CTH	Very good			

Has the TR planned and implemented the voluntary 'Village Relocation' from the Core/ Critical Tiger Habitat (CTH)?

+Assessment will look into the village relocation planning process including availability of manpower, financial resources and NGO support, if any. Is there a mechanism to address the complaints received in respect of relocation process? Effort must be made to assess post-relocation success or otherwise.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*



OUTPUT

5.1

Is adequate information on TR management publicly available?

Assessment criteria

Condition	*Category**	*(Tick ✓)*	*Reference document(s)*	*Remarks*
Little or no information on TR management publicly available.	Poor			
Publicly available information is general and has limited relevance to management accountability and the condition of public assets.	Fair			
Publicly available information provides detailed insight into major management issues and condition of public assets.	Good			
Comprehensive reports are routinely available in public domain on management and condition of public assets.	Very good			

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

5.2

Are visitor services and facilities appropriate and adequate?

Assessment criteria+

Condition	*Category**	*(Tick ✓)*	*Reference document(s)*	*Remarks*
Visitor services and facilities do not exist.	Poor			
Visitor services and facilities are very basic.	Fair			
Visitor services and facilities are monitored from time to time and are fairly effective.	Good			
Visitor services and facilities are conscientiously maintained, regularly upgraded and monitored for visitor satisfaction	Very good			

+Include the existence and quality of visitor and interpretation centers, including skills and capabilities of personnel manning these, TR related publications, films, videos; arrangements of stay (including places serving refreshments and food owned and managed by TR), watch towers and hides including safety factors, vehicles assigned for visitors including riding elephants, if any and their deployment, drinking water, rest rooms, garbage disposal, attended and self guided services in the field, visitor feed back on the quality of wilderness experience.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

5.3

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Little or no systematic evaluation or routine reporting of trends.	Poor			
Some evaluation and reporting undertaken but neither systematic nor routine.	Fair			
Systematic evaluation following phase IV guidelines and routine reporting of trends undertaken.	Good			
Systematic evaluation following phase IV guidelines and comprehensive reporting of trends undertaken and attempts made at course corrections as relevant.	Very good			

Are research/ monitoring related trends systematically evaluated and routinely reported and used to improve management?

+Not all TRs attract projects and researchers and with exceptions, little research takes place on the TRs own steam because of systemic limitations. However, monitoring of some critical issues is expected e.g. population of tiger, co-predators and prey with insights into their demography and distribution (some opportunistic sampling by sightings, signs and spatial distribution during assessment would be extremely useful in terms of expert impression and as a pulse), monitoring incidence of livestock grazing, fires, weeds, sources of water, a variety of illegal activities typically associated with the reserve, wildlife health (e.g. epidemics, immunization of livestock) regeneration and change in vegetation, visitors and their activities, offence cases, ex-gratia payments etc. Efforts must be made to assess the planning and implementation of Phase-IV monitoring protocols and the success of implementation of M-STrIPES (wherever applicable). Are the 'Sykes and Horill' monitoring plots maintained and data analyzed?

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

5.4

Assessment criteria

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
No systematic inventory or maintenance schedule.	Poor			
Inventory maintenance is adhoc and so is the maintenance schedule.	Fair			
Systematic inventory provides the basis for maintenance schedule but funds are inadequate.	Good			
Systematic inventory provides the basis for maintenance schedule and adequate funds are made available.	Very good			

Is there a systematic maintenance schedule and funds in place for management of infrastructure/ assets?

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*



OUTCOMES

6.1

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Populations of key threatened/ endangered species are declining.	Poor			
Some threatened/ endangered species populations declining, some are increasing, most others are stable.	Fair			
Several threatened/ endangered species populations increasing, most others are stable.	Good			
All threatened/ endangered species populations either increasing or stable.	Very good			

Are populations of threatened species declining, stable or increasing?

+This needs to practically relate to the natural ecosystem potential rather than being driven merely by numbers and visibility. The assessment score may be elaborated under remarks.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

6.2

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Population of tiger is showing a declining trend	Poor			
Population of tiger is showing a declining trend and the reason is identified and options to reverse are in place	Fair			
Population of tiger is showing a stable trend but below carrying capacity	Good			
Population of tiger is stable at carrying capacity or showing an increasing trend and surrounding landscape, core area addresses tiger dispersal appropriately	Very good			

Is the population of tigers showing a declining, stable or increasing trend?

+This assessment should be based in the context of available population estimate (2014-15) and the outcomes of the currently ongoing Phase-IV analyses.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

6.3

Assessment criteria+

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Threats to the TR have not abated but have enhanced.	Poor			
Some threats to the TR have abated, others continue their presence	Fair			
Most threats to the TR have abated. The few remaining are vigorously being addressed.	Good			
All threats to the TR have been effectively contained and an efficient system is in place to deal with any emerging situation	Very good			

Have the threats+ to the TR being reduced/ minimized? Or is there an increase?

+Does the TR has a Disaster Risk Management Plan to deal with existing as well as emerging threats?

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

6.4

Assessment criteria+

Is visitor management+ appropriate?

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Tourism management is entirely adhoc.	Poor			
Tourism management and monitoring programmes are described in plan but poorly implemented.	Fair			
Tourism management plan is good and well monitored.	Good			
Tourism management plan is good and well monitored with innovative ways of engaging and educating tourists.	Very good			

+Visitor management followed NTCA guidelines of evaluation of carrying capacity for tourism

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

6.5

Assessment criteria+

Are local communities supportive of TR management?

Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
Local communities are hostile.	Poor			
Some are supportive.	Fair			
Most locals are supportive of TR management.	Good			
All local communities supportive of TR management.	Very good			

+There could be many reasons for disenchantment. It could be real because of managerial neglect or the managerial efforts could be appropriate but there could be local elements/organizations who would like to keep the disaffectation simmering for their own ulterior motives. Likewise success could be entirely because of the efforts of managers or they might be fortunate in striking partnerships with credible NGOs. Assessment may take the prevailing causes into account.

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*



SCORE CARD

2.8

*Score Card**

Framework Element Number	*Framework Element Name*	*Number of Criteria (a)*	*Maximum Mark per question (b)*	*Total (a x b)*	*Marks obtained for the Element*	*Overall MEE Score and % age*
1.	Context	05	10	50		
2.	Planning	07	10	70		
3.	Inputs	05	10	50		
4.	Process	06	10	60		
5.	Outputs	04	10	40		
6.	Outcomes	05	10	50		
	Total	32		320		

**Efforts will be made by the NTCA-WII-MEE Team to address the issue of assigning 'differential' weightages to the 32 Assessment Criteria including 'normalization'.*



R.N. Mehrotra

ADDITIONAL CRITERIA ON CLIMATE CHANGE AND CARBON CAPTURE

2.9

Considering the growing importance of addressing issues relating to climate change, carbon capture, preventing carbon loss and encouraging further carbon capture in TRs, two additional criteria were developed. These criteria have not been included in the formal process of MEE of TRs, but the information gathered will be used to sensitize the conservation community about the significance of these issues and to plan the next steps for addressing them.

Table : 2.7 *Assessment Criteria for addressing issues relating to Climate Change & Carbon capture in the Tiger Reserves (TRs)*

1. Is the TR being consciously managed to adapt to climate change?

Condition	*Category**	*(Tick ✓)*	*Comment/ Explanation*	*Next Steps*
There have been no efforts to consider adaptation to climate change in management	Poor			
Some initial thought has taken place about likely impacts of climate change, but this has yet to be translated into management plans	Fair			
Detailed plans have been drawn up about how to adapt management to predicted climate change, but these have yet to be translated into active management.	Good			
Detailed plans have been drawn up about how to adapt management to predicted climate change, and these are already being implemented	Very good			

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

2. Is the TR being consciously managed to prevent carbon loss and to encourage further carbon capture?

Condition	*Category**	*(Tick ✓)*	*Comment/ Explanation*	*Next Steps*
Carbon storage and carbon dioxide capture have not been considered in management of the TR	Poor			
Carbon storage and carbon dioxide capture have been considered in general terms, but has not yet been significantly reflected in management	Fair			
There are active measures in place to reduce carbon loss from the TR, but no conscious measures to increase carbon dioxide capture	Good			
There are active measures in place both to reduce carbon loss from the TR and to increase carbon dioxide capture.	Very good			

**Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*





Jeffrey Eisen Yju

RESULTS AND OUTCOMES, 2018

3.1 Overall results of MEE of Fourth Cycle of Tiger Reserves in India, 2018

3.2 Cluster-wise performance of MEE of Tiger Reserves in India

3.3 State-wise performance of MEE of Tiger Reserves in India



3.4 Element-wise performance of MEE of Tiger Reserves in India

3.5 Comparison of current MEE TR Results with previous MEE TR Cycles

03





OVERALL RESULTS OF MEE OF FOURTH CYCLE OF TIGER RESERVES IN INDIA, 2018

3.1

The Management Effectiveness Evaluation (MEE) exercise has successfully completed four cycles of evaluation of Tiger Reserves in the country. First cycle of evaluation was conducted for 28 Tiger Reserves in 2006; second cycle of evaluation was conducted for 39 Tiger Reserves in 2010, including repetitions of 28 TRs of 2006; third cycle of evaluation was conducted for 43 Tiger Reserves in 2014 including repetitions of 39 TRs of 2010; fourth and current cycle of evaluation has been conducted for 50 Tiger Reserves in 2018 including repetitions of 43 TRs of 2014. The MEE ratings of Tiger Reserves have been described in 4 categories as, <=40% rated as 'Poor'; 41-59% rated as 'Fair'; 60-74% rated as 'Good'; >=75 rated as 'Very Good' (Box 1). The fourth cycle of evaluation in 2018 represents an overall mean MEE score of 69.73% or 70% with the range of 42.97% to 93.75%. The Pench Tiger Reserve, Madhya Pradesh and Periyar Tiger Reserve, Kerala, have secured the highest MEE score of 93.75% or 94%, and have been rated as very good (Figure 3.1). A total of 21 Tiger Reserves (42%) have been rated in 'Very Good' category, followed by 17 Tiger Reserves (34%) rated in 'Good' category and 12 Tiger Reserves (24%) rated in 'Fair' category (Figure 3.2).

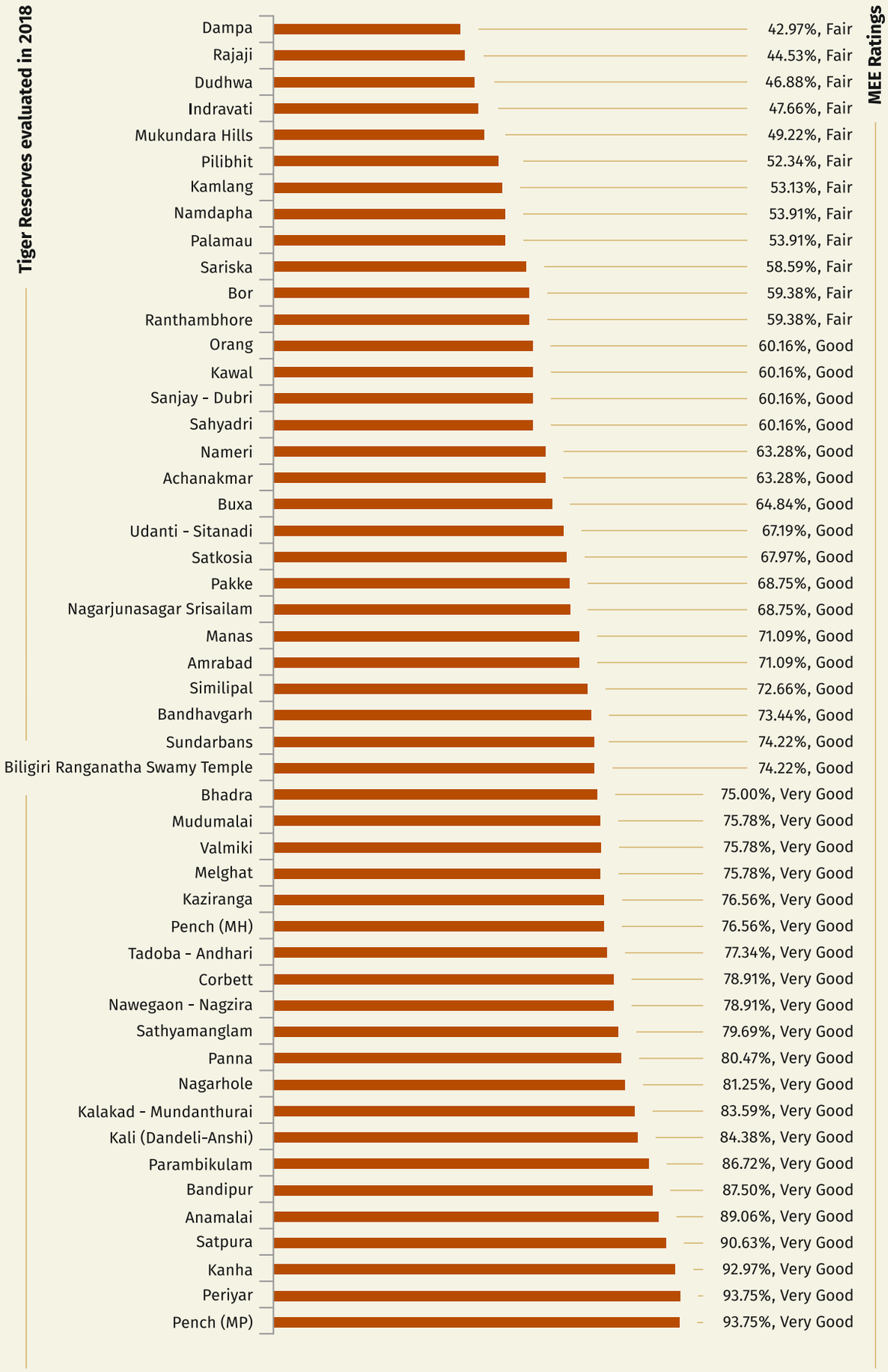
BOX 1: MEE Ratings/ Criteria

The MEE ratings of Tiger Reserves described in 4 categories as:

- <=40% rated as 'Poor';
- 41-59% rated as 'Fair';
- 60-74% rated as 'Good';
- >=75 rated as 'Very Good'.

There has been a continuous improvement in all four cycles of evaluation in MEE score of Tiger Reserves. The overall mean MEE score in second cycle in 2010 was 65%, and 69% in third cycle in 2014, and 70% in current cycle of evaluation in 2018.

Sander Wehkamp


Tiger Reserves evaluated in 2018
MEE Ratings
Dampa 42.97%, Fair
Rajaji 44.53%, Fair
Dudhwa 46.88%, Fair
Indravati 47.66%, Fair
Mukundara Hills 49.22%, Fair
Pilibhit 52.34%, Fair
Kamlang 53.13%, Fair
Namdapha 53.91%, Fair
Palamau 53.91%, Fair
Sariska 58.59%, Fair
Bor 59.38%, Fair
Ranthambhore 59.38%, Fair
Orang 60.16%, Good
Kawal 60.16%, Good
Sanjay - Dubri 60.16%, Good
Sahyadri 60.16%, Good
Nameri 63.28%, Good
Achanakmar 63.28%, Good
Buxa 64.84%, Good
Udanti - Sitanadi 67.19%, Good
Satkosia 67.97%, Good
Pakke 68.75%, Good
Nagarjunasagar Srisailam 68.75%, Good
Manas 71.09%, Good
Amrabad 71.09%, Good
Similipal 72.66%, Good
Bandhavgarh 73.44%, Good
Sundarbans 74.22%, Good
Biligiri Ranganatha Swamy Temple 74.22%, Good
Bhadra 75.00%, Very Good
Mudumalai 75.78%, Very Good
Valmiki 75.78%, Very Good
Melghat 75.78%, Very Good
Kaziranga 76.56%, Very Good
Pench (MH) 76.56%, Very Good
Tadoba - Andhari 77.34%, Very Good
Corbett 78.91%, Very Good
Nawegaon - Nagzira 78.91%, Very Good
Sathyamanglam 79.69%, Very Good
Panna 80.47%, Very Good
Nagarhole 81.25%, Very Good
Kalakad - Mundanthurai 83.59%, Very Good
Kali (Dandeli-Anshi) 84.38%, Very Good
Parambikulam 86.72%, Very Good
Bandipur 87.50%, Very Good
Anamalai 89.06%, Very Good
Satpura 90.63%, Very Good
Kanha 92.97%, Very Good
Periyar 93.75%, Very Good
Pench (MP) 93.75%, Very Good

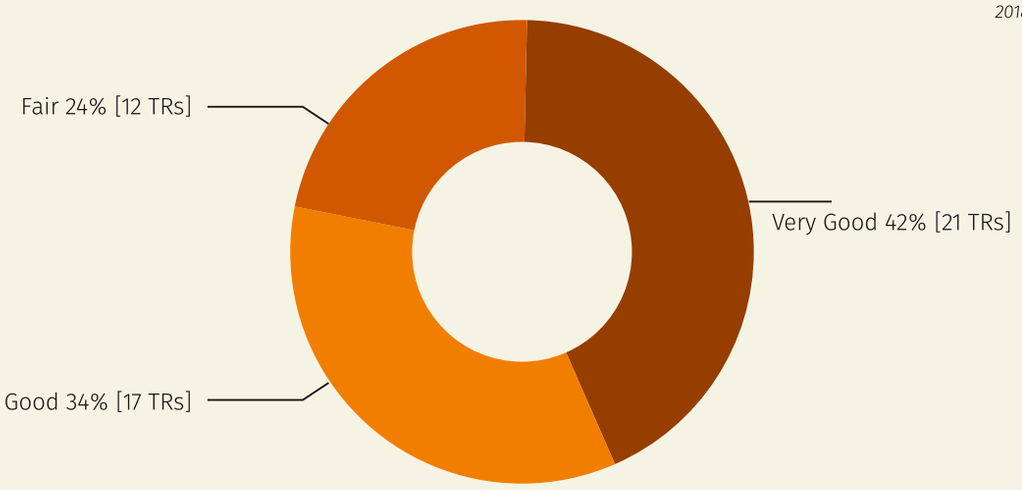


Figure 3.2: *MEE ratings of Tiger Reserves, 2018*

CLUSTER-WISE PERFORMANCE OF MEE OF TIGER RESERVES IN INDIA, 2018

3.2

The 50 Tiger Reserves have been classified into 5 landscape clusters based on the specific landscape characteristics as adopted in the All India Tiger Estimation Exercise *viz.*, (1) Shivalik- Gangetic Plain Landscape Complex, Central Indian Landscape Complex and Eastern Ghats Landscape Complex; (2) Central Indian Landscape Complex and Eastern Ghats Landscape Complex; (3) Shivalik- Gangetic Plain Landscape Complex, Central Indian Landscape Complex and Eastern Ghats Landscape Complex; (4) Western Ghats Landscape Complex; and (5) North-eastern Mountains and Brahmaputra Floodplains. Cluster one includes maximum no. of 13 Tiger Reserves and Cluster three includes a minimum of 7 Tiger Reserves. Also, Cluster three includes Tiger Reserves of maximum five States, *viz.*, Odisha, Bihar, Jharkhand, Andhra Pradesh and Telangana, whereas Cluster two includes Tiger Reserves of only 2 States *viz.*, Madhya Pradesh and Chhattisgarh.

The maximum mean MEE score is 81% in Cluster four that is in Western Ghats Landscape Complex, followed by cluster two with 74.39% as mean MEE score in Central Indian Landscape Complex and Eastern Ghats Landscape Complex, whereas minimum mean MEE score is 63% in Cluster one that is in Shivalik- Gangetic Plain Landscape Complex, Central Indian Landscape Complex and Eastern Ghats Landscape Complex (Table 3.1).

The MEE ratings of Tiger Reserves have been described in 4 categories as, <=40% rated as 'Poor'; 41-59% rated as 'Fair'; 60-74% rated as 'Good'; >=75 rated as 'Very Good'. In cluster-wise ratings, Cluster four represents maximum number of Tiger Reserves in 'Very Good' category (10 TRs), Cluster five represents maximum number of Tiger Reserves in 'Good' category (6 TRs) and Cluster one represents maximum number of Tiger Reserves in 'Fair' category (7 TRs) (Figure 3.3).

Table 3.1. Landscape Cluster And MEE Scores

Landscape cluster No.	Cluster Name	States (No. of TRs)	No. of TRs	Name of the Tiger Reserves	Mean MEE score (%)	Mean MEE score range (%)
I	Shivalik- Gangetic Plain Landscape Complex, Central Indian Landscape Complex and Eastern Ghats Landscape Complex	Uttar Pradesh (n=2), Uttarakhand (n=2), Maharashtra (n=6) and Rajasthan (n=3)	13	Dudhwa, Pilibhit, Corbett, Rajaji, Sariska, Ranthambhore, Mukundara Hills, Melghat, Pench, Tadoba-Andhari, Sahyadri, Bor and Nawegaon-Nagzira	63.00	44.53 to 78.91
II	Central Indian Landscape Complex and Eastern Ghats Landscape Complex	Madhya Pradesh (=6) and Chhattisgarh (n=3)	9	Bandhavgarh, Satpura, Kanha, Panna, Pench, Sanjay -Dubri, Udanti-Sitanadi, Indravati and Achanakmar	74.39	47.66 to 93.75
III	Shivalik- Gangetic Plain Landscape Complex, Central Indian Landscape Complex and Eastern Ghats Landscape Complex	Odisha (n=2), Bihar (n=1) Jharkhand (n=1), Andhra Pradesh (n=1) and Telangana (n=2)	7	Similipal, Satkosia, Valmiki, Palamau, Nagarjunasagar Srisailam, Kawal and Amrabad	67.19	53.91 to 75.78
IV	Western Ghats Landscape Complex	Karnataka (5), Kerala (n=2) and Tamil Nadu (n=4)	11	Bandipur, Nagarhole, Bhadra, Biligiri Ranganatha Swamy Temple, Kali (Dandeli-Anshi), Periyar, Parambikulam, Sathyamangalam, Mudumalai, Anamalai and Kalakad-Mundanthurai	81.00	74.22 to 93.75
V	North-eastern Mountains and Brahmaputra Floodplains	Assam (n=4), Arunachal Pradesh (n=3), West Bengal (n=2) and Mizoram (n=1)	10	Orang, Nameri, Manas, Kaziranga, Pakke, Namdapha, Kamlang, Buxa, Sundarbans and Dampa	63.05	42.97 to 76.56
Total	**5 Clusters**	**18 States**		**50 Tiger Reserves**	**69.73**	**42.97 to 93.75**



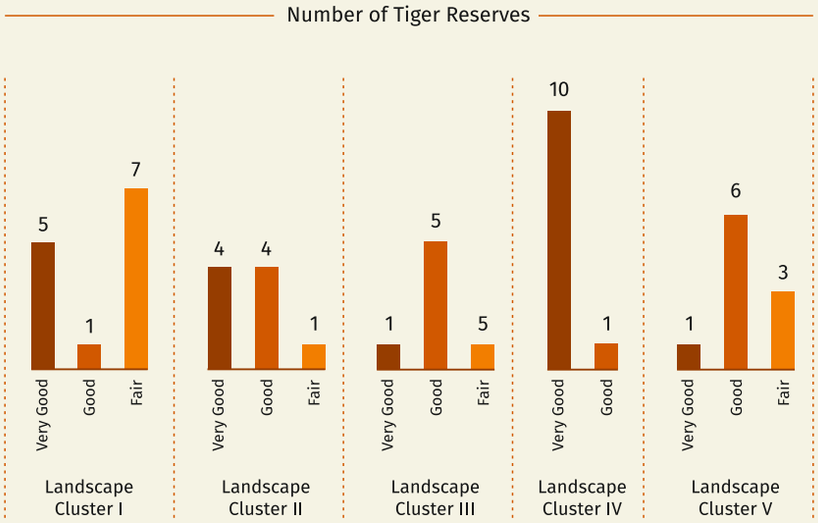


Figure 3.3: *Cluster-wise MEE Ratings of Tiger Reserves, 2018*

Cluster-wise individual ratings of Tiger Reserves are given in Table 3.2. Corbett Tiger Reserve, Uttarakhand and Nawegaon-Nagzira Tiger Reserve, Maharashtra have secured the highest MEE score of 78.91% or 79% in 'Very Good' category; whereas Rajaji Tiger Reserve, Uttarakhand has received lowest MEE score of 44.53% or 45% as 'Fair' in Cluster one. In Cluster two, Pench Tiger Reserve, Madhya Pradesh has secured the MEE score of 93.75% or 94% as 'Very Good' followed by Kanha Tiger Reserve, Madhya Pradesh of 92.97% or 93%; whereas Indravati Tiger Reserve, Chhattisgarh represents lowest MEE score of 47.66% or 48% in 'Fair' category. Cluster three represents maximum score for Valmiki Tiger Reserve, Bihar of 75.78% or 76% in 'Very Good' category whereas Palamau Tiger Reserve, Jharkhand scored minimum of 53.91% or 54% in 'Fair' category. In cluster four, Periyar Tiger Reserve, Kerala scored highest that is 93.75% or 94% in 'Very Good' category, whereas Biligiri Rangaswamy Temple Tiger Reserve, Karnataka rated as lowest that is 74.22% in 'Good' category. Cluster five represents highest score for Kaziranga Tiger Reserve, Assam that is 76.56% in 'Very Good' category and lowest for Dampa Tiger Reserve, Mizoram as 43% in 'Fair' category (Table 3.2).

Table 3.2. *Cluster-wise MEE scores (%) in descending order*

Landscape cluster number	States	Tiger Reserves	MEE score (%)	MEE rating
One	Uttarakhand	Corbett	78.91	Very Good
	Maharashtra	Nawegaon-Nagzira	78.91	Very Good
	Maharashtra	Tadoba-Andhari	77.34	Very Good
	Maharashtra	Pench	76.56	Very Good
	Maharashtra	Melghat	75.78	Very Good
	Maharashtra	Sahyadri	60.16	Good
	Rajasthan	Ranthambhore	59.38	Fair
	Maharashtra	Bor	59.38	Fair
	Rajasthan	Sariska	58.59	Fair
	Uttar Pradesh	Pilibhit	52.34	Fair
	Rajasthan	Mukundara Hills	49.22	Fair
	Uttar Pradesh	Dudhwa	46.88	Fair
	Uttarakhand	Rajaji	44.53	Fair

Landscape cluster number	States	Tiger Reserves	MEE score (%)	MEE rating
Two	Madhya Pradesh	Pench	93.75	Very Good
	Madhya Pradesh	Kanha	92.97	Very Good
	Madhya Pradesh	Satpura	90.63	Very Good
	Madhya Pradesh	Panna	80.47	Very Good
	Madhya Pradesh	Bandhavgarh	73.44	Good
	Chhattisgarh	Udanti-Sitanadi	67.19	Good
	Chhattisgarh	Achanakmar	63.28	Good
	Madhya Pradesh	Sanjay -Dubri	60.16	Good
	Chhattisgarh	Indravati	47.66	Fair
Three	Bihar	Valmiki	75.78	Very Good
	Odisha	Similipal	72.66	Good
	Telangana	Amrabad	71.09	Good
	Andhra Pradesh	Nagarjunasagar Srisailam	68.75	Good
	Odisha	Satkosia	67.97	Good
	Telangana	Kawal	60.16	Good
	Jharkhand	Palamau	53.91	Fair
Four	Kerala	Periyar	93.75	Very Good
	Tamil Nadu	Anamalai	89.06	Very Good
	Karnataka	Bandipur	87.50	Very Good
	Kerala	Parambikulam	86.72	Very Good
	Karnataka	Kali (Dandeli-Anshi)	84.38	Very Good
	Tamil Nadu	Kalakad-Mundanthurai	83.59	Very Good
	Karnataka	Nagarhole	81.25	Very Good
	Tamil Nadu	Sathyamangalam	79.69	Very Good
	Tamil Nadu	Mudumalai	75.78	Very Good
	Karnataka	Bhadra	75.00	Very Good
	Karnataka	Biligiri Ranganatha Swamy Temple	74.22	Good
Five	Assam	Kaziranga	76.56	Very Good
	West Bengal	Sundarbans	74.22	Good
	Assam	Manas	71.09	Good
	Arunachal Pradesh	Pakke	68.75	Good
	West Bengal	Buxa	66.41	Good
	Assam	Nameri	63.28	Good
	Assam	Orang	60.16	Good
	Arunachal Pradesh	Namdapha	53.91	Fair
	Arunachal Pradesh	Kamlang	53.13	Fair
	Mizoram	Dampa	42.97	Fair



STATE-WISE PERFORMANCE OF MEE OF TIGER RESERVES IN INDIA, 2018

3.3

Fifty Tiger Reserves occur in 18 States of the country. The State of Madhya Pradesh and Maharashtra have the maximum number of Tiger Reserves in India that is 6 Tiger Reserves, followed by Karnataka having 5 Tiger Reserves, whereas Andhra Pradesh, Bihar, Jharkhand and Mizoram have only a single Tiger Reserve in each State (Table 3.3). The State of Kerala has secured the highest mean MEE score of 90.23%, followed by Tamil Nadu with 82.03%, whereas Mizoram (mean MEE score 43%) and Uttar Pradesh (mean MEE score 50%) recorded lowest MEE scores (Figure 3.4). Among 18 Tiger States of the country, 5 States reported in 'Very Good' category, *viz.*, Kerala, Tamil Nadu, Madhya Pradesh, Karnataka, Bihar; 7 States reported in 'Good' category *viz.*, Maharashtra, Odisha, West Bengal, Andhra Pradesh, Assam, Telangana and Uttarakhand; whereas 6 States reported in 'Fair' category *viz.*, Chhattisgarh, Arunachal Pradesh, Rajasthan, Jharkhand, Uttar Pradesh and Mizoram (Figure 3.4).

Table 3.3 *State-wise mean MEE score and ratings of Tiger Reserves, 2018*

S. No.	State	No. of TRs	Name of TRs	Mean MEE Score (%)	Mean MEE Rating
1.	Andhra Pradesh	1	Nagarjunasagar Srisailam	68.75	Good
2.	Arunachal Pradesh	3	Pakke, Namdapha, Kamlang	58.59	Fair
3.	Assam	4	Kaziranga, Manas, Nameri, Orang	67.77	Good
4.	Bihar	1	Valmiki	75.78	Very Good
5.	Chhattisgarh	3	Udanti-Sitanadi, Achanakmar, Indravati	59.38	Fair
6.	Jharkhand	1	Palamau	53.91	Fair
7.	Karnataka	5	Bandipur, Kali (Dandeli-Anshi), Nagarhole, Bhadra, Biligiri Ranganatha Swamy Temple	80.47	Very Good
8.	Kerala	2	Periyar, Parambikulam	90.23	Very Good
9.	Madhya Pradesh	6	Pench (MP), Kanha, Satpura, Panna, Bandhavgarh, Sanjay -Dubri	81.90	Very Good
10.	Maharashtra	6	Nawegaon-Nagzira, Tadoba-Andhari, Pench (MH), Melghat, Sahyadri, Bor	71.35	Good
11.	Mizoram	1	Dampa	42.97	Fair
12.	Odisha	2	Similipal, Satkosia	70.31	Good
13.	Rajasthan	3	Ranthambhore, Sariska, Mukundara Hills	55.73	Fair
14.	Tamil Nadu	4	Anamalai, Kalakad-Mundanthurai, Sathyamangalam, Mudumalai	82.03	Very Good
15.	Telangana	2	Amrabad, Kawal	65.63	Good
16.	Uttar Pradesh	2	Pilibhit, Dudhwa	49.61	Fair
17.	Uttarakhand	2	Corbett, Rajaji	61.72	Good
18.	West Bengal	2	Sundarbans, Buxa	69.53	Good
	18 Tiger States		**50 Tiger Reserves**	**Overall 70.00%**	

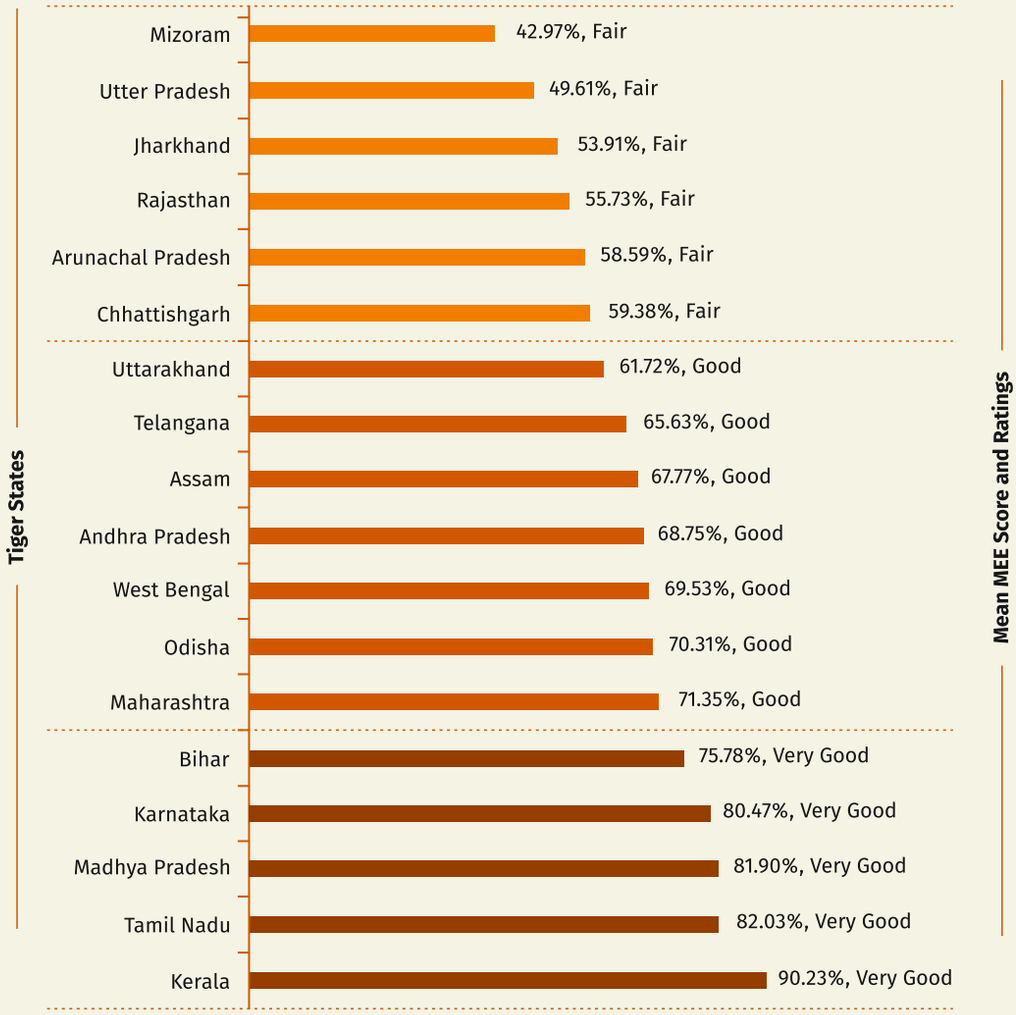


Figure 3.4
Ascending order of Tiger States with mean MEE score and ratings

ELEMENT-WISE PERFORMANCE OF MEE OF TIGER RESERVES IN INDIA, 2018

3.4

Fifty Tiger Reserves of the country were evaluated through MEE framework, which included the 32 'Headline Indicators' in six elements of the framework. The results of 32 'Headline Indicators' were summarised for 50 Tiger Reserves. The result indicates that the 'Headline Indicators' under element 'Context' are best performing and scored a maximum of 72.80% or 73% followed by 'Input' that is 72.30%. Whereas the element 'Process' received least attention by Tiger Reserve Management and scored 66.75% or 67%. The 'Headline Indicators' under 'Planning', 'Output' and 'Outcomes' are average performing indicators (Figure 3.5).

Individual Tiger Reserves have been analysed element wise across the 6 elements. The 3 Tiger Reserves *viz.*, Kanha Tiger Reserve, Madhya Pradesh, Pench Tiger Reserve, Madhya Pradesh and Periyar Tiger Reserve, Kerala are top performing Tiger Reserves in terms of 'Context' and received 100% score. Whereas, Kanha Tiger Reserve, Madhya Pradesh is the only Tiger Reserve that received 100% score in terms of 'Planning' and 'Output'. Nawegaon-Nagzira Tiger Reserve, Maharashtra and Satpura Tiger Reserve, Madhya Pradesh received 95% score as maximum in 'Input'. In terms of

'Process', there is a tie between 3 Tiger Reserves, *viz.*, Nawegaon-Nagzira Tiger Reserve, Maharashtra, Pench Tiger Reserve, Madhya Pradesh and Periyar Tiger Reserve, Kerala, with maximum score of 96% and in terms of 'Outcomes', there is a tie between Satpura Tiger Reserve, Madhya Pradesh, Periyar Tiger Reserve, Kerala and Anamalai Tiger Reserve, Tamil Nadu with maximum score of 95% (Figure 3.6).

The results of 32 'Headline Indicators' pooled together for 50 Tiger Reserves were evaluated during fourth cycle of MEE in 2018. The "Compliance of Statutory requirements, Adequacy of funds- State, Centre & NGOs, Unified control under Field Director, Stable/ Increasing Tiger population, Adequacy of Infrastructure and Resources" are best performing indicators; "Biotic interference in Core Area, Inadequacy of trained manpower resources, Threat abatement, Village relocation planning, Population trends of endangered species" are weak performing indicators. The question 'TCP compliance' rated best at 79%, whereas 'biotic interference in core area received least score was of 60.50% (Figure 3.7).

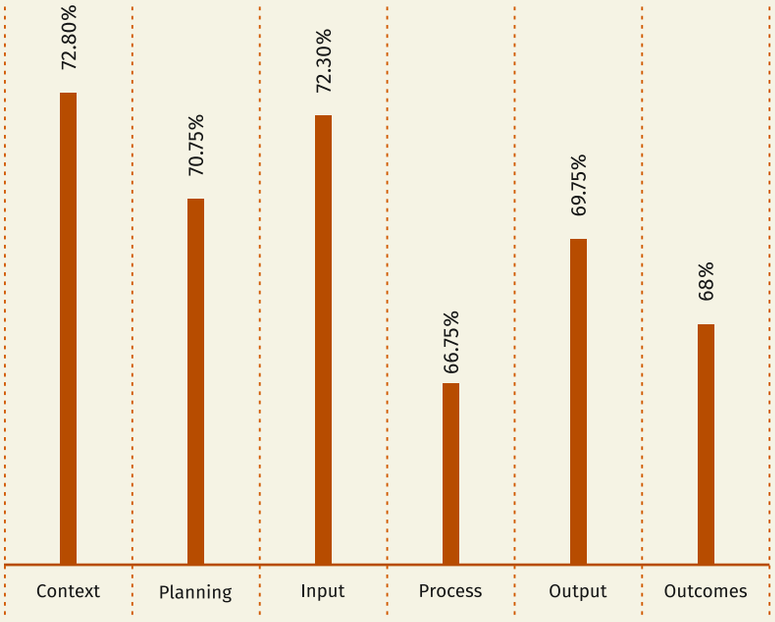


Figure 3.5: *Element-wise overall performance of MEE of Tiger Reserve, 2018*

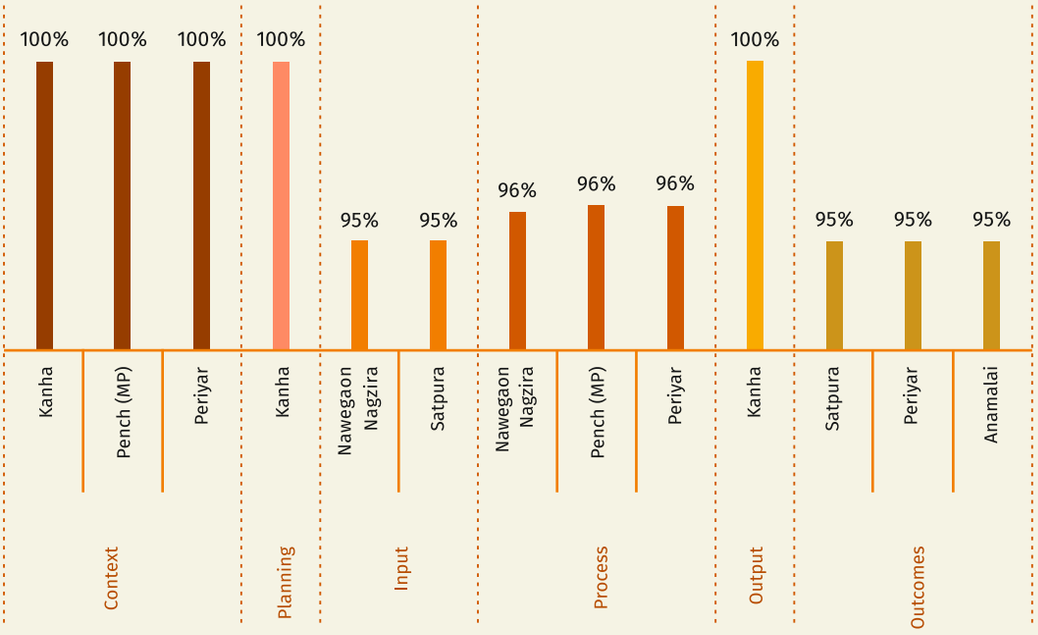
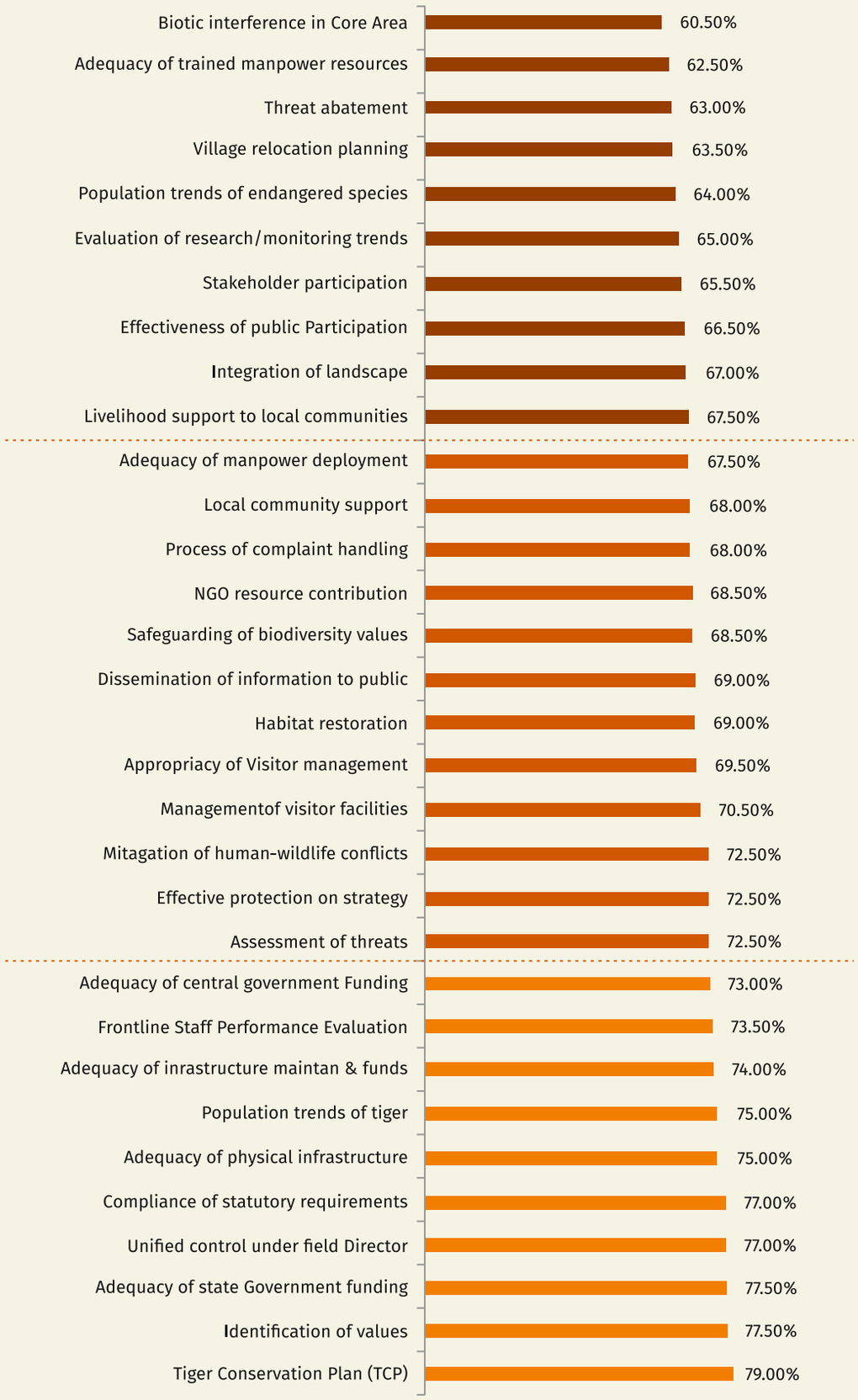


Figure 3.6: *Element-wise best performing Tiger Reserves*

Figure 3.7:
Performance of 32 'Headline Indicators' for 50 Tiger Reserves, evaluated in 2018





COMPARISON OF CURRENT MEE TR RESULTS WITH PREVIOUS MEE TR CYCLES

3.5

Overall comparison of current MEE TR cycle results with previous MEE TR cycles

3.5.1



Under India's Project Tiger, Management Effectiveness Assessment (MEE) of Tiger Reserves (TRs) was conducted in four repeat cycles after every four years from 2006 to 2018 in India. First cycle included 28 TRs in 2006, second cycle included 39 TRs in 2010, third cycle included 43 TRs in 2014 and fourth cycle included 50 TRs in 2018.

There has been continuous improvement during the cycles of evaluation in MEE score of Tiger Reserves in India. The overall mean MEE score in second cycle in 2010 was 65% and 69% in third cycle in 2014 and 70% in current cycle of evaluation in 2018. Most of the Tiger Reserves have been reported in 'Very Good' category in all rounds of evaluation, and this category showed a fair improvement from 32% in 2006 to 42% in 2018 and no Tiger Reserve fell in the 'Poor' category from the third cycle onwards (Figure 3.8).

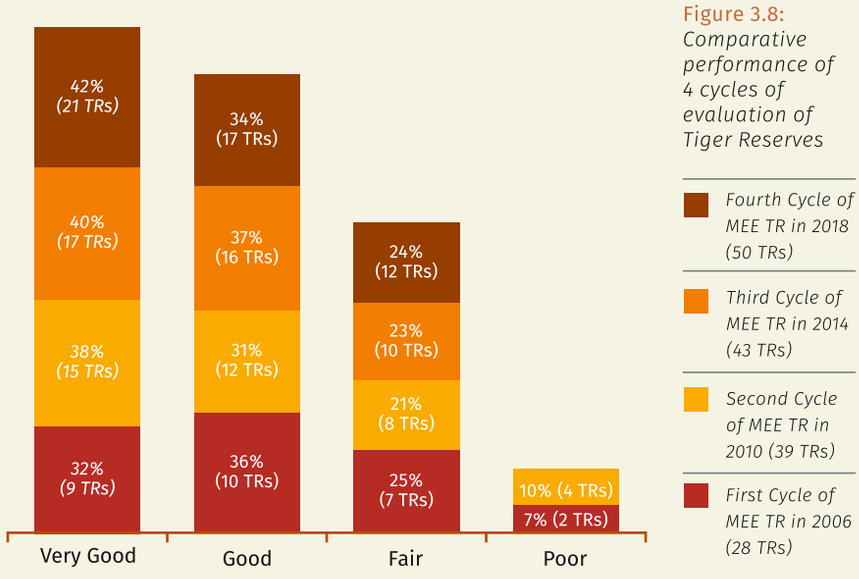


Figure 3.8: *Comparative performance of 4 cycles of evaluation of Tiger Reserves*

A comparison of MEE ratings of current cycle has been made with previous cycles of evaluation. If we compare the current/fourth cycle of MEE ratings with previous/third cycle of evaluation of 2014, it is seen that there are 6 Tiger Reserves, showing an improvement in their MEE ratings from 'Fair' to 'Good' *viz.*, Achanakmar, Kawal, Nameri, Satkosia, Similipal, Udanti-Sitanadi Tiger Reserves; 4 Tiger Reserves showing an improvement in their MEE ratings from 'Good' to 'Very Good' *viz.*, Bhadra, Dandeli-Anshi (Kali), Kaziranga, Sathyamangalam Tiger Reserves. Whereas, 4 Tiger Reserves are showing decline in MEE ratings *viz.*, Ranthambore, Sariska, Sundarbans and Dampa Tiger Reserves. Rest of the Tiger Reserves showed similar trends with respect to previous MEE 2014 ratings (Table 3.4). There are no comparisons for 7 new Tiger Reserves added in current cycle of evaluation in 2018 with respect to previous 2014 evaluations.

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Table 3.4 *Comparative MEE ratings of individual TRs in four MEE cycles from 2006 to 2018*

List of Tiger Reserves	TR Evaluation cycles and MEE Ratings				
	2006 28 TRs	2010 39 TRs	2014 43 TRs	2018 50 TRs	Change Status *w.r.t.* 2014 evaluations
Achanakmar	-	Fair	Fair	Good	↑
Amrabad	-	-	-	Good	-
Anamalai	-	Very Good	Very Good	Very Good	-
Bandhavgarh	Good	Very Good	Good	Good	-
Bandipur	Good	Very Good	Very Good	Very Good	-
Bhadra	Good	Very Good	Good	Very Good	↑
Biligiri Ranganatha Swamy Temple	-	-	Good	Good	-
Bor	-	-	-	Fair	-
Buxa	Good	Good	Good	Good	-
Corbett	Very Good	Good	Very Good	Very Good	-
Dampa	Good	Good	Good	Fair	↓
Dandeli-Anshi (Kali)	-	Very Good	Good	Very Good	↑
Dudhwa	Very Good	Good	Good	Good	-
Indravati	Poor	Poor	Fair	Fair	-
Kalakad-Mundanthurai	Fair	Very Good	Very Good	Very Good	-
Kamlang	-	-	-	Fair	-
Kanha	Very Good	Very Good	Very Good	Very Good	-
Kawal	-	-	Fair	Good	↑
Kaziranga	-	Very Good	Good	Very Good	↑
Manas	Fair	Good	Good	Good	-
Melghat	Very Good	Good	Very Good	Very Good	-
Mudumalai	-	Very Good	Very Good	Very Good	-
Mukundara Hill	-	-	Fair	Fair	-
Nagarhole	Good	Good	Very Good	Very Good	-
Nagarjunasagar-Srisailam	Fair	Good	Good	Good	-
Namdapha	Fair	Fair	Fair	Fair	-
Nameri	Good	Fair	Fair	Good	↑
Nawegaon-Nagzira	-	-	-	Very Good	-
Orang	-	-	-	Good	-
Pakke	Fair	Good	Good	Good	-
Palamau	Very Good	Poor	Fair	Fair	-
Panna	Very Good	Very Good	Very Good	Very Good	-
Parambikulam	-	Very Good	Very Good	Very Good	-
Pench (MH)	Good	Good	Very Good	Very Good	-

List of Tiger Reserves	2006 28 TRs	TR Evaluation cycles and MEE Ratings 2010 39 TRs	2014 43 TRs	2018 50 TRs	Change Status *w.r.t.* 2014 evaluations
Pench (MP)	Very Good	Very Good	Very Good	Very Good	-
Periyar	Good	Very Good	Very Good	Very Good	-
Pilibhit	-	-	-	Fair	-
Rajaji	-	-	-	Fair	-
Ranthambore	Fair	Good	Good	Fair	↓
Sahyadri	-	Fair	Good	Good	-
Sanjay-Dubri	-	Fair	Good	Good	-
Sariska	Poor	Fair	Good	Fair	↓
Sathyamangalam	-	-	Good	Very Good	↑
Satkosia	-	Poor	Fair	Good	↑
Satpura	-	Very Good	Very Good	Very Good	-
Similipal	Very Good	Fair	Fair	Good	↑
Sundarbans	Very Good	Very Good	Very Good	Good	↓
Tadoba-Andhari	Good	Good	Very Good	Very Good	-
Udanti-Sitanadi	-	Poor	Fair	Good	↑
Valmiki	Fair	Fair	Very Good	Very Good	-

The comparison of MEE score (in percentage) of current cycle 2018 has been made with previous cycles of evaluations in 2006, 2010 and 2014, given in descending order in Table 3.5. Further, the mean of all four cycles have been calculated and based on mean score, mean MEE ratings are indicated. The overall mean of all cycles indicated that Indian Tiger Reserves have MEE score of 66.75% or 67% falling in 'Good' category and there are 16 Tiger Reserves rated in 'Very Good' category, whose MEE score ranges from 89% to 75%; 20 Tiger Reserves are rated in 'Good' category, whose MEE score ranges from 74% to 60%; and 14 Tiger Reserves rated in 'Fair' category, whose MEE score ranges from 59% to 41%. Overall, the Kanha Tiger Reserve scored highest mean MEE score of 89%, followed by Pench Tiger Reserve, Madhya Pradesh with 87.36%, whereas Indravati Tiger Reserve, Chhattisgarh scored lowest with 41% (Table 3.5). The cycle-wise mean MEE score indicates an improvement in mean MEE score of 69.43% in 2014 to 70% in 2018.

Table 3.5 *Mean MEE score (%) of individual TRs and MEE ratings in descending order of four MEE cycles from 2006 to 2018*

List of Tiger Reserves	MEE Score Percentage First MEE cycle 2006: 28 TRs	Second MEE cycle 2010: 39 TRs	Third MEE cycle 2014: 43 TRs	Fourth MEE cycle 2018: 50 TRs	Overall Mean MEE Score (%) for 4 cycles	Mean MEE Ratings based on 4 cycles
Kanha	89.73	85.00	87.90	92.97	88.90	Very Good
Pench (MP)	77.84	88.33	89.52	93.75	87.36	Very Good
Parambikulam	-	80.00	86.29	86.72	84.34	Very Good
Periyar	68.65	80.00	91.13	93.75	83.38	Very Good

List of Tiger Reserves	MEE Score Percentage				Overall Mean MEE Score (%) for 4 cycles	Mean MEE Ratings based on 4 cycles
	First MEE cycle 2006: 28 TRs	Second MEE cycle 2010: 39 TRs	Third MEE cycle 2014: 43 TRs	Fourth MEE cycle 2018: 50 TRs		
Anamalai	-	75.00	79.84	89.06	81.30	Very Good
Satpura	69.19	80.83	78.23	90.63	79.72	Very Good
Sundarbans	82.16	75.00	85.48	74.22	79.22	Very Good
Nawegaon-Nagzira	-	-	-	78.91	78.91	Very Good
Panna	72.97	80.83	78.23	80.47	78.13	Very Good
Bandipur	68.11	75.00	78.23	87.50	77.21	Very Good
Mudumalai	-	75.00	80.65	75.78	77.14	Very Good
Kali (Dandeli-Anshi)	-	76.67	70.16	84.38	77.07	Very Good
Corbett	82.16	62.50	76.61	78.91	75.04	Very Good
Bandhavgarh	68.65	85.00	72.58	73.44	74.92	Very Good
Melghat	74.05	73.33	75.00	75.78	74.54	Very Good
Nagarhole	-	63.33	79.03	81.25	74.54	Very Good
Kalakad-Mundanthurai	56.22	75.00	79.84	83.59	73.66	Good
Tadoba-Andhari	72.43	65.83	75.81	77.34	72.85	Good
Biligiri Ranganatha Swamy Temple	-	-	70.97	74.22	72.59	Good
Kaziranga	-	76.72	61.29	76.56	71.53	Good
Pench (MH)	67.57	62.50	78.23	76.56	71.22	Good
Amrabad	-	-	-	71.09	71.09	Good
Sathyamangalam	-	-	61.29	79.69	70.49	Good
Bhadra	63.24	75.00	66.13	75.00	69.84	Good
Dudhwa	83.24	64.17	70.97	46.88	66.31	Good
Buxa	67.03	63.33	66.94	64.84	65.53	Good
Pakke	57.30	70.69	60.48	68.75	64.31	Good
Manas	55.14	69.00	60.48	71.09	63.93	Good
Similipal	75.68	47.50	58.06	72.66	63.48	Good
Valmiki	57.30	41.00	75.81	75.78	62.47	Good
Nagarjunasagar Srisailam	49.19	63.33	68.55	68.75	62.46	Good
Ranthambhore	48.11	70.00	71.77	59.38	62.31	Good
Sanjay-Dubri	-	55.83	70.16	60.16	62.05	Good
Sahyadri	-	55.83	69.35	60.16	61.78	Good
Orang	-	-	-	60.16	60.16	Good
Kawal	-	-	58.87	60.16	59.51	Good
Bor	-	-	-	59.38	59.38	Fair



List of Tiger Reserves	MEE Score Percentage				Overall Mean MEE Score (%) for 4 cycles	Mean MEE Ratings based on 4 cycles
	First MEE cycle 2006: 28 Trs	Second MEE cycle 2010: 39 Trs	Third MEE cycle 2014: 43 Trs	Fourth MEE cycle 2018: 50 Trs		
Dampa	65.41	60.00	68.55	42.97	59.23	Fair
Nameri	60.54	56.03	51.61	63.28	57.87	Fair
Sariska	32.97	59.17	73.39	58.59	56.03	Fair
Palamau	76.22	38.33	54.03	53.91	55.62	Fair
Kamlang	-	-	-	53.13	53.13	Fair
Satkosia	-	37.50	53.23	67.97	52.90	Fair
Namdapha	51.35	57.50	48.39	53.91	52.79	Fair
Pilibhit	-	-	-	52.34	52.34	Fair
Achanakmar	-	38.33	54.03	63.28	51.88	Fair
Mukundara Hills	-	-	52.42	49.22	50.82	Fair
Udanti-Sitanadi	-	34.17	50.81	67.19	50.72	Fair
Rajaji	-	-	-	44.53	44.53	Fair
Indravati	37.84	33.33	45.16	47.66	41.00	Fair
Mean MEE Score (%) of all TRs	**65.37**	**64.77**	**69.43**	**69.95**	**66.75**	**Good**

State-wise comparison of current MEE TR cycle results with previous MEE TR cycles

3.5.2

The fifty Tiger Reserves clubbed State-wise on the basis of the no. of Tiger Reserves in each State and mean MEE score percentage. The overall mean MEE score of four years has shown that Kerala State is the best performing State with 82% score, followed by Madhya Pradesh with 80.25%, whereas Chhattisgarh State is the least performing State with 45.62% in Tiger Reserve Management (Table 3.6 and Figure 3.9).

State	No. of TRs				Mean ME Score %				Of all 4 cycles
	2006	2010	2014	2018	2006	2010	2014	2018	
Kerala	1	2	2	2	68.65	80.00	88.71	90.23	**81.90**
Madhya Pradesh	5	5	6	6	75.68	84.00	79.44	81.90	**80.25**
Karnataka	2	4	5	5	65.68	72.50	72.90	80.47	**72.89**
West Bengal	2	2	2	2	74.59	69.17	76.21	69.53	**72.38**
Tamil Nadu	1	3	4	4	56.22	75.00	75.40	82.03	**72.16**

Table 3.6 State-wise no. of Tiger Reserves and mean MEE score (%) in descending order of four MEE cycles from 2006 to 2018

State	No. of TRs				Mean ME Score %				Of all 4 cycles
	2006	2010	2014	2018	2006	2010	2014	2018	
Uttarakhand	1	1	1	2	82.16	62.50	76.61	61.72	**70.75**
Maharashtra	3	5	4	6	71.35	62.67	74.60	71.35	**69.99**
Uttar Pradesh	1	1	1	2	83.24	64.17	70.97	49.61	**67.00**
Telangana	0	0	0	2	-	-	-	65.63	**65.63**
Assam	2	3	3	4	57.84	67.31	57.79	67.77	**62.68**
Bihar	1	1	1	1	57.30	40.52	75.81	75.78	**62.35**
Andhra Pradesh	1	1	2	1	49.19	63.33	63.71	68.75	**61.25**
Odisha	1	2	2	2	75.68	42.50	55.65	70.31	**61.03**
Mizoram	1	1	1	1	65.41	60.00	68.55	42.97	**59.23**
Arunachal Pradesh	2	2	2	3	54.32	64.09	54.43	58.59	**57.86**
Rajasthan	2	2	3	3	40.54	64.58	65.86	55.73	**56.68**
Jharkhand	1	1	1	1	76.22	38.33	54.03	53.91	**55.62**
Chhattishgarh	1	3	3	3	37.84	35.28	50.00	59.38	**45.62**
Total No. of TRs and Mean MEE Score %	**28**	**39**	**43**	**50**	**64.23**	**61.53**	**68.27**	**66.98**	**65.29**

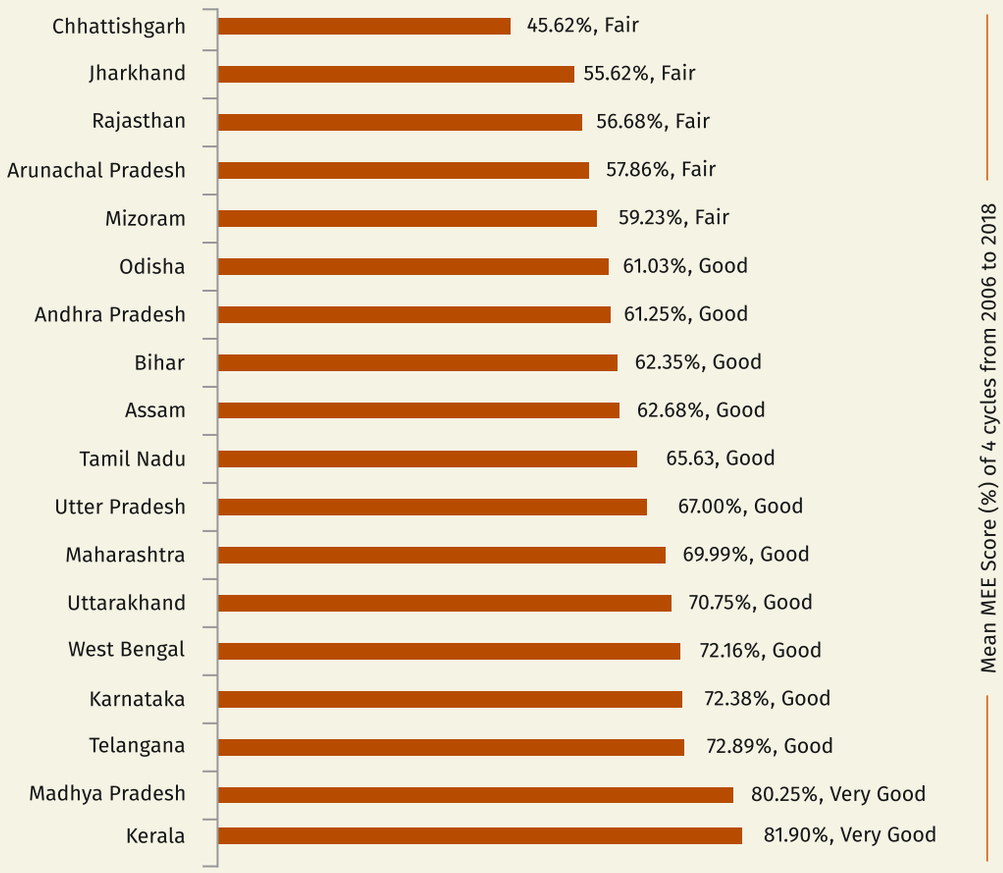

Figure 3.9: *State-wise combined mean MEE score in ascending order of four MEE cycles of Tiger Reserves from 2006 to 2018*

Element-wise comparison of current MEE TR cycle results with previous MEE TR cycles

3.5.3

The MEE of Tiger Reserves is based on the 6 elements of MEE framework. In the first cycle of MEE of Tiger Reserve only 4 out of 6 elements were assessed. The results of 32 'Headline Indicators' were summarised in these 6 elements. The results of 3 MEE TR cycles were comparatively analysed and the overall mean MEE score was calculated. The result indicates that the element 'Context' is best performing with an overall mean MEE score of 71% in 3 cycles and the element 'Process' scored lowest score of 63.35%. This means that the indicators in 'Context' received highest attention while indicators included in 'Process' received least attention by TR management. The 'Headline Indicators' under 'Planning', 'Output' and 'Outcomes' are average performing indicators (Figure 3.10 and Table 3.7).

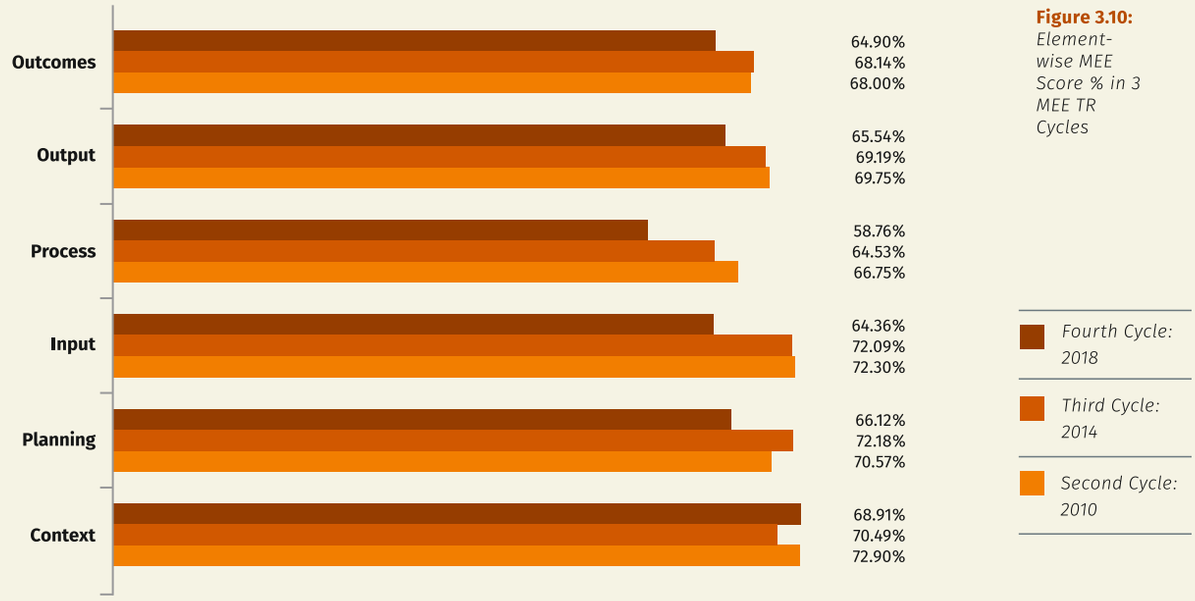

Figure 3.10: *Element-wise MEE Score % in 3 MEE TR Cycles*

Table 3.7: *Element-wise MEE score percentage in 3 MEE TR cycles*

Element	MEE Score Percentage			
	Second Cycle: 2010	Third Cycle: 2014	Fourth Cycle: 2018	Overall Mean MEE Score % of 3 Cycles
Context	68.91	70.49	72.90	70.77
Planning	66.12	72.18	70.57	69.62
Input	64.36	72.09	72.30	69.58
Process	58.76	64.53	66.75	63.35
Output	65.54	69.19	69.75	68.16
Outcomes	64.90	68.14	68.00	67.01

Considering that 'Outcome-based' management approach is considered as most pragmatic management approach, efforts need to be made to step up the performance of the 5 Outcome Indicators of the MEE process.

Comparative performance of Management Strengths, Management Weaknesses and Immediate Actionable Points of Tiger Reserves

3.5.4

The evaluation of Tiger Reserves in India was initiated in 2006 and till now four cycles of evaluation have been completed. These evaluation cycles have helped in enhancing the management perspectives of Tiger Reserves. The MEE exercise has also helped in achieving management goals by TR Managers across the country. With the help of MEE exercise, TRs having better management practices such as protection strategies, good managerial support, mitigation of human wildlife conflicts, compliance of statutory requirements, professionally prepared Tiger Conservation Plans have also been identified (Table 3.8).

Similarly, the MEE exercise clearly highlights the problems and constraints in management. The inadequacy of trained manpower and biotic interference in the core and buffer areas of the Tiger Reserves are the top two management weaknesses that have emerged from the MEE process (Table 3.9). Other issues also need attention like connectivity and corridors, threat mitigation, population trends of endangered species, late release of funds and relocation of villages.

Based on the management weaknesses that have emerged, various immediate actionable points have been suggested for TR management over the course of MEE cycles. Capacity building of staff needs the highest attention. Other important recommendations are removal of biotic interference, threat mitigation, village relocation and public participation (Table 3.10).



Cycle I: 2006	Cycle II:2010	Cycle III: 2014	Cycle IV:2018
Professionally prepared management plans and their implementation	Effective Protection Strategy	Mitigation of human-wildlife conflicts	Compliance of Statutory requirements
Anti-poaching camps and ongoing daily monitoring	Compliance of Statutory requirement	Adequacy of funds- State, Centre & NGOs	Adequacy of funds- State, Centre & NGOs
Innovative thinking, directions and experimentation	Assessment of threats and safeguarding of biodiversity values	Compliance of Statutory requirements	Unified control
Firm resolve among leadership and motivated field personnel	Adequacy of Infrastructure and Resources	Safeguarding of biodiversity values as per plan	Stable/ Increasing Tiger population
Coordination with police, District Administration and other agencies	Management of visitor facilities	Effective protection strategy	Adequacy of Infrastructure and Resources

Table 3.8: *Management Strengths identified in four cycles of MEE of Tiger Reserves in India: 2006 to 2018*

Shantanu Sharma



Cycle I: 2006	Cycle II:2010	Cycle III: 2014	Cycle IV:2018
Inadequate support-equipment, vehicles, staff and incentives to staff.	Inadequacy of trained manpower resources	Inadequacy of trained manpower resources	Biotic interference in Core Area
Insurgency problems in Palamau, Indravati, Nagarjunasagar-Srisailam and Manas	Biotic interference in Core Area	Frontline staff performance evaluation	Inadequacy of trained manpower resources
Loss of connectivity and habitat fragmentation	Stakeholder participation	Population trends of endangered species	Threat abatement
Inadequate and late release of funds and inability of States in providing matching grants/ funds	Dissemination of information to public	Biotic interference in Core Area	Village relocation planning
Unsustainable pilgrimage inside in some TRs	Village relocation planning	Process of complaint handling	Population trends of endangered species

Table 3.9: *Management Weaknesses identified in four cycles of MEE of Tiger Reserves in India: 2006 to 2018*

Cycle I: 2006	Cycle II:2010	Cycle III: 2014	Cycle IV:2018
Improve the support in terms of infrastructure, equipment and incentives to staff.	Capacity building of staff and their strength	Capacity building of staff and incentives	Removal of biotic interference
Special care need to be given to TRs which are facing insurgency problems	Community engagement and ecodevelopment	Village relocation, landscape issues and development	Capacity building of staff and incentives
Both Core and Buffer need to be brought under the control of Field Director	Adequacy of funds and supportive infrastructure and equipments	Public participation and ecodevelopment programmes	Threat mitigation measures
Adequate attention required for habitats outside core areas for dealing with fragmentation and connectivity issues	Tiger Conservation Plans and Foundations	Visitor management and tourism facilities. Conflicts and invasive species	Village relocation, landscape issues and development
Provide adequate funding support particularly from State Govt. and timely release of funds	Landscape issues, single control and dedicated research	Networking with others and international/ interstate coordination	Assessment of population trends of endangered species

Table 3.10: *Immediate Actionable Points identified in four cycles of MEE of Tiger Reserves in India: 2006 to 2018*



Bilal Habib



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MANAGEMENT STRENGTHS, MANAGEMENT WEAKNESSES AND IMMEDIATE ACTIONABLE POINTS OF TIGER RESERVES IN INDIA, 2018

4.1 Cluster One

4.2 Cluster Two



4.3 Cluster Three

4.4 Cluster Four

4.5 Cluster Five



CLUSTER ONE

4.1

Each Tiger Reserve has been evalauated through 32 'Headline Indicators' and detailed MEE Assessment Criteria Form as mentioned in Chapter Two. The detailed MEE Assessment Criteria Form and report card filled for 50 Tiger Reserves is included in a CD enclosed with this report. In addition to filled-in questionnaire form, the brief summary of each Tiger Reserve has also given for quick observation, given in this chapter especially in 3 heads, (a) Management Strengths, (b) Management Weaknesses and (c) Immediate Actionable Points. This brief summary is very helpful to TR Managers for immediate interventions and actions in field.

List of Tiger Reserves included in Cluster One

S. No.	Name of Tiger Reserve	Abbreviations	State
1.	Bor	BTR	Maharashtra
2.	Melghat	MTR	Maharashtra
3.	Nawegaon-Nagzira	NNTR	Maharashtra
4.	Pench	PTR	Maharashtra
5.	Sahyadri	ShTR	Maharashtra
6.	Tadoba-Andhari	TATR	Maharashtra
7.	Mukundara Hills	MHTR	Rajasthan
8.	Ranthambhore	RTR	Rajasthan
9.	Sariska	STR	Rajasthan
10.	Dudhwa	DTR	Uttar Pradesh
11.	Pilibhit	PiTR	Uttar Pradesh
12.	Corbett	CTR	Uttarakhand
13.	Rajaji	RaTR	Uttarakhand

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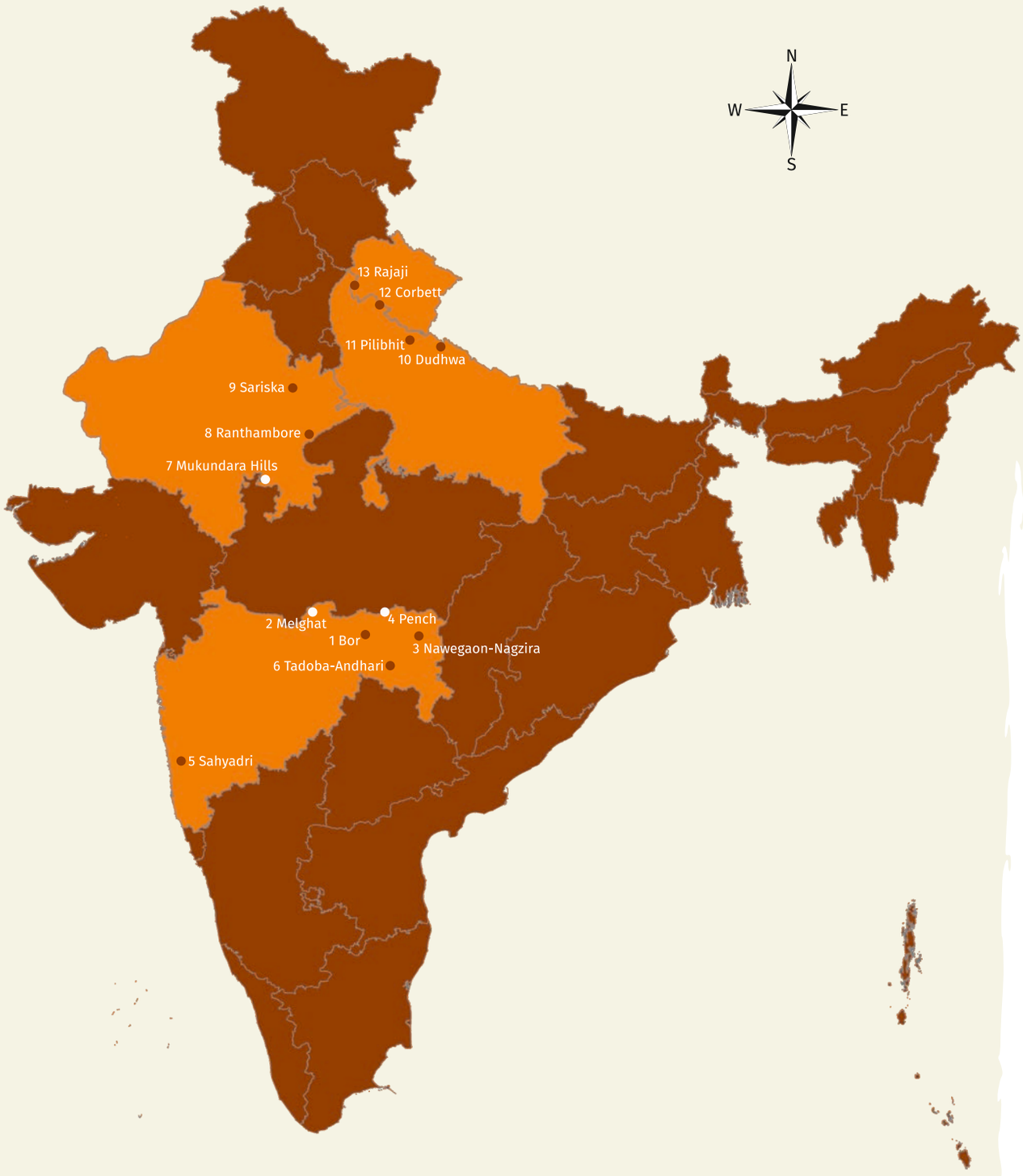

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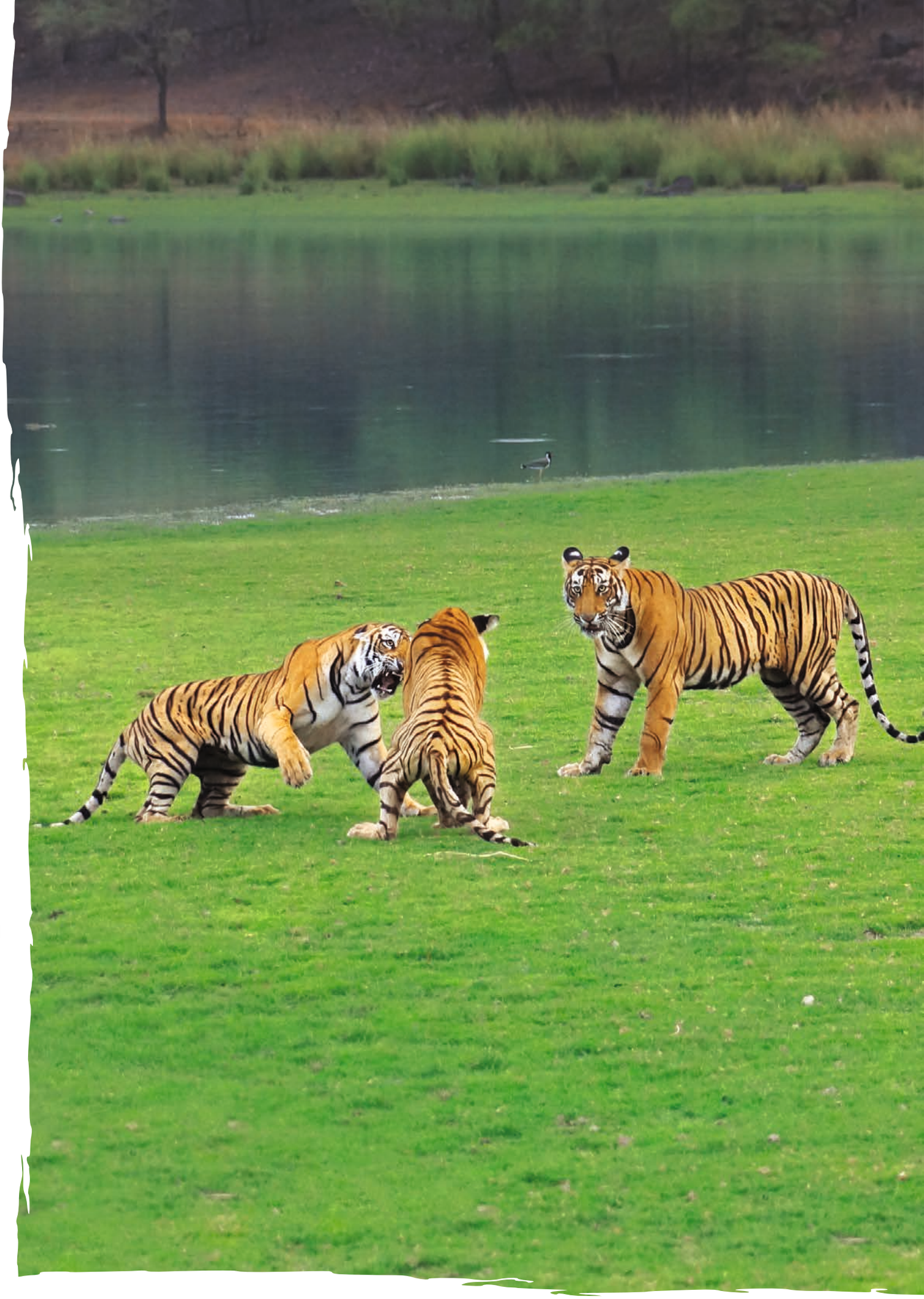


Aditya Mehrotra

BOR TIGER RESERVE, MAHARASHTRA

Evaluation Period
September, 2017

01

Management Strengths

1. The importance of Bor as a gateway between natal areas has already been established. With the protection now afforded by its current status as a TR, it is on the way to becoming a natal area on its own. The presence of breeding tigresses strengthens this view.
2. Theoretically, the shape of the TR (a small core surrounded by a large buffer from all sides) is ideal though a small core area may give rise to problems later.
3. The reserve forms an important catchment of the Bor River and several other rivers and rivulets in the region.
4. The biologically diverse habitat is a central Indian floral/faunal gene pool.
5. The huge reservoir of the dam on the Bor River, located in the centre of the CTH, is a great advantage to the wildlife and therefore needs to be a part of the CTH.
6. A large human-dominated buffer opens up great possibilities of implementing innovative and sustainable livelihood measures, especially participatory ecotourism. The TCP of the buffer provides excellent suggestions for achieving this goal and ensuring that people are involved in the conservation of this important area.
7. Under the IUCN project, interventions are being made to maintain and restore the Bor-Tadoba-Umred-Melghat Corridor.
8. Good interventions have been made in some EDCs to provide sustainable livelihoods to locals and to reduce firewood use and mitigate crop-raiding. The Shyama Prasad Mukherjee Scheme is being used wisely and effectively.

Management Weaknesses

1. The buffer zone of the TR is yet to be brought under the unified control of the Field Director. This is hindering the implementation of a tiger-focused protection and management strategy in the buffer area.
2. The small size of the core, surrounded by a human-dominated buffer, makes it vulnerable to negative interactions between humans and wildlife-especially between humans and tigers.
3. The field personnel spend a large part of their time following and monitoring tigers that have wandered off from the CTH into the human-dominated landscape of the buffer and beyond. This additional task negatively impacts the protection of their assigned beats.
4. The TR faces all sorts of serious threats such as poaching/retaliatory killings, water scarcity, habitat loss due to man-made fires, habitat loss due to weed infestation and disease transmission, as identified in the draft TCP.
5. The prey population is restricted to 11 compartments. This situation needs to be changed. Poorly distributed prey and a low prey density will make tigers cattle dependent and lead to human-tiger conflicts in the future.
6. The land-use pattern outside the TR hampers tiger movements in the landscape.
7. The poor water retention potential of the substratum aggravates the water scarcity in the pinch period.
8. The staff is not skilled in key aspects of wildlife protection and management, such as monitoring of various aspects of management such as habitat interventions, water resources, fire, wildlife crime cases, crime



investigation and intelligence gathering, ecodevelopment, ecotourism and so on.

9. The frontline staff are unaware of the SoPs mandated by the NTCA to be followed in different situations. Thus the SoPs are not being followed in the TR.
10. The Bordharan reservoir is located in the CTH, but its non-inclusion in the CTH is an undesirable compromise that may adversely impact the protection of the TR in general and the CTH in particular.
11. Despite there being frequent incidences of negative human-wildlife interactions, the TR management is poorly prepared to address such cases. The management does not have sufficient skills or equipment or a strategy to tackle the escalating human-tiger conflicts and law and order situations arising out of such conflicts.
12. The support and orientation of the surrounding territorial forest divisions in managing the problems related to tigers frequenting human habitations is poor.
13. Considering the presence of a large number of forest resource-dependent villages in the buffer and beyond, and the wildlife crime history of Wardha Division, the committee feels that there is underreporting of wildlife-related offences and that it is a fair possibility that wildlife offences are either ignored or left unnoticed.
14. Efforts needs to be made to ensure viability and integrity of the corridor connecting TATR and Bor, presently is criss-crossed by roads.

Immediate Actionable Points

1. The buffer along with adequate staff and infrastructure should be handed over to the Field Director without any further delay.
2. A systematic long-term training plan should be prepared and implemented without losing time for providing various management skills and implementation of SoPs.
3. The officers and field staff of adjoining divisions, too, should be trained in tiger monitoring, crime investigation, intelligence gathering, wildlife rescue, first aid and SoPs.
4. The State Government should begin a separate budget head for each territorial division for monitoring and managing tigers in its respective jurisdiction.
5. A full-time veterinarian must be posted to take care of wildlife health-related issues, rescue operations and cattle immunisation
6. The Bordharan reservoir should be made part of the CTH to ensure the inviolate status of the core.
7. Systematic long-term planning should be carried out to reclaim weed-infested areas and to monitor the impacts of habitat interventions.
8. The 190 ha grasslands created at the site of the relocated village Nawargaon can help increase the population of grazer species like the chital; however, the existing chital population of this area would need to be supplemented with animals from other chital-rich areas. Smaller grasslands may also be created in open forests to help the chital proliferate.
9. Some successful interventions have been made to provide sustainable livelihoods, to reduce firewood use and to afford crop protection in some buffer villages. These efforts need to be replicated and should become one of the core activities of the management.
10. Owing to the small core, the long-term existence of tigers in Bor Tiger Reserve depends critically on its connectivity with other natal areas in the landscape. The working plans of the adjoining territorial forest divisions need to be revised with "mainstreaming tiger conservation" as one of the objectives to ensure the continuity of the forested corridors. For this purpose, the territorial divisions should take measures to protect and manage suitable habitats for a healthy prey population: ensuring the availability of water and forage and managing human-tiger conflicts effectively. Sensitisation, and training and equipping the territorial staff in important aspects of

wildlife management such as habitat management, wildlife crime control and human-tiger conflict management would be critical

11. To manage the escalating human-tiger conflicts and law and order situation arising out of such conflicts effectively, the staff need to be skilled and equipped. Hence, a long-term plan needs to be prepared to achieve this. The strategy should include

- Setting up rapid response teams trained in rescuing and providing immediate medical assistance.
- "Training villagers in how to respond to the presence of tigers in their vicinity and to use first aid skills in case of emergencies. The EDCs and Joint Forest Management Committees (JFMCs) around the TRs as well as PAs with tigers such as Umred Karanda Sanctuary should be provided with first aid kits. This measure would be helpful in saving lives.

12. The protection staff should not be diverted to tourism management so that the beats are protected better. The Government should provide additional staff members to manage tourism.
13. A system of monitoring cattle kills made by tigers should be put in place. Similarly, a database on road kills of wild animals should also be maintained so that the TR management can take appropriate preventive and mitigation measures.
14. The TCP of the buffer has good prescriptions for developing fruitful partnerships with buffer villages to promote and manage ecotourism. The TR management should start implementing these prescriptions.
15. Efforts need to be made to ensure viability and integrity of the corridor connecting TATR and Bor. Retrofitting of extant roads would be critical to ensure safe passage to tigers through the corridor.

MELGHAT TIGER RESERVE, MAHARASHTRA

Evaluation Period
May, 2018

02

Management Strengths

1. Excellent buffer forests all around except in certain portions in the north, bordering Betul District, of Madhya Pradesh.
2. There is genetic exchange still between the tiger population in Melghat and the population in Satpura Tiger Reserve.
3. Ample water is available owing to the topography of the Tiger Reserve, which is traversed by six tributaries of the Tapti and Purna rivers.
4. The current set of managers, field staff and contractual subject matter experts deployed in the Tiger Reserve are active and energetic.
5. The Tiger Reserve has started several innovations and initiatives in management and protection; public participation; tourism and school-level awareness activities, which help the reserve in diverse ways.
6. Two well-trained STPF units are deployed in the Tiger Reserve, and these units are proving to be beneficial for the Tiger Reserve. The dog squad (two dogs) has helped crack five wildlife cases.
7. Regular meetings with officials of the Madhya Pradesh Forest Department are organised. These help inter-State

coordination. Joint patrolling is also organised regularly.

8. The Tiger Reserve has good support from non-Government organisations, especially in protection, wildlife monitoring and intelligence gathering.
9. The management of the Tiger Reserve has developed a good rapport with local villagers. Support given to local communities for training and placement of the beneficiaries, supply of raw material and assured markets for the finished products have helped build good relations between the management of the Tiger Reserve and the locals.
10. The reserve is sensitive towards and promotes responsible tourism that has minimal negative effects on the habitat. It has started new initiatives such as promoting adventure sports at the tourist facility centres with the involvement of locals and community involvement in tourism in the buffer zone, which not only adds new dimensions to the tourism but also helps generate incomes for locals. The Ecotourism Plan of the reserve has specified "No Go Villages" where no new tourism infrastructure can be created.
11. The Tiger Reserve has established a Wildlife Crime Control Cell, headed by a Divisional Forest Officer. Thecell has helped arrest more than 100 offenders in tiger poaching cases from several states in India.
12. The reserve has deployed an ecologist and livelihood expert on a contractual basis for specific tasks.
13. The reserve gives due importance to research for scientific management. It has signed a memorandum of understanding with Amravati University to conduct management-oriented research.
14. The fauna of the reserve has been documented excellently by ZSI and specialists from institutions (Conservation Area Series: Fauna of Melghat Tiger Reserve, 2005).
15. Whats App and SMS groups have been created. These groups have helped in networking with the stakeholders and the staff of the Tiger Reserve. The initiative has resulted in better communication and sharing of knowledge with the staff and stakeholders.
16. The Tiger Reserve used an unmanned aerial vehicle (UAV)/quadcopter to monitor graziers and the fire management work. This worked well to deter the graziers.
17. The reserve has adopted effective methods to provide water to the wildlife. Tapping the water sources/seepage springs, harvesting natural water at Narnala Fort and distributing it through pipelines and provision of solar pumps at water holes are some of these initiatives.
18. The management of Melghat Tiger Reserve has taken measures to control the stray dog population in the villages around the Tiger Reserve. Stray dogs pose a serious threat to wild animals through the spread of the canine distemper virus. The management took initiatives to sterilise more than 50 stray dogs in two villages. The stray dogs were also vaccinated against rabies.
19. The TCP of Melghat has been translated into Marathi and has been provided to the staff up to the beat level.
20. The management of the reserve organises Melghat Katta-an interaction programme of the authorities of the Tiger Reserve, youths and members of NGOs on the management and protection of the reserve. This programme helps get feedback from civil society and build good relations with them. The TR also organises a Kulla volleyball tournament every year, in which all the villages around the Tiger Reserve participate, and the local beat guard is one of the members of a team.
21. The reserve organised a competition, Tiger Tech 2018, to channelise youth knowledge and seek new ideas to solve certain management issues in the form of project presentations in wildlife and nature conservation. The competition had different categories (computer technology, architecture/civil engineering and mechanical/ electronics engineering), and youths presented projects and prototypes for a given set of challenges in which they

had to design solutions for effective nature and wildlife conservation. This gave the younger generation of technocrats a good opportunity to contribute towards conservation.

22. The Tiger Reserve has hired specialists for various tasks, such as a livelihood expert; an ecologist; wildlife biologists; social mobilisers; a tourism manager; forest engineers; a wireless supervisor; and a graphic designer. The team does the work efficiently and effectively.
23. The reserve has started imparting training in fire fighting to fire watchers through professionals. After the training programmes, the watchers also get certificates. This also improves their employability in other sectors such as disaster management.
24. The reserve offers discounts to visiting students: students from the taluka, the district and other parts of the State get 75%, 50% and 25% discounts on the entry fee once a year, respectively.

Management Weaknesses

1. About 60% of the notified buffer is not under the control of the Field Director. Apparently, the inordinate delay in transferring the remaining notified buffer to the Tiger Reserve is jeopardising the protection and management.
2. Regular/refresher training for the frontline staff to impart core skills is lacking.
3. There are no planned interventions for habitat improvement and monitoring the condition of its habitat and its use by wild animals.
4. Poaching, encroachment, grazing and uncontrolled fire continue to be serious threats.
5. The connectivity with other tiger areas continues to be threatened by unplanned development such as upgrading of roads and railway lines. The Amravati-Paratwada-Dharni-Burhanpur-Indore and Harisal-Akot roads pose threats to the movements of wildlife. Accidental deaths and injuries to wild animals caused by vehicles on these roads have been reported but the data on the road kills have not been monitored systematically.
6. The Indian railways is about to begin gauge upgrading of the track between the railway stations of Akot and Amlakhurd. About 39 km of the track passes through Wan Sanctuary, which is a part of the core area of the Tiger Reserve. This work would adversely impact the wildlife habitat and wild animals by causing an increase in the traffic of fast trains.
7. The anthropogenic pressure on the Tiger Reserve is quite high. The reasons are: 1) there are several illegal entry points along the border of the Tiger Reserve, allowing villagers from peripheral villages of both Maharashtra and Madhya Pradesh easy access; 2) there are 19 villages within the core; 3) there is excessive intrusion by villagers into inviolate areas for collection of MFP; 4) and there is illicit felling, grazing and poaching. Regular movements of villagers in the Tiger Reserve expose it to recurrent fires in summer.
8. The long, porous northern boundary of Melghat Tiger Reserve runs along the Madhya Pradesh State boundary. This area is devoid of forest cover, and therefore the Tiger Reserve is under constant threat from the villagers of Madhya Pradesh, who often intrude into it for poaching and illicit felling. Pachore village, of Madhya Pradesh, on the western boundary, is encircled by the core of Melghat Tiger Reserve. The villagers are completely dependent on the reserve for various resources and disturb it. Besides, the access of the villagers to the market is by a road that passes through the core area.
9. A large part of the Tiger Reserve is infested with Lantana, as a result of which the quality of the habitat is degraded.
10. The MEE team got the impression that the crime investigation skills of the field personnel are still very basic. Investigations in cases of tiger mortality



are not up to the mark, as seen from a recent poaching of two tigers

11. The grasslands that have been developed in the areas vacated by the villagers are almost neglected. Some of these grasslands are infested with unpalatable grass species and weeds. A plot on the way to Vairat that is managed for grass seed production is infested with unwanted grass species such as Pennisetum. This might be due to seeds sourced from the market.
12. There is no monitoring of livelihoods and eco-development interventions.
13. There is no full- time veterinarian in the Tiger Reserve.
14. There are five temples inside the Tiger Reserve, and two of them are intensely visited. A very large number of pilgrims visit the Mahadev cave temple at Dhargad during the month of Shrawan.
15. Managers perceive that the implementation of the FRA is in favour of the claimants as several individual forest right cases have been decided to the detriment of the department inside the core and buffer and this would adversely impact wildlife in the reserve. Several pockets of disturbance will be created within the reserve vitiating the concept of an inviolate core.

Immediate Actionable Points

1. A systematic long-term plan for eradication of Lantana and development/ improvement of grasslands must be prepared. It would be wise to prepare a detailed project report for each habitat intervention task. This would require collection of baseline information and stating clearly the objective or objectives of the intervention and prescribing a monitoring mechanism. All the relocated village sites must be managed in such a manner as to convert them into productive grasslands. Melghat is primarily a sambar habitat, but with the relocation of villages, a large portion of the valley is available for the creation of productive edge habitat (grasslands). Chital can proliferate under such conditions and a sizable prey base may build up for tigers. This intervention is particularly important as there will be a sudden loss of supplementary prey (cattle) from the habitat after the relocation of all the villages from the core. Therefore, availability of natural prey would reduce competition among tigers and allow more tigers to remain within the core without intraspecific fights.
2. Adequate attention should be paid to restoration of the grasslands created in the areas vacated by villagers. Grass seeds from seed banks that are contaminated with unpalatable grasses such as Pennisetum (deenanath) must not be used in grassland development.
3. Augmentation of the chital population through restocking measures could help build up the prey population in the newly created grasslands quickly.
4. The ad hoc experiment being undertaken by the Tiger Reserve to develop irrigated grasslands in a dry landscape may lead to ecological alterations in the vegetation and must therefore be stopped forthwith.
5. The Government must ensure appropriate retrofitting of all roads and the railway lines that are slated for upgrading.
6. Several families of the Gowli community who opted for relocation and received compensation did not vacate the reserve and shifted to another village, Adau, on the periphery of the core. As their main vocation is cattle rearing they continue to exert a lot of pressure on the habitats. Their aggression is also a source of regular retaliatory forest fires. Serious efforts need to be made by the management of the Tiger Reserve to convince them to move out of the reserve.
7. The corridor plan envisages the creation of an interstate coordination committee with the Government of Madhya Pradesh. There are several interstate issues that would require regular meetings at the level of Forest Secretary and CWLW. An effort should be made to institutionalise this process as soon as possible.

8. At present there is no uniformity in the patrolling registers, and unique and special habitats and sites sensitive to various threats have not been mapped and depicted on the beat map. This may be done at the earliest.
9. It is very important to collect data on wildlife casualties due to road hits systematically. The data would help plan retrofitting structures and other mitigation measures.



NAWEGAON-NAGZIRA TIGER RESERVE, MAHARASHTRA

Evaluation Period
September, 2017

03

Management Strengths

1. The TR is located in the heart of the Central Indian Tiger Landscape, and the Nagzira-Nawegaon corridor forms a crucial link between six TRs in the north and three TRs in the south.
2. There are no villages in the core area of the TR.
3. Only a few vacant posts among the frontline staff
4. The young officials managing the TR have academic qualifications in natural sciences and are highly motivated and courageous. The Field Director is an innovative and supportive leader.
5. Marked improvements in most of the management aspects compared with the findings of the internal MEE 2016. The exercise helped with systematic management planning, including zonation of the TR, and consolidation of the area.
6. Constitution of Koka Wildlife Sanctuary by carving out 96 sq. km. of forests under the control of the Forest Development Corporation of Maharashtra (FDCM), and its addition to the New Nagzira Wildlife Sanctuary, a part of the core area of Nawegaon-Nagzira Tiger Reserve, will help strengthen its linkages with Pench TR (Maharashtra), in the north, and Umred Karhandala Wildlife Sanctuary, in the south.
7. The Shyama Prasad Mukherjee Jan Van scheme has been used effectively to win the support of the buffer villages for the TR.
8. Involvement of various stakeholders such as members of NGOs, professionals and line departments is a regular feature that strengthens the management planning, execution and monitoring.
9. Innovative use of information technology tools to achieve the participation of not only the TR officials and staff but also different stakeholders is definitely a highlight of the TR. The use of WhatsApp application in monitoring and facilitating team work is notable. The "Selfie with Tiger" programme connects managers with the frontline staff, NGOs and other stakeholders. This helps share in real time information that is crucial for the management and protection of the TR.
10. The IUCN-supported Integrated Tiger Habitat Conservation Programme in the buffer and corridor areas of the TR is being carried out well. It focuses on direct community-based interventions to reduce the human pressure, participatory mitigation measures for human-wildlife conflicts, enhancement of protection measures and raising the awareness of local communities



Shantanu Sharma

towards habitat management and protection with the involvement of five or six NGOs. The programme will help improve tiger conservation in the TR.

11. The STPF, 50% of which consists of local women, is young, trained and energetic. Its role in protection and information gathering (due to locals in the force) is helping the TR management to a significant extent.
12. The involvement and supervision of habitat management experts in grassland development work at the sites of relocated villages has resulted in good results.

Management Weaknesses

1. Though the buffer area of the TR has been notified, it is still under the control of the territorial division and the FDCM management.
2. An area of about 17 ha near Nagzira Lake has been carved out of the core/critical tiger habitat and has been notified as the buffer zone. The FDCM tourist complex and the Director's camp residence are located on this land. This complex is a hub of disturbance within the CTH and thus vitiates its sanctity.
3. The delineation of the core/critical tiger habitat is poor in the sense that its width is too narrow at many places and there is no effective buffer around it. As a result, it is predisposed to human-tiger conflicts in future. The greater part of the buffer, which runs east-west and north-south as a distinct unit, does not enclose the CTH.
4. The hostility of the village Pittezari, just outside Nagzira Sanctuary (part of CTH) is a matter of concern. The village is not responding to the friendly overtures of the TR management, and the negative impact of this village on the habitat is visible.
5. The Indian wild dog/dhole is another key predator in the TR. Evidence suggests that the high density of dholes may have an impact on the tiger population, in terms of both competitions for resources and predation of cubs. Further research is required to understand the impact of the high density of Dhole on Tiger population.
6. There is luxuriant woody undergrowth in New Nagzira Sanctuary. It leaves little space for the growth of fodder species, which may impact the habitat use and free movement by wild herbivores.
7. Under the Shyama Prasad Mukherjee scheme, all the buffer villages are to receive Rs.25,00,000 each, irrespective of size (population), need and other relevant considerations. This provision is causing resentment among the EDCs.
8. The low prey density, high wild dog abundance, low tiger population and skewed sex ratio of the tiger population are some of the important biological and ecological issues directly affecting the tiger population in this TR. Poaching of tigers by electrocution is another grave concern. This was highlighted by local activists, old shikaris and retired forest officials who served in the region. In the recent past, three cases of tiger missing have been highlighted by the stakeholders.
9. The CTH of the TR is divided into two distinct blocks-Nawegaon and Nagzira-which are connected through fragmented forests interspersed with villages. Moreover, the portions north to Nawegaon Block and north-east to Nagzira Block are the only relatively unfragmented parts of the notified buffer. However, the major threat that looms large at present concerning the connectivity of these two distinct blocks emanates from highway widening projects. Two highways, NH 6 and NH 753 (originally a State highway), cut through the buffer on the east-west and north-south axes, respectively. The roads passess between the two blocks as well as the Nawegaon Block and buffer forests. NH 753 passes through 39 km of the buffer and ecosensitive zone of the TR. Strengthening the road will act as a barrier to the free movement of wildlife. Tigers have been camera trapped crossing these roads. Widening them further will increase vehicular traffic, which will affect the movements of animals. There are fair chances of increased road kill cases.

10. The process of mutation has not been carried out after the transfer of forest land to villagers for relocation and rehabilitation, and the revenue pattas have not been distributed. The DFO, Gondia, was appointed the Relocation Project Officer. However, the forest land vacated by the villagers has been mutated as forest land.

Immediate Actionable Points

1. The area of the buffer under the control of the territorial divisions and FDCM should be handed over to the TR management at the earliest.
2. The biggest challenge for the management will be to tackle the escalating human-tiger conflict in the entire Vidarbha region. The unusual horseshoe shape of the TR makes it prone to such conflicts. It would be wise to create some more fully trained and equipped wildlife rescue teams (Rapid Response Teams) to attend to emergency cases immediately. It is equally important to intensify the ongoing efforts towards sensitising and training the villagers on how to respond to tigers in their vicinity. The EDCs and JFMCs around the TR need to be trained to give first aid and provided with medical kits to be prepared to deal with such conflict cases.
3. The committee perceives the heavy incidence of timber theft in the territorial divisions and electrocution of wild animals, especially in Gondia Division, as serious threats to be tackled immediately. Electrocution has been identified as a threat to wildlife in the working plans of the division and management plan of the CTH. Hence, a concerted effort is required to detect this crime and apprehend the culprits.
4. The secret funds are inadequately utilised to develop the informers' network and crack the illicit acts. Lack of clarity among officers regarding ways of using the funds could be the key reason for this. The DFO, Gondia, who manages the buffer, is using this fund successfully. Thus, his services might be used to train others officials of the TR.
5. Roads and highways passing through the Nawegaon and Nagzira blocks and the buffer are a serious concern, considering the importance of the forest as a corridor. The plan of further strengthening these roads is going to pose a serious threat to tigers and other animals. It would be fruitful to commission a scientific study to a reputed organisation/ institution to identify the critical stretches for implementing long-term mitigation and retrofitting measures so that the corridor is used actively by wild animals.
6. Within the Nagzira CTH, the tourist complex run by the FDCM is a hub of disturbance and pollution. Garbage generated in the premises is not disposed of properly despite instructions from the FD. This situation needs to be corrected by phasing out this facility, and the tourist complex area (17 ha) should be included in the CTH. Till that happens, the management of the complex should be by the TR functionaries.
7. The present team is doing excellent work, and therefore keeping this team intact for at least 3 years would be critical to strengthen the TR. The Government should enunciate a policy to keep the teams for a minimum of 3 years in all newly constituted Trs.
8. The huge human habitations all around the CTH, especially between the Nawegaon and Nagzira blocks of the CTH, hamper the movements of tigers. The nalas and rivulets running through this intervening part, which is not even part of the buffer, is critical for the movements of tigers. Hence, all the riparian areas (corridors) need to be restored and protected. Efforts should be made to re-vegetate the riparian habitats where there is loss of cover due to developmental works or biotic pressure.

9. A study needs to be conducted to understand the interspecific relationship between dholes and tigers, especially in terms of the dhole's impact on prey-depletion and tiger cub predation.
10. The congestion of the habitat in New Nagzira Sanctuary arising from the luxuriant woody undergrowth also needs to be studied to understand its impact on habitat utilisation by wild animals. Efforts should be made to create more edges.
11. A detailed plan for weed eradication operations for grassland management and a follow-up monitoring plan should be in place for each grassland brought under the management regime.
12. Several endangered bird and mammal species have been listed/reported from within the TR. A status survey of all such species should be carried out and measures taken for protecting them.
13. The Government should rationalise the funding of schemes under the Shyama Prasad Mukherjee Jan Van Yojana on the basis of population/village size/number of households.
14. Pogostemon, an invasive species, has occupied New Nagzira Wildlife Sanctuary. Similarly, invasion by Ipomoea was seen in Nawegaon Lake. Measures should be taken to control these invasive plant species in all the water bodies in the TR.
15. Pogostemon, an invasive species, has occupied New Nagzira Wildlife Sanctuary. Similarly, invasion by Ipomoea was seen in Nawegaon Lake. Measures should be taken to control invasive plant species in all the water bodies in the TR.

PENCH TIGER RESERVE, MAHARASHTRA

Evaluation Period
May, 2018

04

Management Strengths

1. Pench Tiger Reserve, Maharashtra, is part of a vast conservation landscape with active connectivity with other tiger-natal areas therein. Together with Pench Tiger Reserve (Madhya Pradesh), it is connected with Kanha Tiger Reserve, Nawegaon-Nagzira Tiger Reserve, Tadoba-Andhari Tiger Reserve and Satpura Tiger Reserve and Melghat Tiger Reserve through territorial forests. This connectivity holds promise for the long-term conservation of tiger in Pench TR.
2. The planning for the TR has been done meticulously, as a result of which there is a comprehensive and well written Tiger Conservation Plan and Security Plan.
3. The frontline work force (Range Officer and below) is young and dedicated. The Assistant Conservators of Forests are also energetic and committed.
4. The collaboration with NGOs is very systematic. Thus, the TR reaps useful support from them in research and monitoring and in organising resources for management and protection such as vehicles and equipment.
5. The reserve receives adequate funds from the NTCA and the State Government.
6. Earlier, Mansingh Deo Wildlife Sanctuary was in the buffer zone of the TR. In March 2017, it was notified as core/critical habitat, providing an extended CTH for tigers.
7. There has been excellent livelihood training programmes and job placement programmes for local girls and boys. These have thawed the hostile stance of the local villagers. They will help build partnerships that will strengthen the TR.

8. The TCP prescribes a "no-go zone" where any activities incompatible with the objectives of the TR management will not be permitted.
9. Good rapport and joint protection efforts with the adjoining Pench Tiger Reserve, of Madhya Pradesh
10. The intervention to reduce the consumption of firewood by providing subsidised LPG connections under the Shyama Prasad Mukherji Innovative Scheme is effective, and if the villagers continue to use LPG, the condition of the degraded peripheral forests will certainly improve.
11. Considering the continued threat of poaching, the likelihood of increased human-wildlife conflicts and the need to enhance efforts to win support from EDCs, the TR needs a full-time Field Director who can give his/her undivided attention to the reserve.
12. The enclaved villages between the national park and the sanctuary (now in the core) need to be supported under the relocation scheme if they agree to move out.
13. Solar fencing is used by villagers to protect their crops in different parts of the TR. It would be good to train local youths to maintain and repair the minor snags in the system.

Management Weaknesses

1. The efforts made towards monitoring tigers and assessing the effectiveness of the habitat management interventions and eco-development works are inadequate.
2. On the basis of the MEE team's discussions with the officers, complacency with regard to the protection of the core/ critical tiger habitat is suspected. There is a feeling among the officers that the core is fully protected. This needs to be changed as the threat of organised poaching is real and happening.
3. Illegal fishing in the Totladoh reservoir (24% of the 77 sq. km. reservoir is in Maharashtra) is one of the important threats demanding much of the time and efforts of the management. The presence of remains of the demolished hutments of the Totladoh colony should be removed and the area should be reclaimed for creation of grasslands.
4. Despite the technical support from an NGO, the Phase IV monitoring data has still not been fully analysed.
5. The tourism planning, especially delineation of the tourism zone and routes is not based on primary data. The prevalent and likely impacts of visitors on the TR has been neither listed nor assessed. Prescriptions for monitoring the impacts of visitor use and tourist infrastructure are missing. There is no mention of visitor safety measures or a plan to deal with emergencies.
6. Some of the TRs in the State are levying a conservation fee from hotels and resorts. Pench Tiger Reserve has not been able to collect the same except one Resort at Sillari Gate. The hotel owners are also not paying property tax to the panchayat.
7. The Local Advisory Committee for Ecotourism has been constituted, but it is inactive.
8. The cattle pressure from 44 villages is a significant threat in the buffer.
9. Poaching of tigers is another threat in the buffer zone of the TR.

Immediate Actionable Points

1. In March 2017, the entire Mansinghdeo Wildlife Sanctuary was included in the core/critical habitat of the TR. This major change in the status necessitates reconstitution and re-notification of the buffer area, superseding the earlier buffer notification of 29 September 2010. Accordingly, the TCP should also be modified and updated.
2. There is also a need to prepare a forest management plan for the two ranges of the non-PA buffer zone to address the forest-based needs of the local people and the conservation and protection of this zone as a tiger habitat.
3. The TR management is striving hard to



control illegal fishing in the Totladoh reservoir with the help of the STPF and frontline forest force, but the illegal fishing continues. It would be wise to allow fishing in the lower Pench reservoir, located outside the core, instead of Totladoh reservoir. It would require the intervention of the concerned departments as well as the involvement of representatives of the local people to persuade the fisherfolk.

4. It would be worthwhile to start participatory ecotourism with EDCs in Nagalwadi Range, in the buffer zone. The model in practice at Tadoba-Andhari TR may be tried with some local modifications.
5. Effective monitoring of tigers is lacking at present. The management needs to examine the loopholes and implement a foolproof monitoring system. GPS-based monitoring tools should be used.
6. A confession made by poachers arrested in a recent tiger poaching case revealed three other tigers were poached over a span of 3 years. This disclosure clearly exposes the complacency of the management about the protection of tigers in the reserve and its failure to strengthen the tiger monitoring and protection strategy. An alert must be issued if a tiger is found missing from the daily monitoring data.
7. The protection strategy needs to be fortified with an effective informer network within the TR as well as in the adjoining territorial divisions and other smaller PAs of the region.
8. A detailed plan for monitoring should be prepared and followed to understand the impacts of the management interventions and ecodevelopment works in achieving the objectives of the TR.
9. The data analysis and preparation of Phase IV monitoring reports are lagging behind. The management needs to look into the causes of the delay and strive to improve the situation.
10. Monitoring of the hotels and land purchases by private parties must be carried out periodically to protect the no-go areas.
11. Hands-on training sessions related to wildlife crime investigation, identification of animal signs and evidence and wildlife rescue skills should be organised for range officers and other field personnel.
12. There is a need to strengthen the adjoining territorial divisions to protect and monitor dispersing and resident tigers in their respective jurisdictions.
13. A full-time veterinarian should be posted in the reserve.



Upamanyu Chakraborty

SAHYADRI TIGER RESERVE, MAHARASHTRA

Evaluation Period
April, 2018

05

Management Strengths

1. Sahyadri Tiger Reserve forms the vital link between the northern part and the southern part of the Western Ghats Tiger Landscape. The Tiger Reserve is a part of the Western Ghats World Heritage Site, inscribed by the UNESCO in 2012. It harbours rich biodiversity, including some rare and endemic species. The reserve forms the catchment of the Koyna and Warna rivers. The largest reservoir in the country nestles within it. All these features ensure the long-term preservation of this area.
2. A Wildlife Institute of India (WII) team is presently conducting studies for tiger recovery in the Tiger Reserve.
3. Outsiders are not allowed to fish in the Koyna Reservoir or within 10 km of the dam site by the dam authorities.
4. In recent years' initiatives have been taken by the team of young mangers to control illicit grazing, felling, lopping and encroachments. The interior parts of the CTH appear to be well protected. The MEE team did not find any signs of these disturbances in the areas visited on foot or by a vehicle.
5. Since 2016-2017, the management of the Tiger Reserve has started working with the communities in 15 villages, mainly in the north-eastern buffer, to elicit their support for the reserve. Livelihood improvement training programmes, such as paper bag making, office stationery making and cloth bag making are organised for the women of the villages dependent on the Tiger Reserve. Training programmes to impart skills in organic farming, hospitality and guiding, bee keeping and honey collection, etc. are being organised for the men of the villages.
6. The forest guards are young and untrained and, therefore, are amenable to training and skill development. Several training programmes have been started.
7. Relocation of Dicholi village has helped reclaim about 700 ha of land, in which grassland development work has been initiated with inputs from subject experts.

Management Weaknesses

1. At present there are no tigers in the reserve. The presence of tiger was reported but has not been confirmed. Evidence of tiger presence came from genetic analysis of scats carried out by the Centre for Cellular and Molecular Biology several years ago, according to which there are five to eight tigers in the area. There is scanty information on how and when tigers disappeared from the area.
2. The field staff are not used to staying in camps. The camp facilities and equipment provided to them are also inadequate. Several camps, especially in Chandoli, are temporary. The wireless network is not very effective.
3. The frontline staff of the Tiger Reserve are not aware of the Standard Operating Procedures (SOPs) issued by the NTCA.
4. Young and untrained guards are not yet acclimatized and accustomed to forest life.
5. Traditional hunting and poaching for bush meat are prevalent in the area.
6. Two separate distinct units of the Critical Tiger Habitat are connected by a 10 km wide forested buffer in the middle. Though the forests afford connectivity they are on private lands and hence, open to incompatible land-use. Some parts are already deforested

to build resorts. The national highway from Karad to Chiplun, passing through this buffer is being upgraded to a six-lane highway. The stretch from village Rasati to Kemse - Ghatmatha is part of the critical corridor and frequently used by wild animals. The work has already begun just outside the western boundary of the buffer without obtaining clearances and permission from competent authority.

7. Very little management input went into consolidating the two protected areas that now constitute the Tiger Reserve. There are no internal roads in Koyana Wildlife Sanctuary. The road network in Chandoli National Park is better, but the roads are in very bad shape. There are only a few patrolling camps. Previously, the staff never stayed in the camps.
8. The undulating terrain and huge water body make the Koyana part of Sahyadri Tiger Reserve very difficult in terms of access to the interior. No effort seems to have been made so far to build internal roads to facilitate protection and management.
9. Most of the efforts made towards strengthening protection and gaining the local people's support through livelihood interventions are very recent.
10. The tiger movement corridor has been broken in parts of Kolhapur's Shakowadi Taluka due to large-scale bauxite mining. Any new mining sites would permanently impair the corridor.
11. The Tiger Reserve is taking up several measures for habitat improvement and eco-development interventions, but the impact of these interventions is not monitored systematically. There is no mapping and monitoring of unique and special habitats, saltlicks and wallows.
12. The current prey base in the Tiger Reserve is 9.2 wild prey/ sq. km. and 10 feral cattle/sq. km. With a good population of leopards and wild dogs, the current prey status is inadequate for supporting a viable population of tigers.
13. From the reports of studies being conducted for tiger supplementation in Sahyadri Tiger Reserve, it is clear that there has been a long history of release in the Tiger Reserve of leopards that were rescued from different places. So far, no scientific assessment has been made to understand the impacts of this artificial addition of leopards to an already prey-deficient reserve.
14. Risk analysis, especially related to wildlife crime, for identification of high-, moderate- and low-risk areas, has not been done on the basis of wildlife crime data (type of crime, areas prone to different types of crimes, presence of traditional hunting communities, etc.).
15. Large-scale plantation of exotic species such as Eucalyptus was carried out in the past on most of the edge habitats (primarily grassy blanks) in the Koyna part of the Tiger Reserve.
16. There has been no effort to mitigate crop raiding or to tackle human-wild animal conflict.
17. Some local NGOs have highlighted several large pits that were dug for bauxite prospecting before the notification of Chandoli National Park. These pits still exist, and they pose a serious threat to wild animals.

Immediate Actionable Points

1. The Tiger Reserve is doing preparatory work to reintroduce tigers in Sahyadri. However, to ensure a viable tiger population, efforts should also be made to secure the corridors connecting this Tiger Reserve with other tiger-bearing forest areas and protected areas in the Western Ghats Landscape. Thus, it is important to maintain and restore connectivity between the Radha Nagari-Tilari Forests, of Maharashtra; Bhimgarh Wildlife Sanctuary and Kali Tiger Reserve, of Karnataka; and Mhadei Wildlife Sanctuary (tigers are present in these protected areas), Cotigao Wildlife Sanctuary and Netravali Wildlife Sanctuary, of Goa. A detailed study of this corridor would reveal the weak links and the threats to these corridors. This exercise would require interstate cooperation.
2. The ongoing study of WII to prepare a tiger recovery plan for Sahyadri is focused mainly on the CTH of the Tiger

Reserve. To prepare an effective plan, it would be wise to include and study the forest areas outside the CTH as these areas are very important for the long-term conservation of tigers in the Tiger Reserve. The spindle-shaped Tiger Reserve is surrounded by the forests of Satara-Sangli on the east, while on the western side the Ratnagiri forests provide the best additional habitat for tigers. On the southern side the reserve is connected with a wildlife sanctuary of Karnataka through Radhanagari Wildlife Sanctuary and the forests of Kolhapur. In the north the connectivity ends at Bhima Shankar Sanctuary, in Pune District, through Satara Forest Division. This tenuous link on the south is facing threats due to conversion of private forest lands into solar-fenced rubber plantations. The corridor is also threatened by extensive bauxite mining. The WII study needs to assess the impacts of both and suggest a mitigation plan.

3. It has been proposed that the Tilari forest, which still has good connectivity with Karnataka forests, be notified as a wildlife sanctuary (the proposal has already been cleared by the State board for wildlife). This forest may become a source population of tigers for Sahayadri Tiger Reserve, and therefore it would be worthwhile to notify this area as a wildlife sanctuary.
4. A good network of internal roads should be created to facilitate protection and management in the Koyana Sanctuary part of the CTH. The extremely bad forest roads in Chandoli National Park should be reconstructed, and the existing network of internal roads should be strengthened.
5. Currently the Android application M-STrIPES is used by the field staff for patrolling and monitoring. Data collection forms are also used to record the daily patrol data. Animal sightings/signs are not recorded in the data sheets. Also, the data recording format is not uniform across the forest ranges in the Tiger Reserve. To ensure the uniformity of the data the format should be standardised and used throughout the Tiger Reserve.
6. The majority of the frontline staff are unaware of the SOPs issued by the National Tiger Conservation Authority. The Maharashtra Forest Department has produced a handy book that has a compilation of all the SOPs translated into Marathi. It is important to provide copies of the book to all the frontline staff and organise training programmes about the SOPs.
7. To ensure effective protection and management of the Tiger Reserve, the large beats (the smallest is 11 sq. km. in extent, and the largest is 22 sq. km.) need to be reorganised into smaller, manageable beats of area 7-10 sq. km.. At least two officials of the rank of Assistant Conservator of Forests should be posted to assist the Deputy Director of the Tiger Reserve administration on each side of the reservoir.
8. The entire valley in Koyana Sanctuary is in the submergence zone of Koyana Dam. The agricultural fields and forests on the other side of the western boundary of the CTH under the control of Ratnagiri Forest Division offer an alternate habitat and foraging ground for wild animals, but they are exposed to numerous threats. Historically, the tiger occupancy has been restricted to the western ridge of Koyana Sanctuary. Hence, special efforts must be made to train and equip the territorial staff to enable them to monitor and protect tigers in their respective jurisdictions. The staff of the Tiger Reserve and territorial staff must work in tandem.
9. Tourist amenities, especially toilets, should be constructed near the Vasota gate, in Bamnoli.
10. Habitat improvement interventions should be planned systematically, and monitoring the impacts of the interventions should be an integral part of the programme. It is important to assess the effectiveness of the interventions. Mapping and monitoring unique and special habitats, wallows and salt licks should be an integral part of management.
11. Reintroduction of chital in Zholambi Beat of Chandoli National Park had failed in the past. Over two dozen chital were maintained in a 1 ha enclosure and subsequently released in the wild



without a sound monitoring protocol. As the area harbours a good number of leopards and dhole, the predation pressure is high and therefore the reintroduced chital probably succumbed to that pressure. The most prudent way to ensure the survival of reintroduced prey would be to construct large predator-proof conservation breeding enclosures and release the animals in large groups when the population builds up. The conservation breeding enclosures may be built in the areas from where the villages have been relocated or at suitable sites in Sagreshwar Sanctuary, Sangli, which is close by.

12. In the past, most of the grassy blanks were planted with Eucalyptus (an exotic). The management has planned to remove Eucalyptus from this natural area. While it may be a good step to get rid of the exotics to reclaim the grasslands, it would be unwise to remove Eucalyptus from steep hillsides as this move would trigger erosion and jeopardise the reservoir.
13. The practice of releasing rescued leopards in the Tiger Reserve needs to be stopped as the introduction of more leopards in a prey-deficient habitat may adversely impact the tiger reintroduction plan.
14. There are around 500 feral cattle in the reserve. The management has plans to remove them from the CTH. The MEE team feels that the feral cattle in Sahyadri serve a useful purpose as they act as a prey buffer and in all likelihood their number will be kept in check by the leopards.
15. When staff members and researchers come across large-sized scats, these should be collected and sent for DNA analysis to a recognised laboratory such as CCMB/WII to ascertain species identity.
16. There is a plan to carve out 14 villages in the south-western part of Koyana Sanctuary from the CTH by realigning the boundary of the core area. In fact, these villages are not on the periphery but are located within the CTH, and one of the villages, Navja, has good forest cover. In the past, this area was known for harbouring tigers. Secondly the western ridge of Koyana Sanctuary, within which these villages are located, has a history of tiger presence. Thus, keeping in view the importance of the area for conservation of tigers, the plan should be reconsidered.
17. The TR management is urged to assess the hazard posed by the pits dug in the past on the plateau of Rundiv, in Chandoli National Park by the mining department for bauxite prospecting prior to the notification of the national park. The reserve should take appropriate measures, such as systematically planned awareness outreach programmes and regular interactions with villagers, to persuade them to give up traditional hunting practices.



Upamanyu Chakraborty

TADOBA-ANDHARI TIGER RESERVE, MAHARASHTRA

Evaluation Period
July, 2017

06

Management Strengths

1. Tadoba-Andhari Tiger Reserve (TATR) is a part of a large tiger landscape in central India. Its connectivity with tiger-natal areas makes it important from the viewpoint of conservation of the species. Through Nawegaon-Nagzira Tiger Reserve, it is linked with Kanha Tiger Reserve in the north-eastern side, which is an important tiger source population in the landscape. In the south it is connected to Indravati Tiger Reserve (Chhattisgarh) through the forests of Chandrapur and Gadchiroli District.
2. The relocation of three villages completely and half of one village has added about 400 ha of area for wildlife use, free from excessive anthropogenic disturbance.
3. The buffer area is having a healthy forest cover. The 697 sq. km. extent of forests in the area is also rich in wildlife, including tigers, leopards and wild dogs.
4. The presence of perennial water sources such as the Andhari River, Erai Dam, Kolsa Lake, Junoria Lake and Tadoba Lake within TATR makes it a good habitat for wildlife.
5. A dedicated team of officers and frontline staff and empowered and managed EDCs are in place. Excellent work by the buffer area management team, led by a motivated Deputy Director, has resulted in good village relocation and standard buffer management practices involving community institutions such as EDCs.
6. The model of involving EDCs in ecotourism activities in the buffer area is noteworthy.
7. Adequate financial resources are available from the State Government, especially for implementing measures to mitigate human-wildlife conflict, creating alternative livelihoods including innovative ecotourism in the buffer with the active involvement of EDCs, reducing the use of fuel wood, creating awareness and eliciting the support of the locals.
8. Good support is available from some NGOs for awareness programmes, research, and protection (equipping protection camps).

Management Weaknesses

1. Although, only a village and a half remains in the core area, 23 out of the 92 villages located just outside the core exert significant pressure on the resources of the buffer as well as the core zone. As many villages have a good number of bamboo artisans, containing the illegal extraction of bamboo is a challenge for the management.
2. Unending political pressure to allow tourism in the core zone during the monsoon demoralises the management and staff, who are working relentlessly to create a disturbance-free core/critical habitat.
3. The approved Tiger Conservation Plan is for the period from 2015-2016 to 2025-2026, but it contains data which is a decade old. Further, little effort has been made to prescribe protection and management measures based on analysis of this data. There is little planning for habitat improvement interventions. Habitat management prescriptions are generic. There is no system of monitoring the effectiveness of the habitat improvement measures.
4. Information-based wildlife crime prevention measures are ineffective since the informer network is



inadequate. The wildlife crime investigation skills of the frontline personnel are weak.

5. The Chandrapur-Mul-Gadchiroli road poses a serious threat to wild animals. Over the last 3 years 21 wild animals were killed in road hits, including a tiger and a leopard. This road needs retrofitting along critical accident-prone stretches.
6. The TR authorities appeared to be complacent towards the threat to tigers from organised gangs of poachers.
7. Protection of tigers outside the reserve is not ensured through effective protection measures in the adjoining forest divisions. Cases of poaching in the corridors falling in the Vidarbha region are on the rise.
8. Incidences of tiger-human conflict are increasing around Tadoba.

Immediate Actionable Points

1. The TCP requires mid-term corrections to address the issues stated in the section on weaknesses.
2. It would be worthwhile to prepare a detailed project report for each habitat intervention task. This report should contain the baseline information, clearly define objective(s) of the intervention and a monitoring mechanism.
3. The sites of relocated villages need to be converted into productive grasslands. This will help the chital to proliferate and build a sizable prey base for tigers. This intervention is particularly important as there will be a sudden loss of supplementary prey (cattle) from the habitat after all the villages are relocated from the core. Therefore, availability of natural prey would reduce competition among tigers and allow more tigers to remain within the core without intraspecific fights.
4. Hands-on training sessions on wildlife crime investigation, identification of animal signs and evidence and wildlife rescues should be organised for range officers and other field personnel.
5. Considering the increasing conflict, two more fully equipped and trained wildlife rescue teams must be created to manage conflict situations effectively.
6. In case the villagers are willing to move out, the TR should take the initiative to relocate and rehabilitate villages located in the weak links of the corridors as well as in the buffer adjoining the core. The Madhya Pradesh Government has already started doing this.
7. Plantation of Prosopis, which is an invasive species and a threat to the indigenous biodiversity, has been carried out on the overburden from the open cast coalmines around the TR. A plan should be developed to replace Prosopis with local plant species to prevent its spread into the reserve.
8. A study should be commissioned to study air and water source pollution and ascertain the impact of particulates coming out of open-cast coalmines on the ecological conditions of the TR and on the health of wild animals and the staff.
9. The management of the buffer zone of the TR must not be as stringent and restrictive as that of the core. Otherwise, the very purpose of creating the buffer would be defeated.
10. The buffer forest should be protected adequately, but very limited habitat development works should be undertaken. However, water sources may be created in areas where water is scarce.
11. The wireless network should be strengthened and wireless sets should be made available to all members of the buffer zone staff so that communication and protection are effective.
12. The secret fund must be used fully to create an effective network of informers among the workforce of villagers deployed on a rotational basis by the TR management in the protection camps.
13. The Chandrapur-Mul-Gadhchiroli highway must be retrofitted to prevent deaths of wild animals that cross over

from Chandrapur forest to the buffer zone and vice versa.

14. The spurt in tiger numbers is a recent phenomenon in the Vidarbha region, and this could happen because of the successful management and protection interventions carried out in the recent past. A study by Wildlife Conservation Trust has revealed that there are 48 tigers in the non-PA forest area of Chandrapur District. As locals are not used to the sight of tigers in their neighbourhood, their reactions to tigers in and around villages are often hostile, provoking attacks by the tigers that result in injury or death of human beings or end in retaliatory killing of tigers. Therefore, the management of both TATR and adjoining territorial divisions must launch awareness-cum-training programmes for villagers to change their attitude and behaviour towards tigers and to train them in taking precautions and avoiding attacks by the tigers.
15. The wildlife rescue capacity must be strengthened to curb human-tiger conflicts within and beyond TATR.
16. The protection strategy needs to be fortified with an effective informer network within the TR as well as the adjoining territorial divisions and other smaller PAs of the region.
17. The community nature conservancy programme to promote high-end tourism in the buffer zone villages would vitiate the sanctity of the core/critical habitat and adversely impact habitats and wildlife, besides such a programme will be unethical as villagers residing in the core are being relocated out to create an inviolate space for tigers. More tourism in the core would negate their sacrifice.



Shantanu Sharma

MUKUNDARA HILLS TIGER RESERVE, RAJASTHAN

Evaluation Period
February, 2018

07

Management Strengths

1. A strong political will and support from the Government to establish Mukundara Hills as a popular Tiger Reserve.
2. Enthusiastic and motivated Field Director and Deputy Director and a staff of young members.
3. Serious and concerted efforts have been made to stop the seasonal movement and grazing of around 2,00,000 migratory sheep through the CTH and to evict illegal cattle camps from the core and buffer.
4. There is tenuous connectivity with Ranthambhore Tiger Reserve through Indergarh-Lakheri-Ramgarh Vishdhari Sanctuary-Dabi-Jawahar Sagar Sanctuary and with Darra through the ravines of Chambal and Kalisindh. Another possible corridor is up to Gandhi Sagar Sanctuary, of Madhya Pradesh, through Bhainsroadgarh Sanctuary.
5. A good tiger reintroduction plan has been prepared, and several measures to strengthen the protection and monitoring have begun. The e-eye surveillance system, M-STrIPES, creation of STPF has been planned.
6. About 10,000 LPG connections have been provided to families residing in the buffer to reduce the anthropogenic pressure exerted on the TR for firewood.

Management Weaknesses

1. The shape possesses an inherent disadvantage to MHTR, making it vulnerable to the biotic pressures emanating from 14 villages inside the reserve and about 87 villages around the periphery. As grazers with a poor socioeconomic background are the predominant occupants of the area, the habitat is under severe stress.
2. The unusual shape of the core, with patches of buffer areas, and the excessive mining in the corridor linking MHTR with the Bundi forests make it a tough task to ensure the long-term viability of tigers in this area.
3. The area has a poor prey base. Recently 400 chital from Jodhpur Zoo were released in the CTH, but post-release monitoring was not done, and thus the fate of the released animals is not known. Sambar are also being translocated from a military area. There are good numbers of leopards, jackals and wolves in the landscape. These animals exert high predation pressure, and therefore there is a likelihood that the released populations will soon dissipate to unviable levels and be eliminated completely.
4. Man-made development infrastructure passing through the CTH, like the Jaipur-Mumbai railway line and NH 12, pose serious challenges for the managers.
5. The infestation of Prosopis in the grasslands and Lantana in other areas is destroying the habitat for herbivores.
6. Preparations to curb the risk of poaching are not visible on the ground yet. As soon as tigers are brought, the dormant local poachers may be activated by the organised mafia.
7. The frontline staff is untrained and inexperienced in wildlife management and protection.
8. The villagers still residing in the CTH are hostile to the management. There have been physical confrontations with the staff in the village of Borawas recently and in the village of Giridharpura during the last year.
9. The plan to release tigers within the next 6 months is premature as the preparations are not complete yet. The non-involvement of a full-time research

team in the release programme and the subsequent monitoring of the released tigers and prey species is going to be detrimental. The training imparted to the staff to develop their monitoring skills (analysing signs and evidences, Pug Impression Pads (PIPs), camera traps, etc.) appears to be inadequate. As a result, the plan to release tigers this year will not be very fruitful. With the prey base being low, tigers that are reintroduced now may thrive on cattle, which would certainly aggravate the conflict with local villagers.

10. Masonry walls are being constructed to protect the CTH from the biotic pressures. Care must be taken to ensure that these man-made barriers do not cut off the access to the corridors.
11. Some villages have been relocated on forest land, but the forest lands have not been de-reserved and mutation of the land has not been done. As a result, the legal status of the land has remained unchanged, even in cases where relocation was completed 9 years ago. Due to this lapse, the relocated families are not eligible for agriculture loans, and they do not benefit from the panchayat's developmental activities. Such inordinate delays may lead to a loss of credibility and impede the relocation process.
12. The impacts of the interventions carried out to reduce the villagers' dependence on the forest, especially the current number of LPG connections provided to the villagers, are not monitored.

Immediate Actionable Points

1. The present practice of hard-releases of prey species into the CTH will not be successful. It would be useful to establish in situ conservation breeding facilities at multiple locations within the CTH.
2. The process of relocation of the villages of Giridharpura and Borawas should be hastened to help reduce the conflicts and make available a large, undisturbed habitat for wild animals.
3. The skills needed by the staff for controlling wildlife offences have to be enhanced through training programmes focused on surveillance of criminals, habitual offenders and traditional hunter communities; intelligence gathering; crime investigation; managing conflicts with villagers; and monitoring the prey base, predators, water sources, fires, road kills, cattle kills, impacts of habitat interventions and interventions in the villages to reduce resource dependence (distributions of LPG connections, etc.).
4. As most of the villagers in the buffer depend on cattle and a sizable number on mining for their livelihoods, the conflict with them will continue in the future unless a long-term systematic intervention is set in motion to provide them skills and opportunities to switch over to other livelihoods.
5. The complaint of rehabilitated villagers about non-issuance of revenue pattas of the forest land on which they are settled should be addressed at the earliest to make the rehabilitated families eligible for agriculture loans and reaping the benefits of rural development schemes of the Government. The management must take cognizance of this issue to resolve it. In March 2017, the MoEF&CC issued a clarification allowing de-reservation of forest land diverted for relocation and rehabilitation of villagers from PAs, and this needs to be consulted.
6. The retrofitting of NH 12 and the railway line passing across the entire width of the CTH at Darra Wildlife Sanctuary needs to be completed as soon as possible.
7. Strengthening the management of Bhainsroadgarh Sanctuary would be necessary to support the Mukundra tiger relocation project. This is the area that the tigers from Mukundara would occupy in the coming years. It would be prudent to notify Bhainsroadgarh Sanctuary as a satellite core of MHTR and bring it under the administrative control of the MHTR management.
8. Reports of the occasional presence of tigers in this forest tract indicate the existence of live corridors, but the situation on the ground today is dismal.



The corridor between Bundi and Mukundara is already vitiated owing to the heavy mining activity in Suket. As the Government is keen on bringing in tigers into Mukundara, it would be worthwhile to free some areas by stopping mining in critical movement passages. A study may be initiated at the earliest to understand the ground situation and give suitable recommendations.

9. The impact of interventions in the villages such as supplying cooking gas connections is not being monitored. It would be useful to monitor the level of use of LPG as well as its impact on the consumption of firewood.
10. The committee came across some cemented water holes constructed for wild animals. The excessive use of cement-concrete in such water holes and their design should be reviewed and improved. The committee also advises that building artificial water holes that require filling up by transporting water from elsewhere be avoided. In areas where water is scarce, solar-powered pumps may be provided for filling up the water holes. The availability of groundwater should be determined beforehand by carrying out a Vertical electrical sounding (VES) resistivity survey.

RANTHAMBHORE TIGER RESERVE, RAJASTHAN

Evaluation Period
February, 2018

08

Management Strengths

1. The TR, consisting of Ranthambhore National Park, Sawai Mansingh Sanctuary, Sawai Madhopur Sanctuary, Kailadevi Sanctuary and some reserved and protected forests, provides tigers with 1700.22 sq. km. of habitat, thus constituting an extremely important conservation unit.
2. The TR is important for the water security in the region since it forms the catchment of two major rivers-the Chambal and the Banas. Also, the historical and cultural attributes of the reserve are striking. The Kailadevi and Ganesh temples and Ranthambhore Fort are of immense historical and religious significance.
3. The Great Boundary Fault of Rajputana, separating the Vindhyan Mountains from the Aravallis, prominently manifests here in the form of the diversity of habitats and biota. The rugged undulating rocky terrain, with many narrow and some wide tree-studded valleys and grass-clad hilltops, is a natural advantage to Ranthambhore Tiger Reserve. As a result of the geomorphic fortification afforded by the hills, there is access to this protected area (PA) from only a few locations.
4. It is the highest revenue earning TR in the country. This world-famous reserve, known for easy tiger sighting, attracts around 4,70,000 tourists, of which almost one-third are foreigners.
5. The creation of a masonry wall along the periphery of the national park on the western boundary has certainly helped protect and rejuvenate the degraded parts by mitigating the severe biotic pressure and human-wildlife conflict.
6. With the villages inside relocated and the cattle camps disbanded, the national park part of the CTH is now almost free of cattle pressure, firewood collection, lopping and tree felling.

Management Weaknesses

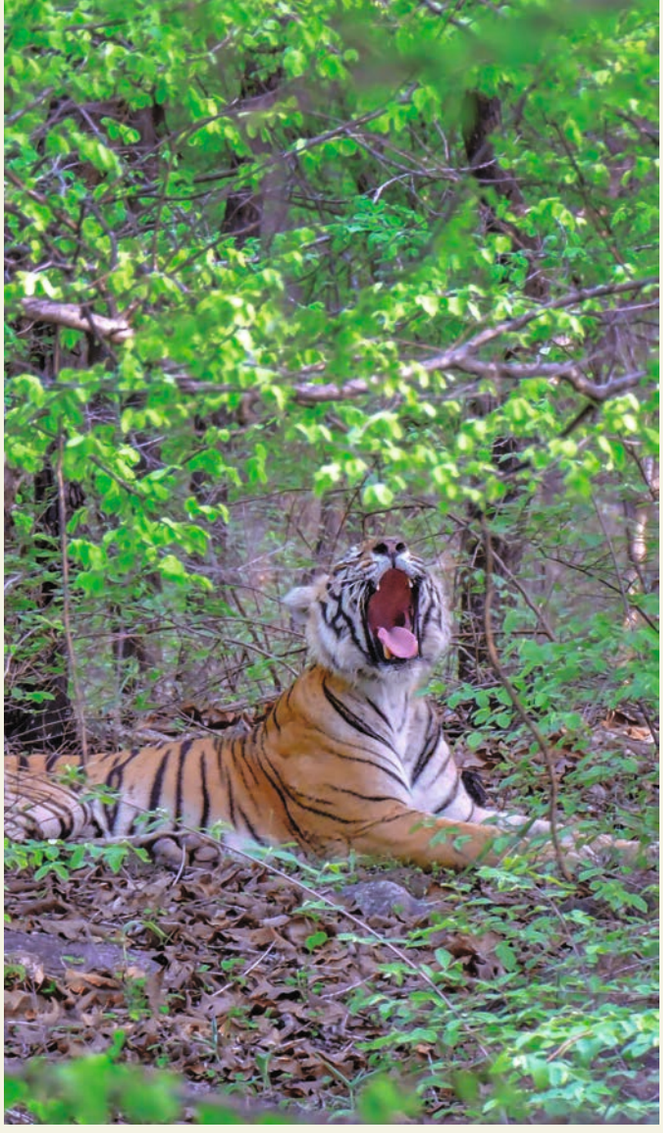
1. Buffer zone of the TR is very small, patchy and scattered. Hence it is not effective in terms of reducing the anthropogenic pressures on the core/critical tiger habitat.
2. Many parts of the CTH excluding the national park area are under intense biotic pressure from 65 villages (around 8000 families and 80,000 cattle) inside the CTH and 112 villages located less than 2 km from the periphery of the CTH (16,000 families and 1,60,000 cattle).
3. There is a complete lack of long-term planning for habitat improvement or treatment of the areas vacated after village relocation. Except for the regular monitoring of tigers, no other serious effort has been made to carry out research and monitoring. Systematic monitoring of several aspects of management and protection, especially wildlife offences, water sources, health of wild animals, domestic cattle and dogs, effectiveness of wildlife rescue teams and tourism, is almost absent. There is an apparent lack of a scientific temper in the management of the TR.
4. The areas vacated after the relocation of 12 villages, approximately 36 years before, have climaxed into woodlands due to the absence of management inputs. These sites should have been managed to create productive grasslands for deer species, especially the chital. Allowing the vacant sites to be converted to woodlands is a great loss to the reserve. Ironically, the management still continues with the same policy.
5. Visitors to temples inside the CTH cause serious adverse impacts in the TR. Collection of firewood for cooking, littering and open-air defecation lead to habitat degradation, pollution and the threat of epidemics. During the parikramas they leave burning incense sticks and food material inside the CTH. The discarded food attracts ungulates, primates and birds. Approximately 8,00,000 people visit the Ganesh temple during the August-September mela, and the annual footfall crosses 15,00,00-20,00,000. The pilgrims coming from other states come a day in advance. Besides, there are several other temples within the CTH. After the mela, several organisations help remove the solid waste, but there is no systematic and planned intervention to manage the solid and green waste.
6. Some villagers have a long history of enmity. The pressures at the periphery of Sawai Madhopur, Sawai Mansingh and Keladevi are still intense. Mining has emerged as a new threat.
7. Though the tigers have begun inhabiting Sawai Mansingh Sanctuary, now part of the CTH, the presence of several villages in the valley is a serious impediment. The prey base in this part is still poor, and therefore cattle predation may increase, leading to conflicts to the detriment of both tigers and people.
8. The maintenance of the patrolling camps, equipment and facilities for the staff in the camps and field is inadequate.
9. The newly recruited staff members have little interest in serving in the TR.
10. The relationship of the local villagers with the reserve is still fragile. The Tiger Conservation Plan (TCP) highlights the point that there is a lot of latent resentment amongst the population towards the park. There is a feeling of alienation, and the people perceive that the national park has not contributed anything to the rural economy. The benefits of tourism have accrued only to the city dwellers and rich people, not to the villagers. On the other hand, a lot of damage is caused to the crop and cattle by the wild animals, yet there is no compensation for crop damage.
11. Systematic and planned efforts to elicit the local people's support are lacking. The TR management assumes that the villagers are hostile due to mining issues, but the management has made no serious effort to improve their relationship with the locals.
12. The villagers have not been provided with alternative livelihood options and vocational skills to reduce their dependence on the TR.
13. Little effort has been made to address the issue of crop raiding.
14. There are two sanctioned posts of Veterinary Officer, but both these positions are vacant.



15. A majority of the buildings, including the Field Director's (FD's) office, are not being maintained. The camps lack basic amenities, equipment and tools.
16. The TR managers are not trained in wildlife management. Besides, few initiatives have been taken up for building the capacity of the staff.
17. The visits to the TR have doubled in the last 5 years, from around 2,47,000 visits in 2012-2013 to around 4,70,000 visits in 2016-2017. Besides, there are more than 2000 bed-nights available in the hotels and resorts around the park, and there is a likelihood that the number will increase to 2500 bed-nights soon. The TCP sees the sudden spurt in tourism as a serious issue. Despite this, a proposal to enhance the carrying capacity and allow more vehicles and visitors into the CTH is being processed. This move may prove counterproductive. Human imprinting of birds was also seen at spots where tourists halt and spend some time during their safari. Apparently, the field personnel do not restrain them from feeding the birds, and even they enjoy feeding wild birds and animals.

Immediate Actionable Points

1. There has been an inordinate delay in the approval of TCP. Only recently (in November 2017), has the NTCA suggested some changes to the TCP regarding the buffer zone. The TR management should amend the draft TCP and get it approved at the earliest.
2. The tiger recruitment rate in the TR is healthy, but the information available on the dispersal and the fate of the sub-adults is scanty. The TR should monitor this aspect on a priority basis.
3. Presently, the priority of the TR management is tourism, and there is little focus on protection, scientifically planned habitat interventions and regular monitoring of various aspects of TR management. The focus needs to change. It would be wise to concentrate on the major task of relocation of villages from the core and reclaim vacant fields as edge-habitats, strengthen protection and crime investigation, equip patrolling camps, monitor wildlife health, impart skills through training programmes to the field staff, find ways to strengthen the interface with the local people to create awareness and impart vocational training to village youths and women according to a long-term action plan.
4. In the light of the rapid increase in tourist numbers, the TR management should plan and execute a sustainable tourism model on a priority basis. The TCP prescribes the entry of 90 vehicles inside the park at a time on the basis of the calculated carrying capacity. Only morning and evening rounds are allowed in most TRs as the carrying capacity calculations are based on various factors, such as road length, proneness to erosion, disturbance to key wildlife species, number of vehicles per kilometre, duration of each trip and temporary closure of areas. However, in 2016 the State Government notified two other kinds of trips-full day (12 hours) and half day (6 hours) tours. Tourists are allowed to take full day and half-day tours and visit any or all of the tourist zones by paying enormous amounts of money. However, the Government order about tourism rules does not mention full day and half-day safaris. The practice of allowing tourists for the entire day militates against the carrying capacity limits as calculated and prescribed in the extant TCP. The ad hoc arrangement thus, defeats the very purpose of fixing the carrying capacity. Tourism data is hardly analysed or used in taking management decisions. A new post, that of DCF (Tourism), has been created but with limited responsibility, such as bookings and accounting. The DCF (Tourism) should monitor various aspects of tourism, especially the impacts of visits, tourist facilities and amenities and tourist characteristics, and advise the management to take appropriate action.
5. The forest land at Aamli on which a village has been rehabilitated has not been mutated in favour of the inhabitants, and as a result the legal status of the land has remained



Moulik Sarkar

unchanged. Due to this lapse, the relocated families are not eligible for agriculture loans, and they are mostly deprived of the panchayat's developmental activities. Such delays may lead to a loss of credibility and impede the relocation process.

6. The buffer is small and disjointed. The local people have no involvement in tourism except in some menial jobs, and only a small number are engaged in the taxi business and as guides. A participatory ecotourism plan should be developed for tourism in the peripheral areas of the CTH and in good areas of the buffer patches to involve locals and allow them to reap direct benefits from ecotourism. It is important to win the support of the locals.
7. The tourism receipts, like any other revenues, go to the Government exchequer and are released by the Finance Department after a gap of a year or so. As the tiger foundation is entitled to receive the revenue generated from tourism activities, the entire amount should directly accrue to the foundation without any interference from the Finance Department. The foundation is a registered society governed by the Societies Registration Act, 1860. Therefore, the current practice of routing tourism receipts through the Finance Department is not legitimate. This lacuna should be removed as early as possible so that the funds may be utilised for conservation activities without an unnecessary delay.
8. The tourism fee also includes an eco-development fee, which constitutes more than 50% of the tourism fee. At present the corpus generated from tourist receipts is around Rs.50 crores, but perhaps only a little of this fund has been utilised for ecodevelopment works. This money may be fruitfully utilised to initiate job-linked livelihood interventions for village youths and women.
9. The MEE team received feedback from some stakeholders pointing towards irregularities in the current system of safari bookings in the TR. The State should investigate the issue diligently and take measures to develop and implement a better system, ensuring transparency.
10. Patrolling camps (nakas and chowkies) must be provided with potable water and solar power, and the field staff, including the work-charge and daily wage protection workers, need to be provided with appropriate field gear and equipment.
11. A study needs to be carried out to assess the impacts of the pilgrims on the habitat and the wildlife around the Ganesh temple and to suggest mitigation measures.



SARISKA TIGER RESERVE, RAJASTHAN

Evaluation Period
August, 2017

09

Management Strengths

1. Sariska Tiger Reserve forms the north-western limit of the distribution of tigers in India. It is a repository of the biodiversity of the Aravalli Hills, the oldest mountain range in India.
2. That there is a team of young and dedicated managers at present augurs well for the Tiger Reserve, and this team should continue to manage the reserve for at least 5 years in this, the consolidation phase. The Tiger Reserve is at a critical juncture and therefore, needs continuity of officers and staff.
3. The LPG connections provided to about 15,000 families in 13 or 14 villages would help reduce the dependence of the villagers on the reserve for firewood.
4. With the addition of about 60 sq. km. of excellent forest of the Jamua-Ramgarh Sanctuary and of approximately 180 sq. km. extent of the territorial forests of Alwar Forest Division, the buffer zone of Sariska has grown by about 245 sq. km. This zone will provide a home to the tigers dispersing from the critical core habitat of the reserve.
5. Recently, the Tiger Reserve management has installed GPS devices on the Gypsies registered for safaris. This step allows movement of tourist vehicles in the Tiger Reserve to be monitored in real time.
6. Monitoring of the reintroduced tigers and their progeny is being done meticulously.

Management Weaknesses

1. Though over a decade has elapsed since the first batch of founder population was reintroduced in the area, Sariska is at risk of losing its tigers once again due to the slow growth of tiger population. This is because most of the decimating factors continue to operate.
2. The Tiger Reserve is apparently isolated, with no connectivity with other natal areas of tigers. Thus, natural exchange of gene pools with other tiger populations is nearly impossible.
3. There are 26 villages in the core/critical tiger habitat of the reserve. These villages depend on the forests for resources. There is excessive degradation of the habitat owing to resource utilisation by the villagers and their livestock.
4. No solution is in sight for mitigating the grazing pressure faced by the core/critical tiger habitat. The villagers inside the reserve bring in cattle of outsiders. A recent study conducted by the Wildlife Institute of India (WII) indicates that the severe human disturbance in the core/critical tiger habitat may be responsible for the poor fecundity of tigers.
5. There is no input to convert the relocated and rehabilitated village sites into productive edge-habitat despite funds having been provided for habitat improvement.
6. There is a scarcity of perennial water sources inside the Tiger Reserve. The conditioning of the animals to the noise of the tractors carrying water tanks is obvious.
7. Village relocation has been effected in the Tiger Reserve (TR), but there is no mechanism in place to provide subsequent support for the relocated families. The communication between the TR management and the relocated villager is negligible. Thus, in case there is any problem, the villagers find themselves stranded. This situation will discourage the villagers of the remaining villages from accepting relocation.

8. Some villages have been relocated on forest land, but the forests have not been de-reserved and mutation of the land has not been carried out. As a result, the legal status of the land has remained unchanged, even in the cases where the relocation was done 9 years ago. Due to this lapse, the relocated families are not eligible for agriculture loans, and they are mostly kept deprived of the panchayat's developmental activities Such inordinate delays may lead to a loss of credibility and may impede the relocation process.
9. Pandupol, deep inside the critical tiger habitat, Nal Dev and the Bhartrihari temple, along SH 13, have become sources of high levels of disturbance caused by rowdy elements.
10. The TR management has virtually no control over the religious tourists and the activities of the temple managers and visitors. Pilgrims feed the wild animals at the temples and along the roads leading to them. This has altered the behaviour of the wild animals, forcing them to congregate on the roads and beg for food. This has also led to conditioning of the wild animals to human crowds. Animals feeding on the garbage lying around is a common sight. The Pandupol temple management dumps garbage in large, open cemented bins. The MEE team witnessed sambar, wild pigs, macaques and birds making a beeline to these garbage dumps. The temple management sets fire to the garbage, sending toxic fumes into a natural and clean environment. However, these problems could be easily managed, but little effort has been made so far by either the temple management bodies or the TR management.
11. There is no monitoring of the movement and the speed limit of vehicles carrying visitors to the temples. More than 25,000 vehicles carry around 1,20,000 pilgrims to the temples every year, creating noise, throwing up dust and risking the lives of the wild animals that congregate and scavenge along the roads in large numbers. Despite repeated requests, the MEE team could not obtain information on road kills of wild animals. Thus, the team infers that the TR management does not monitor this crucial aspect.
12. Due to a lack of forest rest houses/ inspection huts in the TR, senior officials are unable to stay in the field. The tourism infrastructure of the reserve is also very basic.
13. Opening up the core/critical tiger habitat for tourism in the monsoon this year is not a good idea, as this would add to the myriad of human-induced pressures that this TR is already facing.
14. The ecotourism plan does not address the visitors' safety issues.
15. There are several cases of human-wildlife conflict in and around the TR, and in many cases animals need to be rescued. However, there is no full-time veterinarian in the TR to cater to rescued wildlife.
16. The Local Area Committee has not been constituted, and the ecosensitive zone has not been notified yet.
17. The TR management is not levying conservation fees on lodges and resorts.
18. Political interference by local public representatives in the TR management issues has demoralised the work force. The officers and staff appear to be totally on the back foot, and they yield under pressure.
19. Some of the villages in the core/critical tiger habitat are hostile towards the TR. In an incident, an angry mob of villagers instigated by local political leaders even set fire to an immobilised leopard. An FIR was filed, but no arrests have been made.
20. The relationship of the TR management with the local people is not good. And very little effort is being made to improve them.
21. There are only 40 ecodevelopment committees (EDCs), while there are 178 villages in the core and buffer zones. The EDCs have not prepared micro plans.
22. The frontline staff are not trained in various aspects of wildlife management.
23. The officers and staff are unaware of the Standard Operating Procedures (SOPs) issued by the NTCA.



24. Due to presence of hunting communities (for e.g. the Bawaria community) in the region, the TR is subjected to wildlife poaching. This community was behind the poaching of tigers in 2005-2006, leading to the extirpation of tigers in Sariska.
25. In recent years, some key species such as the sloth bear, chinkara and caracal, have not been recorded/sighted in the TR. The population of the chowsingha has also declined. It is suspected that the poaching of these non-charismatic species is continuing unnoticed.
26. The good forest of Jamua-Ramgarh Sanctuary has been added to the buffer zone of the TR. However, this forest could have been added to the core zone.
27. Almost 65% of the beats are manned by daily wagers instead of forest guards. The situation needs to be changed, and regular forest guards should occupy these posts.
28. Hardly 20% of the TR visitors visit the Nature Interpretation Centre (NIC). The quality of the centre is poor. It is non-thematic and does not cover many important topics and aspects. The NIC visitors are charged a fee of Rs.20. Very few visitors make use of this facility. The entry fee is undesirable, and visits to the interpretation centre must be free.
29. Mining leases have been given close to the core/critical tiger habitat. At places, the distance is less than 500 m. There are 61 mines within 500 m of the TR boundary. Moreover, mined areas have yet to be reclaimed. In Jamua-Ramgarh Sanctuary, which is the buffer of Sariska TR, there are 24 mines within 100-300 m from the TR boundary.

Immediate Actionable Points

1. The protection and wildlife monitoring protocol that is operational on a pilot basis in Ajabgarh Range seems to be effective, and hence it needs to be replicated in all the other ranges of the TR.
2. Regular forest guards should be posted in the TR, and they should be deployed in the beat chowkies, currently manned by daily wage workers.
3. It came to the notice of the MEE team that new recruits do not want to work in Sariska Tiger Reserve due to tough conditions. To overcome this obstacle, the recruitment rule should be changed suitably to encourage the recruitment of more local youths, who are familiar with a life in the jungle, as guards and in the protection force. At least 1 month's initial training in a remote part of the core/critical tiger habitat just after induction should be made mandatory. This experiment has worked well in Kanha Tiger Reserve, Madhya Pradesh.
4. The secret fund allocated in the APOs is very important for developing an effective network of informers for wildlife crime prevention and control. In the APOs of Sariska TR the secret fund allocation was Rs. 10,000-25,000. Unfortunately, not a single rupee was spent in 2012-2013 or 2013-2014. The TR needs to utilise this fund effectively to contain wildlife crime by creating and maintaining informers and to trap criminals.
5. Under the schemes of NABARD and CAMPA, plantation is being carried out all along the open habitat patches at the foothills on the southern periphery. It would be wise to guard against planting all open areas. It is advised that some open areas (edge-habitats) be maintained as grasslands.
6. A detailed plan should be prepared for restoration of all the vacated village sites as edge-habitats. A monitoring plan should be an integral part of this effort. In the last few years, the allocation of funds by the NTCA for habitat restoration works such as removal of weeds and reclaiming vacant village lands has been very limited. It is suggested that funds from CAMPA and the Tiger Foundation be earmarked for long-term interventions and monitoring.
7. Solar pumps may be useful in solving the scarcity of water, at remote locations, during the pinch period. Solar pumps would end the current practice of using water pumps powered by tractors to fill up water holes, which is altering the behaviour of animals.

8. In recent years as many as five leopards have been captured in conflict situations, and all of them have been sent to Jaipur Zoo for a lifetime of captivity. It is suggested that an appropriate protocol be followed when taking a decision to send a captured animal to a zoo or any other captive centre.
9. At least one resident veterinarian needs to be posted in the TR. This veterinarian should be trained in wildlife health management and rescue operations. It is expected that with an increasing population, tigers will come out of the core/critical tiger habitat and will begin exploring the buffer areas and the corridors. This would obviously result in increased encounters with human beings.
10. Regular training sessions and mock drills should be organised for the rescue team. The team needs to be equipped fully.
11. The TR should assess the training needs of the staff and prepare an annual plan of training inputs provided to staff members and officials at various levels so that a trained workforce is created. Regular hands-on training programmes in wildlife crime prevention and investigation must be organised at the range level.
12. The SoPs issued by the NTCA should be translated into Hindi and made available to the relevant levels of the frontline staff. The SoPs should also be made a part of the relevant training programmes.
13. An ambitious Rs.99 crores participatory ecotourism programme for the buffer is in the pipeline. It is important to plan for the manpower needed to manage these works and activities. If this planning is not carried out, the buffer staff will be overburdened and the protection of the buffer will suffer. Besides, it would be useful to spell out clearly the roles and responsibility of each stakeholder and the mechanism for benefit sharing with the EDCs.
14. In Sariska, the Tiger Foundation Fund is used to disburse compensation in human-wildlife conflict cases. It would be wise to stop paying compensation from the Tiger Foundation Fund. As in other states, the State Government in Rajasthan should allocate funds for compensation from the regular budget as a matter of policy. Many states have included this provision under the Service Guarantee Act. The funds are placed on the central servers so that they are available and compensation is disbursed in a timely manner to the victim or kin. Compared with most other wildlife-rich states, the quantum of compensation is very low and needs to be enhanced.
15. EDCs should be constituted in all fringe villages and participatory ecodevelopment micro-plans should be prepared. This would help improve the relations between the TR management and the fringe villages.
16. The mined areas should be reclaimed by filling them with the debris and planting with indigenous species. Plantation of Prosopis should not be done.
17. In the TR, cattle apparently represent a major source of food for the tigers. A research study carried out by the Wildlife Institute of India did not consider cattle as a food source of tigers. Thus, a study needs to be conducted on the utilisation of cattle by tigers. At the same time, the population of feral cattle should also be assessed and monitored. It must be kept in mind that removal of all the cattle, of the 26 villages that would be relocated in future, from the critical tiger habitat (CTH) may adversely affect the availability of prey for tigers.
18. Non-availability of potable water in some remote camps is an issue that needs to be tackled by providing water filters in all camps. Health checkups must be carried out regularly for all the field personnel.
19. Efforts should be made to develop long-term partnerships with NGOs such as WWF, WCT and WTI for research and monitoring, corridor mapping, strengthening the protection and mitigating the human-wildlife conflict.
20. The Phase IV monitoring data indicate that the training imparted to the staff for data collection was inadequate. As a result of this shortcoming, the results are not reliable. The management must therefore arrange regular training programmes for the staff.



21. Exposure trips of the villagers of the existing villages in the core/critical tiger habitat to the relocated and rehabilitated villages should be organised. These trips will let them see and understand the benefits of relocation. Such exposure would certainly motivate a good number of villagers.
22. The EDCs should be made active. Awareness tour should be organised for EDC members in addition to skill development training programmes.
23. LPG connections are being given to villagers under a 100% subsidy. This needs to be discouraged, and contributions of the beneficiary families should be made mandatory. The usage of LPG in cooking should be monitored.
24. Currently, the amount budgeted for development work in the TR is transferred to the EDCs that execute the work, and the Forest Range Officer monitors it. The model of execution needs to be reviewed for fine tuning and improvement and for making it more transparent.
25. Private and panchayat lands in the middle of the core/critical tiger habitat are being used by tigers frequently. This exposes them to the threat of being poached. The land patches should be acquired and made a part of the core/critical tiger habitat.
26. A recent study has revealed that the level of cortisol (a stress hormone) in the tigers in Sariska is high. The secretion of the hormone might be triggered by the anthropogenic disturbances and might be the reason for the poor fecundity of the tigers in Sariska. Cortisol also causes abortions and abandonment of cubs. Thus, the relocation of the remaining 26 villages needs to be expedited to improve the breeding success of the tigers.
27. The complaint of rehabilitated villagers about non-issuance of revenue pattas of the forest land on which they are settled should be addressed at the earliest. Since the forest land has not been denotified and mutated into revenue land, the farmers without pattas are unable to get agriculture loans or reap the benefits of many rural development schemes. The management must take cognizance of the issue to resolve it.
28. Local farmers are employing people from the Bawaria community to guard their crops and cattle against wild animals. It is quite possible that under the garb of crop protection many wild animals are being hunted outside the core. Such cases are seldom detected. A Wildlife Crime Investigation Cell needs to be constituted at the TR level and sniffer dog squads put on job to help detection of such offences.
29. A close scrutiny of the map of the landscape reveals that some connectivity still exists between Ranthambhore and Bharatpur through the forested ridge that begins at Lalsot and runs south-west to north-east up to Mandawar. The chances of tiger getting into Uttar Pradesh are high due to the presence of forest and crop cover. But the tigers dispersing from Sariska or Ranthambhore may use the route from the Mandawar-Rajgarh hills through Bharatpur and Rajgarh. It would be wise to initiate a study to identify the weak links in this connectivity and plan adequate interventions to make those areas suitable for tiger dispersal.
30. The part of Alwar Forest Division included in the buffer of Sariska and about 200 sq. km. of territorial forests beyond it provide a home to the tigers dispersing from the core area. The need of the hour is to monitor the tigers dispersing to this area and to ensure that they are afforded protection. Thus, it is important to train and equip the territorial forest staff to monitor the tigers in their respective areas appropriately and and to provide adequate protection to these tigers.
31. The politicians and the District Administration need to be briefed and sensitised to the possibilities of tigers occupying the territorial forests in the State. Not long ago, many tracts of territorial forests in Rajasthan were endowed with tigers. Hence, the people should be ready to accept them once again and feel proud to have them.

DUDHWA TIGER RESERVE, UTTAR PRADESH

Evaluation Period
April, 2018

10

Management Strengths

1. Unique and rich habitat that harbours a number of threatened species. This TR has the distinction of having the largest population of one of the three sub-species of Swamp Deer Rucervus d. duvaucelli.
2. It holds a thriving population of the reintroduced one-horned rhinoceros.
3. It has active connectivity with other protected areas in the landscape, including those in Nepal.
4. Abundant availability of water.
5. In recent times many good initiatives, mainly related to evacuation of encroached areas along the Nepal border, have been undertaken by the present Deputy Director. Some instances of good wildlife crime investigation and the removal of a 35 year long illegal occupation of forest land in the core by the Deputy Director were brought to the notice of the team.
6. There is good support from non-Governmental organizations in mitigating human-wildlife conflicts and monitoring of corridors and the wildlife population. The human-tiger conflict has been addressed with the support of WTI. WTI has had in place a well-equipped conflict mitigation team comprising of a veterinarian, a biologist and a sociologist since 2009 for the purpose, and Primary Response Teams (PRTs) of locals have been constituted in sensitive villages. These measures have resulted in the capture of eight tigers in the landscape, of which four have been released back in the wild. WWF-India has assessed the status of some identified corridors in the landscape. The organization also supports the Tiger Reserve in monitoring the rhinoceros' population and the ranging patterns of the rhinoceroses.
7. A satellite population of four rhinos has been established recently in Belrayan Range, in an area of 13.5 sq. km.. The male rhino kept here is the one that strayed into Dudhwa from Shukla Phanta Wildlife Reserve, of Nepal. This is a good strategy as it will certainly improve the genetic diversity of the rhino population at Dudhwa.
8. Several Sashastra Seema Bal (SSB) camps have been established on the international border with Nepal, and these are acting as effective deterrents to intruders. The forest staff maintain a good relationship with the SSB personnel.
9. The Special Tiger Protection Force has been constituted from the Police Department for enhancing protection.

Management Weaknesses

1. Three units of the reserve, Dudhwa National Park, Kishanpur Wildlife Sanctuary and Katarniaghat Wildlife Sanctuary are managed separately and not as a single entity. The role of Field Director seems to be perfunctory. There appears to be no effort to consolidate the entire Tiger Reserve as one cohesive unit.
2. There are 34 villages in the core of the Tiger Reserve that need to be relocated, but the legal menaces of the FRA vis-à-vis the Wildlife (Protection) Act, 1972 and the high land price in the region have stalled their relocation.
3. The camps inside the reserve are poorly equipped and manned by a staff of inadequate strength. The staff are also not oriented towards stringent monitoring of the wildlife.
4. The level of vacancies among the staff is very high.
5. The MEE Team found that roads are



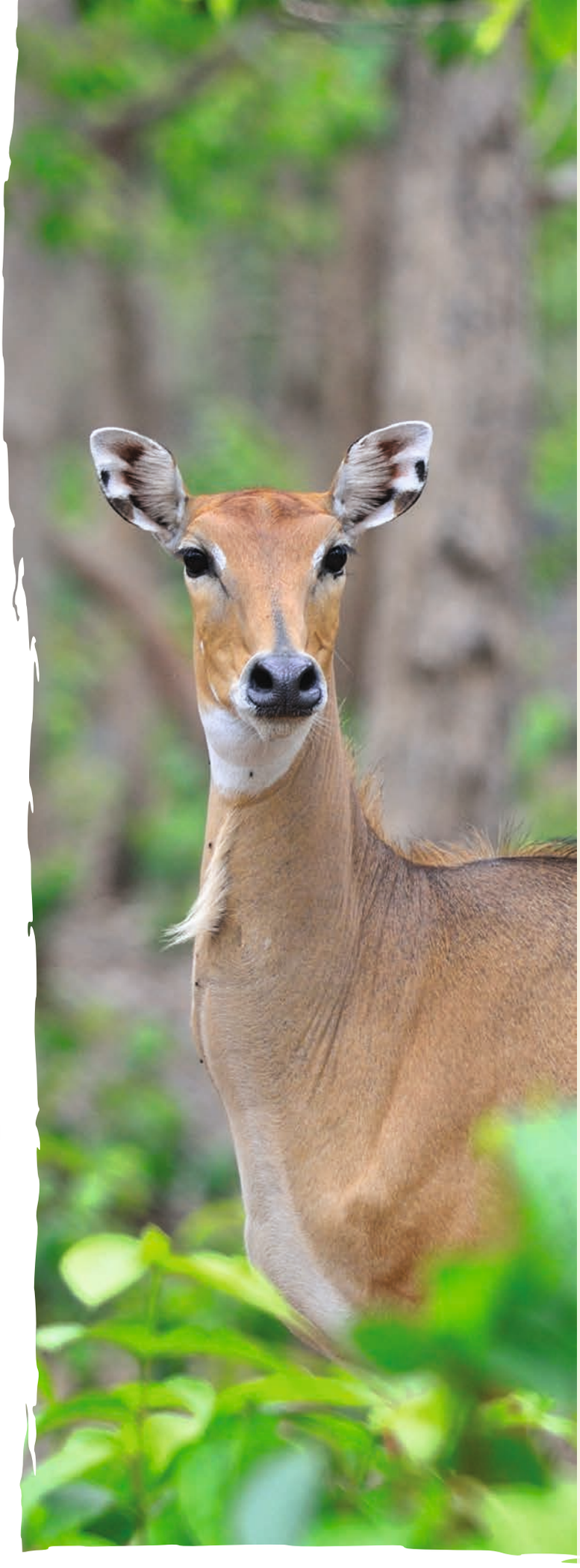
excellent and that the number of roads and buildings in the reserve is adequate, but most of the buildings are in bad shape. Similarly, the habitat management interventions are unplanned and unmonitored. The reason cited was an utter lack of funds for maintenance work.

6. There is an apparent lack of scientific temper among the officers and staff. Despite there being good scientific prescriptions in the TCP for habitat intervention and monitoring, the management has paid little heed to these. The only major habitat improvement intervention is the annual harrowing and burning of all the grasslands. But the committee did not find any protocol in place to monitor the impact of such manipulation of the habitat. The species composition of the grasslands has not been studied to understand the impact of regular harrowing and burning practices. The special and unique habitats have neither been mapped nor monitored. Though certain pockets are severely infested with weeds, little effort has been made to assess the extent under various weeds and to reclaim the affected areas. Only Euryale ferox (makhana) is removed from some wetlands.
7. There is no separate Security Plan for the Tiger Reserve. Mapping of sensitive and vulnerable sites based on offence data has not been done. Though, the TCP has a theme plan, 'Protection and Intelligence Gathering', most of the prescriptions are not implemented on the ground.
8. The management has not identified areas that are critical from the viewpoint of wildlife offences to take effective protection measures. Patrolling is done by beat guards and daily wagers. The frontline staffs, including Range Officers, are unaware of the SoPs issued by NTCA.
9. The offence data pertaining to the last 3 years show an increase in the number of poaching cases and a marginal decline in illicit felling. Besides, there are several cases (on an average 266 cases/year) of various offences. Surprisingly, data shows that there are no incidences of fire and encroachment.
10. Some instances of good wildlife crime investigations and removal of encroachment were brought to our notice. But systematic and planned mitigation of various threats was not visible on the ground.
11. No attempt has been made to revive the defunct EDCs. The committees have yet to be constituted in the buffer area. The manager and field staff of the buffer zone are apparently not clear about the objectives of buffer zone management as well as the kind of interventions required, and therefore there has been no progress in the management of the buffer since, its notification last year. Compensation is not given to the villagers in cases of crop damage and killing of cattle. Crop damage is a serious issue but it has been addressed poorly.
12. The aspects of livelihoods, alternative resources and protection have remained untouched over the last year. The staff of the buffer are poorly oriented towards crime investigation protocols. There is no wireless communication as number of stations and wireless sets available is not adequate.
13. Several roads and the meter gauge railway line passing through the Tiger Reserve pose a serious threat to the wild animals. A systematic record of cases of train hits has been maintained by the management for the core area, but there is no record for the buffer zone. Records of road hits are not maintained.
14. Though there are several local NGOs working in the field of wildlife conservation, their skills have not been tapped by the management of the reserve. An effort should be made to make them partners in activities related to conservation awareness, guide training, eco-development and combating wildlife crime.
15. Green and solid waste from the tourist complexes and the patrolling camps are not being disposed off effectively.

Immediate Actionable Points

1. Ensure timely allocation of an adequate budget to the reserve.
2. Fill up all vacant posts as early as possible.
3. Register the Tiger Conservation Foundation so that additional funds are available for the reserve.
4. In order to ensure long-term conservation of the Tiger Reserve, it would be imperative for the Government to take all possible measures to secure the connectivity between the three separate units of the core area. Meetings at the level of the CWLW have taken place, but little work has been done on the ground. Besides the internal efforts, it is important to get into an interGovernmental agreement with the Government of India, Government of Uttar Pradesh and the Government of Nepal to safeguard and restore the trans-boundary corridors.
5. The forest corridor between Dudhwa National Park and Kishanpur Wildlife Sanctuary needs to be restored. However, the Sharda River, which flows along the eastern boundary of Kishanpur, and some natural water channels are probably used by wild animals for movement between the two protected areas. Protecting the natural water channels and maintaining a green cover along them is imperative for ensuring the long-term survival of the tiger as the Dudhwa-Kishanpur link provides a connection to the larger tiger landscape through Pilibhit Tiger Reserve. The sugarcane fields between the two protected areas also provide movement cover to wild animals, but this land use is a potential source of human-carnivore conflicts.
6. Kishanpur Wildlife Sanctuary is closer and much better connected to Pilibhit Tiger Reserve than to Dudhwa Tiger Reserve. It would be useful to make Kishanpur a part of Pilibhit Tiger Reserve.
7. Recently, the Uttar Pradesh High Court ordered that the railway line passing through Dudhwa should be realigned or shifted. As per the order of the court, a high-level meeting chaired by the Cabinet Secretary was held in March 2018. It was recommended at this meeting that (1) the meter gauge line passing through the Tiger Reserve not be upgraded and retained as it is and that (2) a train be operated on the meter gauge line for ecotourism. We hope that adequate safeguards will be put in place before the ecotourism train starts operating in the future. Otherwise it will defeat the very purpose of the court order, which is to stop the accidental deaths of wild animals on the track.
8. Water samples from the wetlands and waterholes should be monitored regularly to ascertain if there is any arsenic contamination.
9. The Field Director should strive to manage the three units of the core and the buffer zone as a single entity of a Tiger Reserve rather than three disjunct units.
10. It came to our notice that revenue generation targets are fixed for the forest ranges that are met either through revenue generated through tourism activities or compounding of offences in the Tiger Reserve. To meet the revenue targets, the offence cases pertaining to the core area are also compounded, in violation of section 51 C of the Wildlife (Protection) Act. This practice is illegal and therefore must be stopped.
11. All levels of officers and field personnel and all personnel must be trained according to an annual training plan. The training must be in various core skills such as reading signs and evidence of wild animals, effective patrolling, crime scene investigation, interrogation, collection of forensic evidence, implementation of SoPs, conflict resolution, wildlife rescue, etc.
12. The camps inside the Tiger Reserve should be provided un-contaminated potable water, solar lights and basic camp paraphernalia. The staff should be trained in camp maintenance and camping etiquette. Camps were in a very shabby State.
13. All efforts should be made to manage the buffer zone according to its objectives. Adequate financial and skill training must be provided to the staff to





achieve these objectives. The EDCs that are defunct now need to be reconstituted as per the GR through a transparent process.

14. It is crucial to escalate the awareness activities as well as involve villagers in surveillance and primary interventions such as issuing alerts and providing first aid immediately to the victims in human-carnivore conflict-prone areas. The village youths who are members of the PRTs constituted by WTI need to be trained and imparted these skills. Creating a trained and equipped cadre in the Tiger Reserve as well as the adjoining forest divisions will further strengthen the capacity to avoid or manage wildlife conflict situations. There is a need to provide professional training to the forest staff in physical and chemical capture, mob management and precautions that save the lives of both onlookers and animals. Besides appropriate equipment and tools for rescue, a customised transportation vehicle needs to be provided.
15. Land to the extent of 38.42 sq. km. of the Central State Seed Farm (Ministry of Agriculture, Government of India) that has been transferred to Katarniaghat Wildlife Sanctuary needs to be restored. Locals are making unsuccessful attempts to encroach upon the area, which has been vacated by the officials and staff of the seed farm. The area consists of orchards and Jatropha plantations. There are farms in the three forest blocks- Girijapuri Block of Katarniaghat Range and Bagulia and Koliagauri blocks of Nishangara Range. Because Katarniaghat Sanctuary is narrow, it is vulnerable to encroachment. It would be imperative to take full control of this area and convert it into grasslands and savannah-like habitats.
16. The health of the wildlife in the reserve is not monitored. Records are not maintained for the vaccination of the livestock in the villages within and outside the core also. The vaccination done by the veterinary department in the villages around the Tiger Reserve is not monitored. It would be wise to fill up the vacant posts of veterinarians, provide the vets with skills and equipment and make them responsible for health-related tasks.

Nilanjan Chatterjee

PILIBHIT TIGER RESERVE, UTTAR PRADESH

Evaluation Period
April, 2018

11

Management Strengths

1. The functional connectivity with the adjoining tiger habitats in the landscape, such as Suklaphanta National Park of Nepal and Dudhwa Tiger Reserve, persists, and tenuous connectivity with Corbett Tiger Reserve through the forests of Uttarakhand links the reserve with the major sources of tiger in the landscape.
2. Because the reserve is situated in the Terai, there is no dearth of water, and the habitat is highly productive.
3. Good efforts have been made to reduce illicit grazing and felling pressure within a short span of time.
4. Well maintained forest roads and other infrastructure help manage the area better.
5. The frontline staff are active and effective under the able leadership of the managers of the reserve.
6. Sincere efforts have been made to involve villagers in ecotourism activities at Chuka through eco-development committees (EDCs). The ecotourism facility is run by the Uttar Pradesh Forest Development Corporation, but the canteen is run by the EDC.
7. There are useful and effective partnerships with the Wildlife Trust of India, for managing the human-tiger conflict, and WWF-India, for monitoring tigers.
8. Interaction and co-ordination meetings with other agencies are organised regularly. Trans-boundary meetings with counterparts in Uttarakhand and Nepal are also organised, and matters related to wildlife crimes are discussed formally. Meetings with the Police (Superintendent of Police) and District Administration are held every month, and co-ordination meetings with the Shashastra Seema Bal (SSB) are organised every 3 months.

Management Weaknesses

1. The horseshoe shape of the reserve, the inadequate width of the core at several places, the human habitations and farmlands surrounding the reserve, the fragmented and threatened corridors, and manmade habitats beyond the core are major causes of conflict with the local people and may be detrimental to long-term conservation of the tiger in this reserve. The land use outside the reserve (crops such as sugarcane being grown round the year) aggravates the human-tiger/leopard conflict.
2. The proposed road along the Indo-Nepal border may permanently impair the fragile corridor connecting the reserve with Suklaphanta National Park.
3. An extent of 17.63 sq. km. of the notified buffer in Sahjahanpur Division is still not under the unified control of the Field Director of the reserve.
4. A draft TCP was submitted to the NTCA on 29th February 2016, but even after two years, the TCP has not been finalised and approved, due to lack of incorporation of the NTCA comments.
5. The beats are very large in size (the average beat size is about 15 sq. km.), and the beat map is not digitized. It does not show the locations of unique and special habitats, wallows, salt licks, water holes and areas vulnerable to different categories of threats.
6. Several field officer and frontline staff posts are lying vacant, and beat guards have to look after multiple beats due to a shortage of staff members. Two sanctioned posts of Veterinary Officer are also lying vacant. The sanctioned strength of the frontline staff is less than what is actually needed. The average age of the field staff is greater

than 45 years. There is a dearth of lady Forest Guards. Those posted in the Tiger Reserve do not want field postings.

7. The groundwater has high levels of arsenic. This poses a health hazard to field staff members who drink water from shallow-bore hand pumps.
8. The core area of this Tiger Reserve is under intense biotic pressure from about 350 villages located within 3 km of the core. Thus, there is continuous pressure on the forest of the core for fuelwood, grazing, thatch grass, mushrooms and Grewia berries. The peripheral areas and the areas along the banks of the Sarda River still suffer heavy grazing pressure. Fires are lit by villagers around old growth trees to encourage good growth of mushrooms in the rainy season.
9. There is no long-term planning and monitoring of grassland management interventions. In the absence of scientific monitoring, it is not known whether the practice of annual harrowing and burning of the grasslands is actually contributing to the productivity of these areas or leading to their deterioration. The grasslands are also being encroached upon by woody species such as Bombax and weeds, and there is no long-term plan to address this issue.
10. An utterly inadequate budget and delayed release of funds have impacted time-bound management activities.
11. Poaching threats loom large on the Tiger Reserve as traditional poachers (Bawarias) still operate around the reserve.
12. The field staff of the Tiger Reserve need training for enhancing skills needed for crime investigation as per the Standard Operating Procedure (SoP), surveillance, wildlife monitoring (identifying signs and evidence), human-wildlife conflict management and wildlife rescues.
13. The international border with Nepal makes the area vulnerable to poachers and those involved in illicit felling and other nefarious activities.
14. We observed extensive burning of undergrowth in the sal forests, especially in Haripur Range. Apparently, when the fire lines are burned, the staff deliberately allows the fire to spread into the woodland. This may be due to a notion that the practice will help fresh, green grass to grow. However, every green grass species is not edible.
15. The public roads and some traditional routes used by the villagers are used by unscrupulous elements to trespass. Besides, because of the tar roads and a railway line, there is a threat of speeding vehicles and trains causing accidental deaths of wild animals. Display boards warning the drivers to be cautious and to drive at a maximum speed of 30 km/hour have been placed at certain points. The speed breakers provided on the roads at certain points are utterly ineffective owing to a flawed design. Sadly, the management does not maintain records of accidental deaths on rail tracks or roads.
16. The protection camps are poorly equipped, and the protection and monitoring infrastructure is inadequate.
17. Most of the EDCs were established some years ago and are defunct.

Immediate Actionable Points

1. All the vacant positions need to be filled up without delay.
2. The TCP should be approved as early as possible.
3. The 17.63 sq. km. of the notified buffer in Sahjahanapur Division should be brought under the unified control of the Pilibhit Field Director.
4. The current forest beat size is too large to be protected effectively by a frontline team of beat guard and watchers of the present strength. A reorganisation of beats, followed by an increase in the number of beat guards, is necessary.
5. Timely release of funds must be ensured so that time-bound management interventions are not impacted adversely.
6. The approximately 5 km long and 1.5 km wide discontinuity of the forest area in southern part of the left flank of the core of Pilibhit Tiger Reserve has

extensive farmlands and human habitations. Ground information suggests that there are movements of tigers through this land. The situation may lead to serious human-tiger conflicts in the future. It would be imperative to restore the connectivity of the Lalpur-Deoria breach by acquiring strips of farmland about 250 m wide at two locations where there are frequent sightings of tigers and re-vegetating them to facilitate tiger movements. The strips should be secured with fences all along. A plan should be prepared after carrying out a feasibility study.

7. The Garah-Lalpur-Deoria corridor, the Surai-Khatima-Kilpura corridor and the Pilibhit-Tatarganj-Shuklaphanta corridor (and the associated Lagga-Bagga corridor) identified by WWF-India need to be restored to make more than 3000 sq. km. of contiguous forest habitat available in the landscape. A coordinated effort by the Uttarakhand Government would help secure the Surai-Khatima-Kilpura corridor.
8. In areas such as the Barhi and Mala ranges, on the left side of the horseshoe, where sugarcane is being cultivated in huge farms, preferably a 7-foot-high wall/ appropriate physical barrier should be erected on both the flanks (east and west), along the boundary up to the breach at Lalpur, thus leaving a gap on the southern side. A similar strategy has been successful in Ranthambhore Tiger Reserve, where the entire township of Sawai Madhopur has been separated from the core by a wall.
9. There is only one human habitation (Musepur in Barahi Range, with about 25 families) inside the core area. As this is a case of encroachment, NTCA is not mandated to provide funds to relocate it either. It would be wise to raise funds from CAMPA or another State plan scheme to relocate this human settlement as soon as possible. An appropriate strategy may be formulated for removal of such encroachment.
10. The TR shares State and international boundaries with Uttarakhand and Nepal respectively. Such areas are sensitive in terms of wildlife offences and illegal trafficking of wild animal products. Trans-boundary cooperation among the Governments and the forest/protected area managers is necessary. Thus, trans-boundary collaborative meetings at various levels (senior-level meetings to be mandatory) should be institutionalised and systematised.
11. Keeping in view the threats to wildlife and their movements due to the proposed road along the India-Nepal border, which will pass through the Tiger Reserve, appropriate retrofitting measures should be taken to facilitate unhindered movement of wildlife, especially in the Lagga-Bagga forest of Pilibhit.
12. A study should be carried out to understand the impacts of the existing roads and railway track on the wild animals, especially considering the mortality cases in road and rail hits.
13. Lesser known species such as the Otters, Fishing Cat, Hispid Hare, Pangolin and Bengal florican need to be studied in the reserve. Though the gharial is listed as one of the reptiles present in Pilibhit, the staff believe that it is not found within the reserve any more. This needs to be confirmed, and a recovery plan may be worked out.
14. There is also a need to study the impact of burning the grasslands regularly.
15. The draft TCP prescribes interventions for habitat management/ improvement, such as removal of weeds from woodlands and wetlands, removal of woody encroachments from grassland areas and development and management of water holes. These prescriptions are implemented to some extent, but the impacts of these interventions vis-à-vis management objectives are not monitored. A protocol should be put in place to monitor the impacts.
16. Good grassland management and monitoring protocols have been prescribed in the TCP, but most of these protocols are not followed on the ground. It would be useful to begin following the TCP prescriptions.
17. The efforts made by WTI to tackle human-tiger conflict in the landscape are commendable, but at present the focus is largely on rescuing tigers and



leopards from human-dominated landscapes. The committee would like to suggest that efforts should be made towards making the communities fully prepared to deal with conflict. This can be achieved through focused awareness programmes as well as involving villagers in surveillance and primary interventions such as issuing alerts and providing first aid to victims. The best way to achieve this would be to train and equip the village youth with the required skills.

18. Training and equipping a cadre of the forest staff of the Tiger Reserve and adjoining forest divisions will further strengthen the capacity to deter or manage wildlife conflict situations. Professional training related to physical and chemical capture, mob management, precautions that save the lives of onlookers and animals, etc. should be imparted to the frontline staff and officers.
19. Over the last 2 years, there have been 10 cases of physical assault on staff members following incidents of human death caused by big cats. Therefore, an atmosphere of trust needs to be built up with the villagers. This may start with revival of the dormant EDCs. The funds needed for launching livelihood interventions may be obtained from CAMPA, Tiger Conservation Foundation and district funds. The establishment of a fool-proof mechanism to provide immediate assistance to villagers and speedy payment of compensation to the families of the victims in conflict cases would also bring down the hostility.
20. All measures should be taken to keep the core area free of human activities that create biotic pressure and disturbances. However, considering the fact that numerous human habitations surround the narrow core area, achieving this may be a herculean task, and there are bound to be human and livestock casualties until the problem is addressed effectively. At present the rules forbid payment of compensation for cattle kills as well as human deaths and injuries caused by carnivores in the core area. These rules may be counterproductive. In cases of human injury or death by carnivore attacks, compensation should not be denied except in cases where an investigation has revealed that a person's intent to visit the area was doubtful.
21. As per the GO (Government Order), crop compensation is paid only in cases of damage caused by elephants and rhinos. The Government should consider revising this GO to include other scheduled wild animals.



Pallavi

CORBETT TIGER RESERVE, UTTARAKHAND

Evaluation Period
May, 2018

12

Management Strengths

1. This Tiger Reserve has an important source population of tigers in India. It stands out as a stronghold of the north-westernmost population of the tiger and Asian elephant along with Rajaji. Its position in the Terai Landscape ensures long-term continuity of tigers and elephants provided there are serious efforts by the respective Governments to safeguard the connectivity between different units. It is also an extremely rich habitat for an array of bird species, almost 50% of the species of bird of the subcontinent are found in the reserve, and several of them are threatened and endangered.
2. Corbett is an icon of tiger conservation in India, having the support of all levels of stakeholders, from policy makers to local communities.
3. Recent interventions of the courts and the subsequent actions of the State Government will reduce habitat fragmentation due to mushrooming of resorts and other tourist infrastructure along the boundary. Orders from the courts to reduce impacts of unsustainable practices and incompatible land use along the boundary of the Tiger Reserve and to make the core inviolate by ordering the evacuation of illegal occupants within the core area will stop further fragmentation of habitats.
4. The Government order to the District Magistrates to stop the purchase and sale of lands in the abandoned villages as well as villages located within 2 km of the boundary of the Tiger Reserve is likely to rein in incompatible land use along the boundary of the Tiger Reserve.
5. The Security Plan of the reserve is comprehensive, and the prescriptions combine the traditional patrolling protocol and use of modern technology. The Security Plan forms the basis of the preparation and implementation of the annual security plan. A Special Operation Group (SOG) has been set up under a Range Officer. The SOG maintains a database of habitual criminals and provides assistance with crime investigation.
6. The latest technologies are being used. For example, unmanned aerial vehicles (UAVs) are being used for surveillance, especially in inaccessible areas, and for fire control. A dog squad provides much-needed support in wildlife crime detection and investigation.
7. The Kalagarh Wildlife Training Centre plays an important role in imparting skills to staff members from Corbett Tiger Reserve as well as neighbouring divisions, including divisions of Uttar Pradesh, in wildlife conservation and management.

Management Weaknesses

1. Delays in the release of funds adversely impact time-bound managerial inputs. Payment of wages to watchers is delayed by 3-6 months. This is an unhealthy situation and may make the watchers vulnerable to attempts by unscrupulous elements to change their loyalties.
2. There has been a huge gap between the funds demanded from CAMPA and the actual allocation. Considering the assets and habitats of the protected area that need regular maintenance, there is a dire need to provide adequate CAMPA funds to the reserve.
3. There is a huge vacancy at the level of Forest Guards. This has thwarted the purpose of reorganising beats into smaller, manageable beats. Many beat guards are managing more than two beats.



4. All the corridors are facing various degrees of threats from a rapid growth of resorts and expanding human habitations and encroachments. The Kosi corridor is highly disturbed. The road from Dhela to Ramnagar and Ramnagar to Mohan is full of villages, Ramnagar town, hotels, eateries, encroachments etc. The roads, buildings and boundary walls prevent the safe movement of wild animals to Terai West Division and Ramnagar Division.
5. There is a proposal to upgrade a stretch of about 50 km of the Kandi Road between Kotdwar and Ramnagar that passes through the Tiger Reserve. This will have an impact on the corridor along the southern boundary adjoining Uttar Pradesh.
6. There is human-wildlife conflict of severe intensity all around the reserve but especially along the southern, eastern and northern borders of the reserve.
7. There is continuous pressure due to heavy use of resources on the southern border adjoining Uttar Pradesh.
8. Dhikala Chaur and some other grasslands are heavily infested with weeds such as Lantana, Artemisia and Cannabis. Infestations of woody species have resulted in shrinkage of grasslands. Regular cool-burning without any monitoring has perhaps resulted in this degradation.
9. The e-eye surveillance system needs to be fully operationalised by the Tiger Reserve management.
10. Poaching of wild animals is common outside the reserve and some instances of tiger poaching had occurred within the reserve, therefore, the Tiger Reserve is highly vulnerable.
11. The heavy traffic of speeding and honking vehicles on the Dhikuli-Dhangadhi road on the periphery of the core is a source of disturbance and poses a formidable barrier for wild animals. This traffic prevents easy access to the Ramnagar forests. Accidental deaths of wild animals on the road are frequent, but the incidents are not recorded meticulously.
12. Air, noise and solid waste pollution due to littering by roadside eateries and commuters is a huge problem.
13. There has been a lack of research initiatives into various aspects of wildlife ecology, habitat management and human-wildlife interactions in the Tiger Reserve.
14. The livelihood improvement interventions that have gone into the eco-development committees are negligible. Likewise, there is little involvement of villagers in eco-tourism, especially in the buffer area.
15. Phasing out of the tourism facilities inside the core is yet to be done in spite of being a prescription of the Tiger Conservation Plan.

Immediate Actionable Points

1. There is a need to work closely with the District Administration towards implementing the court orders, which aim at creating an inviolate core by evacuating encroachers and eliminating incompatible land uses, noise pollution and littering along the periphery of the reserve. Expeditious evacuation of the Kalagarh Hydroelectric Project Colony would make the core totally free of human habitations. Similarly, removal of the encroaching village Sundarkhal would revive the lost Corbett Tiger Reserve-Kosi River-Ramnagar Forest Division corridor.
2. A Local Advisory Committee (LAC) needs to be created/revived (the MEE team was not provided with any document related to either the constitution or meetings of the LAC) as per the guidelines of the NTCA since, the TCP visualizes a wide range of roles for the committee for curbing/managing incompatible tourism-related development and activities outside the core in non-forest land where the CWLW has no legal power to act. The LAC also has a role in monitoring incompatible development of tourism infrastructure and resource use. It would be useful to develop standards and indicators to assess the level of compliance by the resort owners and eateries with the environmental and ecological requirements of the reserve as outlined by the guidelines issued by the NTCA as



Upamanyu Chakraborty

well as the court's order. The LAC may periodically deploy an independent agency to carry out monitoring and assessment of the activities, waste disposal, water use, sewage diposal and infrastructure of the tourist facilities around the reserve.

3. The boundary of Corbett Tiger Reserve with Uttar Pradesh is about 50 km long. There are many villages in on this boundary, and wild animals regularly raid the crops, but villagers are not paid the relief amount for crop damage. A few years ago, the management of the Tiger Reserve used to pay compensation to the sufferers, but reportedly, due to resistance from the Uttar Pradesh Forest Department, the practice was discontinued. The management of the Tiger Reserve had also established EDCs in these villages to take care of the forest-based needs of these villagers, but these too were discontinued. As the rapport with the villagers of Uttar Pradesh has been lost, their support or sympathy for the reserve and wild animals cannot be expected. This may prove to be harmful in the long run. It would be wise to discuss this issue at the highest levels of administration of both the states and find a way to alleviate the hardship of the villagers and gain their support for the reserve.
4. The arrangement for sharing information and jointly taking up patrolling exercises in the areas bordering Uttar Pradesh needs to be institutionalised. Quarterly review meetings of the PCCFs and CWLWs of the two states would be a good initiative. An annual review meeting may be held to sort out inter-State issues at the Forest Secretary level.
5. Inter-divisional meetings to review protection and ecodevelopment-related issues should be carried out at the FD and CF/CCF (territorial divisions) levels, and periodic meetings should be convened by the PCCF (HoFF).
6. There is an urgent need to work vigorously and effectively with the revived EDCs around the park to address the human-wild animal conflict and livelihoods, especially in the villages dotting the southern and eastern boundaries of the reserve. However, agriculture is the mainstay of many villagers, and unemployment is a major issue for many others. A concerted effort to start a placement-based skill training prgramme (like those implemented in Kanha Tiger



Reserve, Madhya Pradesh and Pench Tiger Reserve, Maharashtra) may be helpful in weaning the unemployed people away from unsustainable and illegal livelihoods.

7. It would be appropriate and very useful to prepare a long-term project for maintaining and monitoring grasslands and to earmark adequate funds for this project.
8. In contrast with the situation in most other states, Corbett Tiger Reserve receives only 20% of the revenue generated from tourism activities, and the rest goes to the Government. This situation defeats the very purpose of creating the Tiger Conservation Foundation. It would be wise to provide 100% of the receipts from tourism to the foundation so that the mangers are able to make fruitful ecodevelopment interventions and ensure that time-bound management inputs are implemented according to schedule.
9. Releasing funds in a timely manner is critical as most of the management inputs are time-bound. It must be ensured that this is done.
10. There has been a huge gap between the funds demanded by Corbett Tiger Reserve from CAMPA and the actual allocation. Considering the assets and habitats of the protected area that need regular maintenance, there is a dire need for adequate CAMPA funds.
11. Speeding, honking and littering on the Ramnagar-Mohan road are serious issues. Rigorous monitoring and legal action against violators are lacking at present. These issues should be managed with utter seriousness.
12. Enforcement of the law is needed to prevent littering along the roadside.
13. During our interactions with the EDCs, the villagers highlighted the issue of large-scale unemployment in the area and requested that villagers, especially youths, be involved in the ecotourism management activities in the buffer zone as most of the tourist-related jobs have been taken away by inhabitants of Ramnagar. We suggest that the Participatory Buffer Tourism Model practiced in Tadoba-Andhari and Melghat be studied and suitable initiatives taken up in Corbett Tiger Reserve.
14. The Field Director should exercise full control over the operation of E-Eye System for surveillance.



Moulik Sarkar



15. The process of constituting the STPF should be expedited.
16. In recent years' tiger poaching incidences have occurred within the reserve and in the adjoining forest divisions that provide space for the spillover population of Corbett. Hence, it is of utmost importance to ensure that the dispersing tigers in these areas are protected. It is important to enhance the skills of the staff and managers and strengthen the protection of the infrastructure in the adjoining territorial divisions. Moreover, the staff posted in these divisions need to be empowered through skill enhancement in different disciplines of wildlife management and protection, especially monitoring and rescuing wildlife.
17. Research that may help improve the management of the reserve needs to be promoted or carried out in-house, by hiring researchers. Research needs to be carried out to understand the causes of local extinction of the Barasingha and Wild Dog also. The management of Corbett Tiger Reserve may also consider reintroducing the Barasingha as suitable habitats are still available within the core area.



Moulik Sarkar



RAJAJI TIGER RESERVE, UTTARAKHAND

Evaluation Period
May, 2018

13

Management Strengths

1. The interior parts of the core of the Tiger Reserve are relatively less disturbed after the relocation of a sizable portion of the human habitations.
2. Relocation of Gujjar deras has helped establish a healthy population of tigers in Chilla range.
3. The protection is being revamped by creating more patrolling camps along the vulnerable peripheral areas. The camps are well maintained, and the strength of the staff manning them and the equipment are adequate.
4. The water management has improved. Innovative measures have been adopted to use natural water sources in the hills to create waterholes in the valleys.
5. Defunct EDCs are being revived, and efforts are on to involve them in ecotourism.

Management Weaknesses

1. It was observed that the participation/ involvement of the Deputy Director and wardens in the implementation of activities and the decision-making process in the Tiger Reserve is poor, possibly due to inadequate delegation or non-delegation of responsibilities by the Director.
2. The Tiger Reserve is beset with all sorts of problems including the effects of linear infrastructure (railway line, roads, transmission line and canal); blockage of corridors; anthropogenic pressure; and poaching, which could be detrimental for wildlife in general and tigers and elephants in particular.
3. The limited movement of wildlife between the eastern and western portions of the reserve is resulting in a skewed distribution of tigers (more tigers in the eastern part). The expanding human habitations, shops and eateries along NH 74 have choked up the east-west corridor. The varied land uses, including industrial use, transport infrastructure, human habitations and canals within and beyond the periphery continue to act as formidable barriers for the wild animals.
4. The buffer area is too patchy, disturbed and small to bear the heavy anthropogenic pressures from all around.
5. Eateries dump waste along the roadside in the east-west corridor. This not only leads to scavenging by wild animals but also habituates carnivores to the presence of people, and as a result, they lose their natural fear of humans. A WII study identified 167 leopard individuals from camera trap images obtained from all over Rajaji. Two-thirds of these leopards occupy the western part of the Tiger Reserve. This situation may have resulted in an aggravated leopard-human conflict.
6. The buffer is still not under unified control, and there is obvious resistance on the part of the management to take charge of the buffer for fear that problems will aggravate when the areas are transferred.
7. The buffer area is inadequately manned. During visit of MEE team to the buffer area and their interaction with the staff, it was revealed that there are inadequate manpower and resources for protection.
8. Increase in anthropogenic pressure is due to establishment of new Gujjar deras by unauthorised families. Shyampur Range in Haridwar Forest Division (buffer) suffers from heavy lopping and grazing. There are 97 Gujjar

deras with permits, and many new possibly illegal deras are being built in the range, putting further pressure on the buffer.

9. There have been cases of tiger poaching in the buffer in the recent past. One tiger cub was poached only recently in the buffer, in Shyampur. This shows that current protection measures are not sufficient.
10. Inadequate fund availability is another constraint. There is tremendous delay in releasing funds. Even watchers are paid once in 6 months.
11. The method of daily patrolling followed by the field staff is weak and grossly inadequate for the protection of a Tiger Reserve reeling under multiple threats. The feedback that we received indicated that daily patrols are not more than 2-3 km every day, and patrolling registers are poorly maintained. Long-range patrolling is done on a fortnightly basis.
12. The reserve is very vulnerable to man-made fires, encroachment, illicit felling along the southern border and poaching, but the mangers seem complacent that the core is now fully secure. The fact remains that the peripheral areas are still highly vulnerable to poaching and retaliatory killings as there is a sizable population of traditional hunters (there are settlements of the Sapera and Kanjar communities all along the southern boundary of the reserve and near Chilla, in Haridwar town). Excessive extraction of boulders and sand mining from rivers continue.
13. In the wake of possible threats, the informer system and the crime-investigation skills of the field staff are still very weak.
14. Little effort has been expended towards disease surveillance in the influence zone and periodic ocular estimation of the health of wild animals. There is no record of prophylactic immunisation carried out within the reserve and within 5 km of the reserve boundary by the Animal Husbandry Department.
15. Discussions with staff members revealed that there is intradepartmental bickering and that relationships with NGOs and NGIs have soured.
16. Presence of a special economic zone (SIDCUL) and Bhadrabad Industrial Area in close proximity with ancillary development close to the boundary of the reserve)
17. Pollution/contamination of the Susua River, flowing through the habitat, with effluents from Dehradun and various settlements.
18. The system of daily monitoring and reporting of tigers is very weak.
19. Human settlements are present in the core and critical tiger habitat. There are still several chaks and goths and 14 Gujjar deras within the core.
20. Since March 2014, 16 persons have lost their lives due to leopard attacks in Motichur Range, especially along the Motichur-Raiwala-Haridwar section of NH 74. The attacks still continue-the last one happened on 21st May 2018, despite the fact that the management has already captured five leopards from the affected area. During 2014-2018, 11 leopards were captured inside the reserve near human habitations. Three of these individuals were sent to a life-time care facility/rescue centre, and the rest were released back in the Tiger Reserve without much considering the effects of releasing such animals in the new area. There is an obvious lack of effort or skills to identify and capture problem individuals.
21. There are no mitigation measures in place to protect wild animals from road hits. A WII study found a total of 222 road-kills of four different taxa (reptiles, amphibians, birds and mammals) from 5 September 2016 to 18 April 2017 in the buffer zone of the Tiger Reserve. The divisional record lists the mortality of 26 leopards and one tiger due to road hits over a decade.
22. The resurgence of elephant deaths due to train hits, after a zero-death level for over a decade, on the 18 km length of the railway line on the Haridwar-Dehradun section passing through the reserve, is a matter of serious concern.



Immediate Actionable Points

1. With the relocation of the Gujjars, Rajaji is well on the path of recovery, but immediate administrative revamping is required. It is necessary to fill up all vacant posts as early as possible. The buffer zone should be handed over to the management of the Tiger Reserve without any further delay. Two Deputy Directors with financial powers should look after the east and west parts of the reserve.
2. The dependence of the Taungya villages situated in the reserve on the forest resources needs to be reduced through appropriate interventions. In cases of crop damage and cattle depredation in these villages, compensation should be provided here too.
3. The statutory requirements need to be fulfilled without further delays. The Tiger Conservation Foundation needs to be constituted and registered, and the TCP should be submitted to the NTCA to seek the necessary approval.
4. A comprehensive tiger conservation plan with good prescriptions is ready. It needs to be approved and implemented at the earliest.
5. A team from the Tiger Reserve, including a veterinarian, has been deployed to radio-collar the two tigers occupying the western part of the Tiger Reserve. It might be futile to capture and radio-collar free ranging animals, especially in a situation when their home ranges and occupied areas have been determined well using other techniques such as camera trapping.
6. Regular hands-on training should be imparted to the field personnel in effective patrolling methods, surveillance, crime detection, securing crime scenes, investigation, interrogation, collection of forensic evidences, etc.
7. A criminal database must be prepared, and the activities of all habitual offenders should be monitored. All poaching cases involving Schedule-I must be investigated by officers not below the rank of ACF.
8. A fully equipped Rapid Response Team consisting of trained and equipped personnel should be created to take care of human-carnivore and human-elephant conflicts.
9. A long-term awareness programme should be launched for people residing along the Haridwar-Dehradun highway and carrying on business there and for villagers along the periphery of the reserve. The programme should sensitise the people to the human-wild animal conflict issues as well as to the do's and don'ts in cases of conflict situations. The current roadside signboards alerting people to the risk from of leopard attacks are drab and hardly draw attention. Attractive, large hoardings must be made and placed at strategic places. Pamphlets carrying messages to alert the residents of the area should also be distributed.
10. There are good prescriptions in the draft TCP for monitoring changes and reclaiming the areas freed of human habitations. A detailed assessment of the weed proliferation in both moist and dry grasslands should be made, and a long-term plan for restoring grasslands should be prepared and carried out.
11. Some EDCs have been revived, but the level of interaction of the management of the Tiger Reserve with the villagers is still inadequate. Focused livelihood interventions and efforts towards creating awareness and managing conflict should be made in a concerted manner.
12. Night traffic on the Chilla-Rishikesh power channel road should be strictly regulated to avoid human/wildlife injury and mortality.
13. Effective measures need to be taken to address the threats to elephants posed by trains on the Haridwar-Kansrao section of the railway line passing through the Tiger Reserve. The traffic consists of 29 passenger trains and goods trains passing on this track daily, and the train speed, which is bound to increase with electrification of the track, needs to be considered seriously by all stakeholders. The State Government should take up this issue on priority with the Ministry of Railways. There are two strong judgements by the Hon'ble U.P. High Court IN - MISC. BENCH No. 1011 of 2016 at Lucknow) and Patna High Court (In Civil Writ

Jurisdiction Case No. 14479 of 2007) in a similar matter that may be used to compel the Railways to implement mitigation measures.

14. There are several temples in and around the core/critical tiger habitat of Rajaji, which attract a sizable number of pilgrims/visitors. The draft TCP has dealt with this subject comprehensively, and a master plan needs to be developed in consultation with the respective District Administrations and EDCs to manage the traffic, littering and noise during festive occasions as well as to ensure that the pilgrims are safe from wild animals.

15. These are some issues that need immediate resolution:

i. The eviction of illegal dwellers of Kunao Goth, which occupies about 7.5 sq. km. of Gohri Range.

ii. Non-compliance of stipulated conditions for diversion of forest land. The stipulated conditions required the Irrigation Department to prohibit the establishment of shops/commercial activities on the said land.

iii. There are around 500 houses in the Chilla Hydel Power Project Colony, in the vicinity of the entry point to Chilla Range. More than 100 houses are in a dilapidated State and need to be demolished, but they are reportedly illegally occupied by people. A thorough survey and eviction are required.

iv. Construction of bridges for wildlife movement (including elephants) on the Chilla canal as articulated at length under the Zone Plan for road-rail retrofitting in the TCP.

v. Completion of the long-pending flyover on the Chilla-Motichur corridor (articulated at length under the Zone Plan for road-rail retrofitting in the TCP). A strong political will is needed to complete the flyovers in Chilla-Motichur, Laltapar and Teen Paani corridors on NH 74. They have been awaiting completion since 2011.

vi. The army ammunition dump and the encroachment by a temple in the Chilla-Motichur corridor need to be evacuated.

vii. Crowding, eateries, shops, illegal expansion of temple premises and unauthorised parking by a large number of trucks along the road at the base of Chandi Hill have created a barrier that prevents the movements of elephants. Strict enforcement of the law and regulation of the chaotic situation are the possible solutions for managing the adverse effects of these activities.

viii. Scenes of people sitting along the roadsides and venturing inside the Tiger Reserve are quite common. There should be restrictions on such activities for the safety of people. Instructional signage should be installed to make people aware of the dangers involved.

ix. Pilgrims/visitors trek to Nilkanth temple through the core area of the Tiger Reserve, but there is no system of granting permissions or regulation of the activity. These need to be implemented for the safety of the visitors and the protection of the Tiger Reserve.



Ramesh Mehrotra



CLUSTER TWO

4.2

S. No.	Name of Tiger Reserve	Abbreviations	State
1.	Achanakmar	ATR	Chhattisgarh
2.	Indravati	ITR	Chhattisgarh
3.	Udanti-Sitanadi	USTR	Chhattisgarh
4.	Bandhavgarh	BTR	Madhya Pradesh
5.	Kanha	KTR	Madhya Pradesh
6.	Panna	PaTR	Madhya Pradesh
7.	Pench	PTR	Madhya Pradesh
8.	Sanjay -Dubri	SDTR	Madhya Pradesh
9.	Satpura	SaTR	Madhya Pradesh

List of Tiger Reserves included in Cluster Two

MEE TEAM

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Shri Yogesh, IFS,
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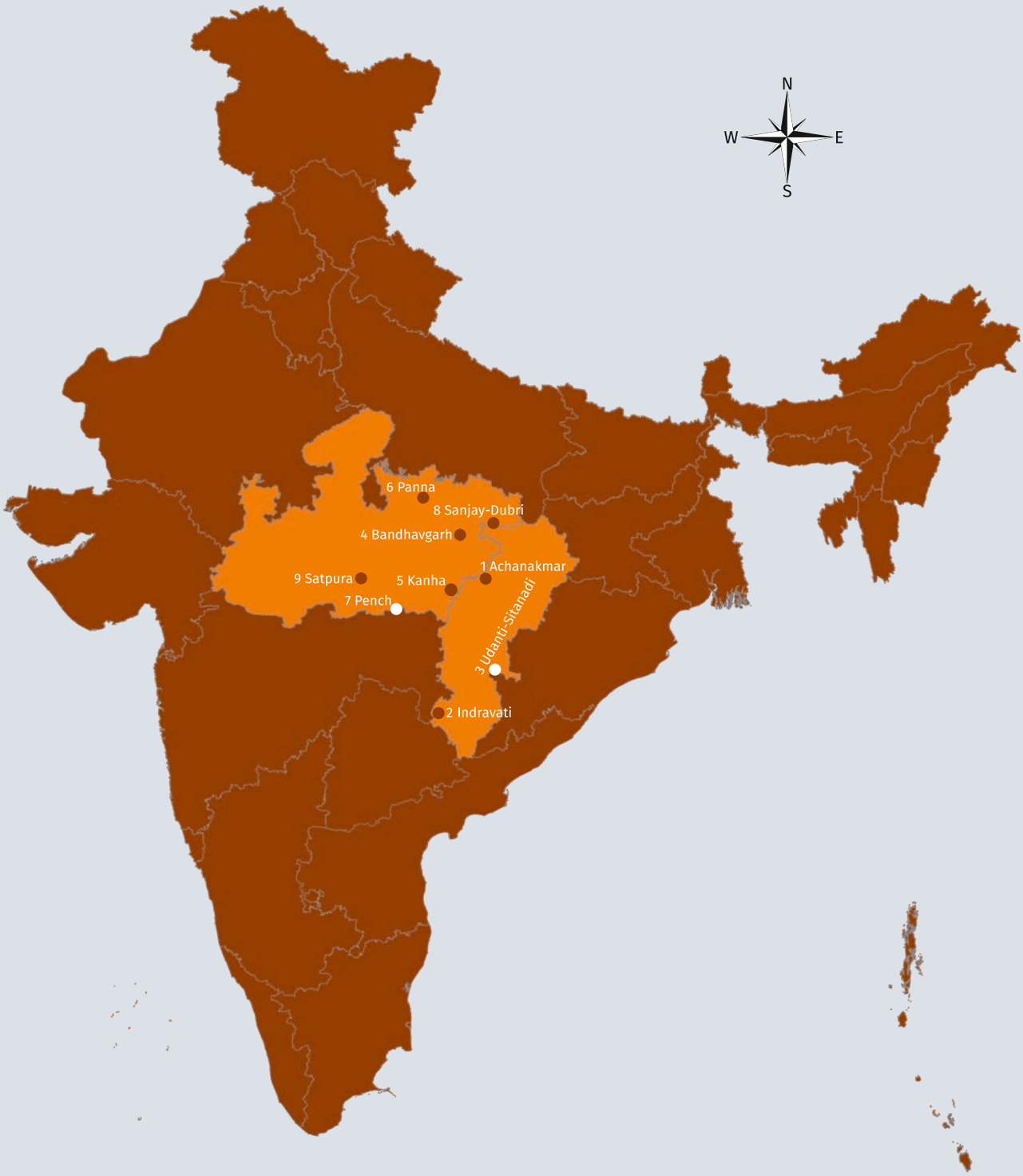

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ACHANAKMAR TIGER RESERVE, CHHATTISGARH

Evaluation Period
November, 2017

01

Management Strengths

1. Achanakmar is part of the Achanakmar-Amarkantak Biosphere Reserve and the Central Indian Satpura-Maikal Landscape. It has the potential for good prey base and predator population.
2. Achanakmar Tiger Reserve (ATR) has a vast stretch of rich forest without a road network or railway line except one road, namely the Kota-Keonchi road, which is used by the public as a short cut to approach Amarkantak. Two corridors, namely the Kanha-Achanakmar corridor, passing through Phen Wildlife Sanctuary, and the Bandhavgarh-Achanakmar corridor, have been identified as corridors that support the exchange of genetic material and provide linkages between source populations. ATR is also a link between Kanha and Palamau.
3. Consequent to the relocation of six villages, 19 villages are left inside the core area.
4. The management of ATR is now following the security plan and an appropriate protection strategy. Records of staff patrolling, daily patrolling, M-STrIPES and barrier/check gates are being maintained properly. A total of 216 paidal forest guards (two per beat), 42 STF personnel (seven teams of six persons each), 70 persons for 25 barrier/check gates, 30 persons for 19 WT stations, 22 persons for 11 patrolling camps, five residence-cum-watch towers and six elephants are being used to strengthen the protection. In addition, joint operations are being conducted with territorial divisions. A dog squad is in use for surveillance in weekly haats/bazaar The villagers residing in core and buffer areas cooperate with Forest department and assist the management of ATR as and when required.
5. Earlier, ATR was facing a shortage of officers/officials/manpower at all levels, but now, it has a qualified team of forest guards because of new recruitment.
6. ATR management has been able to complete and update the mapping of incidences of fire, the number and locations of water bodies and the locations of villages, grasslands and other infrastructure.
7. Public facilities for tourism have been developed in one complex at Shiv Tarai, outside the core and buffer areas.

Management Weaknesses

1. A total of 25 villages were located inside the core and buffer areas. Nineteen of these villages, with cattle camps, are inside the core area, which hinders wildlife management. Though a relocation plan was stated to have been prepared, no action in this direction in the field was visible.
2. There is a shortage of vehicles for patrolling and Wireless handsets for communication. Charging the batteries of handsets in remote areas is a problem due to defective solar panels, and repairing or replacement of these defective sets is time consuming and a difficult task.
3. The buffer area is in strips and not continuous, and as a result, the core is porous. The Forest Development Corporation is engaged in operations in some compartments adjacent to the core area, affecting the desired level of management.
4. ATR had been facing a shortage of funds for various conservation and

development activities including protection. There have been delays in the release of funds sanctioned by the NTCA and State Government. Transaction of money from treasury and reimbursement of expenditures incurred by staff for activities are not smooth.

5. The Kota-Keonchi road, passing through the core area, has been opened for public with an intervention through the High Court that can increase disturbances inside the forest.

Immediate Actionable Points

1. Immediate relocation of 19 villages along with cattle removal should be the topmost priority, to avoid further damage to wildlife.
2. Post-relocation care of villagers is essential. Without it, ATR may suffer adverse impacts of the forthcoming relocation. It would be appropriate if ATR involves NGOs in the process.
3. Development of grasslands with appropriate species in consultation with a grassland expert and improvement of water bodies mainly in and around lands abandoned by village relocation need to be done on priority.
4. The frontline staff need to be oriented towards wildlife management and conservation through training and exposure to important protected areas and Project Tiger areas of adjacent states.
5. Newly recruited frontline staff members need motivation by the senior officials.
6. The forest block under Forest Development Corporation should be taken over and managed by the management of ATR.
7. Tourism activities at the present complex need to be expanded by development of an interpretation center and using other material, especially for children, for publicity and awareness. The accommodation at the complex at Shiv Tarai needs improvement.
8. The management of ATR should undertake active management of tiger population because of the critically low density of tigers and to avoid a skewed sex ratio.
9. The Tiger Reserve requires at least three patrolling vehicles for management that need to be procured.
10. A veterinary facility needs to be developed for rescuing and rehabilitating wild animals.
11. The management of ATR should find out a permanent solution for the issue of engagement of daily wagers involved in protection and development activities.
12. Research activities on various aspects of management should be prioritized.
13. Interstate co-ordination with Madhya Pradesh is needed for restoration of corridors and for carrying out activities related to wildlife management in the area.
14. The management of ATR should ask the appropriate authority not to allow movement of public vehicles on the Kota-Keonchi road and to maintain the check gate properly in the interest of wildlife conservation.
15. The NTCA and State Government need to review the status of fund deficit provided to ATR and consider meeting additional justified requirements of funds. Funds may be released in time for proper utilization in development activities.



Nasim Ahmad

INDRAVATI TIGER RESERVE, CHHATTISGARH

Evaluation Period
May, 2018

02

Management Strengths

1. Indravati Tiger Reserve (ITR) has a large forest area encomprising 1258 sq.km. with rich biodiversity. It is contiguous with large tracts of forest in Bijapur, Narayanpur, Gadchiroli and Bhupalpalle districts.
2. Based on remote sensing data, Space Application Center, Ahmedabad, in collaboration with Forest Department, Chhattisgarh published a report titled "Study of Network of Wildlife Reserves in East M.P.", which identified the Kanha-Indravati corridor as extending towards Pench (Maharashtra) on one side. In addition, three corridors, i.e. the Indravati-Udanti-Sitanadi-Achanakmar-Kanha corridor and the Indravati-Kawal (Andhra Pradesh)-Tadoba (Maharashtra) corridor, which extend from Sironcha Forest Division (Maharashtra), and the Indravati-Udanti Sitanadi-Sonabeda Sanctuary (Odisha) corridor have potential for tiger and other animal movements.
3. Indravati is the abode of the last Asiatic wild buffalo population in Central India.
4. A buffer area has been notified and is under the unified control of the Tiger Reserve, although very few activities such as development of water bodies and construction of an information Centre are being carried out.
5. Some recently recruited local forest guards have been trained in wildlife management for 6 months, in addition to having received training in forestry. They possess good academic backgrounds and have an orientation to wildlife conservation.

Management Weaknesses

1. ITR has been affected by LWE (Left Wing Extremism) for more than two decades, and its notified core area is out of bounds for the field staff. As a result, development works and monitoring activities have been adversely affected.
2. Fifty-six villages of local tribes, mainly Gond, Madia, Halba, Muria and Telenga people who have a large number of cattle, are located inside the Tiger Reserve (core and buffer). They indulge in their traditional hunting practice of pardas, extension of agriculture by encroachment, illicit felling, cattle grazing, firewood collection and collection of mahua and other MFP. As a result, the objectives and goals of the Tiger Reserve are not achieved.
3. The office of the Deputy Director is at Bijapur (District HQ), in the vicinity of the park, but the office of the Field Director is approximately 170 km away. Hence, the development, supervision and monitoring activities are affected.
4. Because of the LWE problem, tourism has not yet started and there are almost no visitor facilities in the park except one information/interpretation Centre at Bijapur and another one being constructed at Kutru (Buffer Range).
5. Records reveal that the management of the Tiger Reserve has mostly been under the additional charge of the Territorial CCF/ CF as well as of DCF. Such dual control affects regular monitoring and timely management actions.
6. Although the river Indravati and various streams flow through the Tiger Reserve, the area faces a scarcity of water during dry season.
7. Presently, the postings of officers/officials are not in accordance with the sanctioned strength, and the

strength is not adequate for managing the total area. However, under the prevailing circumstances, the staff strength may work till the normal situation prevails.

8. In general, the officers, including Range Officers except for few forest guards, do not have training or appropriate orientation towards wildlife management.
9. The infrastructure, including the accommodation of the staff and communication facilities, is poor. The Wireless handset facility is not usable as it is sensitive to LWE activities, and the landline and mobile communication systems are in a very poor condition.
10. The prey and predator bases are low because of the disturbances in the Tiger Reserve. Traditional hunting using dogs, bows, urea, traps, fire and other traditional weapons persists and is a threat.
11. Frequent forest fires, lack of people's participation at the desired level and inadequate awareness are significant threats.

Immediate Actionable Points

1. The Tiger Conservation Plan of the reserve has not been approved yet for want of clarification/ amendments by ITR authorities on the observations of NTCA. This needs to be attended on priority.
2. Posting of a regular Field Director and Deputy Director exclusively for ITR is required. The posts of Assistant Directors and Forest Range Officers have to be filled up.
3. Training of officers in wildlife management at the Wildlife Institute of India (short-duration course/workshop) and exposure of field officers/officials to wildlife management activities in an adjacent State (Kanha/Pench Tiger Reserve) with good wildlife management are urgently required.
4. Newly recruited local forest guards should be detailed, to collect data /information on habitats and populations of various animals. This data will help in planning proper management interventions and activities.
5. As the buffer area has been taken over by the Tiger Reserve, activities proposed in the TCP, including the building of a database, should be carried out for the buffer area.
6. Villages located in remote parts of the core area need to be relocated soon and the status of the present inhabitants in core area need to be updated after assessing the condition of the area so that the core can be made inviolate.
7. An interpretation/information Centre that provides detailed information about the area should be created at Bijapur. It should have basic visitors' facilities. The Centre should have wildlife films of interest for children, brochures/ pamphlets, sitting places and public conveniences that may be used at least by local school children. Publicity and awareness programmes, mainly anti-poaching strategy and wildlife conservation-oriented programmes, should be arranged for school children from time to time.
8. A long-term project in which a proper survey is carried out for the Asiatic Wild Buffalo for determining, its status should be carried out and conservation through breeding practiced. After this, the required protection must be provided.
9. ITR has a common boundary with Maharashtra. Hence, interstate co-ordination meetings/dialogues at different levels not only involving the park authority but also the administration and police will be of great help.
10. Human-animal conflicts needs to be handled skillfully by providing innovative eco-development work to obtain the cooperation of the EDCs so as to gain their support for the Tiger Reserve for its development and protection.
11. A protection strategy should be formulated for the park on priority, in accordance with the security plan to avert threats to threatened species and conservation values.



12. Considering the vast area of ITR, veterinary services may be developed for rescuing and rehabilitating wild animals.
13. M-STrIPES needs to be implemented in a full fledged manner to improve the protection.
14. Staff amenities such as furnished camps and line quarters are necessary to counter staff absenteeism.
15. Because ITR is a tribal area with a problem of bush-meat hunting, adequate provisions may be made for awareness creation, alternate development, intelligence gathering and enforcement.
16. To check grazing and collection of firewood and other MFP, development schemes for biomass use reduction, substitution and generation may be undertaken.
17. A massive public participation and awareness generation programme is suggested.

UDANTI SITANADI TIGER RESERVE, CHHATTISGARH

Evaluation Period
May, 2018

03

Management Strengths

1. This area falls in the Central Indian Tiger Landscape and is rich in biodiversity.
2. USTR is potentially good habitat for the Tiger, Asiatic Wild Buffalo and Gaur. In fact, this Tiger Reserve has the most appropriate habitat for the remnant population of the critically endangered Asiatic wild buffalo, which is equally significant as the tiger for conservation.
3. USTR shares a border with Sunabeda Wildlife Sanctuary (Odisha), and it has corridor linkage on the western side with Kanker and North Kondagaon up to Indrâvati (Bastar).
4. This Tiger Reserve has two core areas, i.e. Core I, notified under Udanti Wildlife Sanctuary (276 sq. km.), and Core II, under Sitanadi Wildlife Sanctuary (575 sq. km.). The topography is flat, with sal and teak forest, and belongs to biographic zone 6C. The area also has rich mineral resources, mainly diamond. The buffer area of the Tiger Reserve has also been notified, and the core and buffer area are under the unified control of the Field Director, USTR.
5. There is potential for tourism in the buffer and peripheral area of Core I, and in Udanti Wildlife Sanctuary, the Devdhara waterfall is an attraction.
6. The EDCs are cooperative in providing protection to the area because of eco-development works carried out by the tiger Reserve in collaboration with WTI (NGO).
7. The Asian Wild Buffalo Centre, established in the Udanti area (Core I), under a recovery plan in collaboration between the Tiger Reserve and WTI, is progressing very well.

Management Weaknesses

1. USTR is affected by LWE (Left Wing Extremism) activities. Therefore, infrastructure development works, including protection, are lacking.
2. Fifty-one villages are located inside the Tiger Reserve, out of which Core I has 17 and Core II has 34. The relocation process of the villages has not yet started
3. USTR has dense forests and little grassland. This is one of the reasons for the prey base to be low and as a result, carnivore population is low.

4. In the Sitanadi area There is no buffer to the west and north of Core II.
5. Despite the presence of rivers and nallas, namely the Pairi, Sondur, Udanti, Sitanadi, Khallari and Lilanj nallas, due to which the Tiger Reserve is cut off for 3-4 months during the monsoon, there is scarcity of water and moisture.
6. There is neither a network of camps nor organised patrolling. Maintenance of patrolling registers and monitoring by superiors has not yet been institutionalized. This is leading to slackness in protection, and the situation has worsened due to LWE activity. All the protection camps and watch towers are deserted at night. The communication facilities, especially the WT network, are not working, and officials depend only on mobile phones for communication. The mobile phone service is not available in remote areas.
7. There is a shortage of accommodation for the staff also. The frontline staff is inadequate in strength considering the extent of the Tiger Reserve. Except for a few forest guards, officers/field-level officials are not trained in wildlife management and hence the required orientation towards wildlife is lacking.
8. A State highway, namely the Raipur-Deobhog-Kalahandi highway, passing through Core I (Udanti area) bisects the area, and PWD roads (Raipur-Sihawa-Borai, Sihawa-Belar-Keskal and Raipur-Nagri-Jhariabahra-Deobhog roads) crisscross the tiger Reserve. This poses a threat to the reserve.
9. USTR may face problems from proposals to construct an irrigation dam, a 33/11 kV electricity line and a 132 kV transmission line and to establish CRPF camps.
10. Core I and Core II are separated by a human-dominated buffer area that might hamper the movements of animals from one core to another.
11. Traditional hunting using dogs, bows, urea, traps, fire and other traditional weapons persists and is a threat to wildlife populations.
12. The eco-centre at Koyba and other tourism facilities are under-utilized.
13. Frequent forest fires, poor people's participation and inadequate awareness and education are also significant threats.

Immediate Actionable Points

1. Roads are not motorable during the monsoon. This hampers monitoring activities in the area. The office of the Field Director is located at Raipur, which is more than 100 km from the Tiger Reserve. This affects proper supervision. Management should address prevailing problems of monitoring and patrolling activities.
2. Only one female tiger and one male tiger were known to be present in this Tiger Reserve, in the Kulhadighat area. The male has been poached, and the skin was seized this year. Only one tiger is left in the reserve. Management should take effective steps to introduce a few more tigers from other areas so that a viable population is maintained, after building up prey.
3. Relocation of the villages in the reserve, especially those located in remote locations in the core areas, should start at the earliest so as to make the area inviolate. This will lead to development of grasslands/meadows and boost up the herbivore population, which is quite low at present. To facilitate relocation of villages outside TR, capable forest officers be posted there and some reputed NGO may be roped in for the purpose.
4. There is a practice of constructing large ponds (in the vicinity of villages, where no evidence has been found of large animals, viz. Gaur and Asiatic Wild Buffalo) in the area. This practice is being followed in the Tiger Reserve presumably with the intention of conserving water. The selection of sites needs to be reviewed based on the abundance and size of animals. The number of ponds may be increased as water bodies close to village are likely to be visited more by cattle than by wild animals and will therefore be vulnerable to contamination with disease-causing organisms. An increase in the number of ponds will improve the moisture regime. However, large ponds

will be of greater use in the Udanti area, where large animals are present.

5. The extent of grasslands in USTR is abysmally low because of the dense forests. Development of grasslands is essential as it has a barring on populations of prey and predators in the reserve. Grassland development has been initiated in small patches in Core II (Sitanadi) where the forest density is moderate (< 40-50%). Thus, the desired results may not be obtained. The selection of sites for development of grasslands needs to be assessed thoroughly on the basis of herbivore populations. It should be carried out in areas where the forest density less than 30%. Some patches in Udanti area appear to be good for development of grasslands. Along with the development of grasslands, invasive species may be removed. Plateaus, meadows and grasslands may be mapped, after which the habitat may be developed with inputs from a field Agrologist.
6. The population of the Asiatic wild buffalo at the rescue centre/breeding centre at the village of Jugad, in the Udanti area is represented by only two females and the rest are all males. Actions must be taken by the authority to ensure proper male-female ratio.
7. Human-animal conflicts need to be handled skillfully through cooperation from EDCs. Innovative eco-development work must be provided so as to gain the support of EDCs to develop and protect the Tiger Reserve.
8. Despite the problem of LWE, some tourism can be developed for daytime visits in and around the Devdhara waterfall area by creating nature trails/treks, a watch tower and interpretation/information center at Sankra and Koyba. Publicity materials should be provided at these centres to create awareness among school children. Basic facilities such as public conveniences need to be provided.
9. The sanctioned strength of the frontline staff needs be rationalized considering the area of the Tiger Reserve. New and old forest guards should be provided training in wildlife management. The Assistant Directors and Range Officers posted in USTR need to be deputed to will managed Tiger Reserves of adjacent States for exposure to the work being done there.
10. The protection strategy of the park area should be given priority in accordance with a security plan so as to avert threats to the conservation values and the threatened and endangered species of USTR.
11. Considering the vast area of USTR and future requirements of active population management, veterinary services may be developed for translocation, conservation breeding, rescue, and rehabilitation of wild animals.
12. M-STrIPES needs to be implemented in a full-fledged manner to improve the protection scenario.
13. The extent of the Tiger Reserve must be consolidated by adding the Kulhadighat buffer area (where tigers are reported). Extending the buffer to Dhavalpur and Mainpur is suggested.
14. The land use activities in the buffer area between Core I and Core II must be streamlined in co-ordination with line departments to facilitate the movements of animals.
15. All the roads may be maintained so that movement in rainy season is possible and monsoon patrolling can be carried out as prescribed by the NTCA.
16. The Wireless Transmission network may be revived for effective communication.
17. Amenities such as furnished camps and line quarters are needed to counter staff absenteeism. Because USTR is a tribal area, with problems of bush-meat hunting, adequate provisions may be made for awareness, alternate livelihoods/subsistence, intelligence gathering and enforcement. To check grazing, firewood collection and MFP collection, biomass-use reduction, substitution and generation need to be included in future programmes.
18. A massive public participation and awareness programme is suggested.
19. The Government may consider separating the post and office of the Field Director from that of the CCF (Wildlife), Raipur and shifting of the office of the Field Director to Gariyaband.

BANDHAVGARH TIGER RESERVE, MADHYA PRADESH

Evaluation Period
April, 2018

04

Management Strengths

1. Tiger Reserve serves as an important water recharge system for nearby villages. Surrounding hilly region of the reserve acts as a catchment for the streams flowing down to this area.
2. Bandhavgarh gets a substantial number of tourists, mostly for tiger tourism, and generates significant revenue. About 33% of this generated amount is utilized for the welfare of 150 EDCs in and around the reserve. Management has developed a system of regular meetings with hoteliers, Gypsy operators and guides as a part of its strategy for stakeholder engagement.
3. Tiger Reserve has evolved an effective habitat recovery programme for development of waterholes and grasslands (25 ha grass seed collection plot available) without resorting to the usual strategy of burning of grasslands. Strip management of grasslands has resulted in selective augmentation of ungulates. Waterholes have been developed adjoining each grassland to ensure even distribution of ungulates.
4. Even though human-wildlife conflict is at its peak around Bandhavgarh Tiger Reserve, there is an efficient system of compensation payment. Ex-gratia payment for cattle deaths is cleared within 20 days and relief for human deaths is made within 2 days. In 2018 an ex-gratia payment of Rs. 6,87,400 for 71 cases of human injury and Rs.1,77,60,855 towards relief for 2206 livestock kills has been made.

Management Weaknesses

1. The first impression of the MEE team is that TR is much into managing conflict of tigers and ex-situ conservation. There is a less focus of looking at the larger landscape picture, where Bandhavgarh could play a role as a large source population for tigers and ungulates.
2. The Tiger Conservation Plan (TCP) has been prepared but it is yet to be approved by the National Tiger Conservation Authority (NTCA), for incorporating corrections by the State.
3. The core area of the reserve still has 10 villages, namely Gadhpuri, Bagdari, Saijwahi, Gangital, Kushmah, Kothiya, Bamera, Kaseru, Badwahi and Baghaia. These villages do affect the continuity of tiger habitat.
4. The relationship between the park management and the villagers is often volatile, primarily because of the human-wildlife conflict.
5. About 20% of the posts among the frontline staff are reported to be vacant or ineffective. Protection systems being handled by frontline staff are not adequate. The communication equipment, like wireless sets, is not adequate. This reserve is located in districts that have people from hunting tribes. It would be complacent to not consider the security threats to the park and to not act on those.



Upamanyu Chakraborty

Immediate Actionable Points

1. Management need to work on the gaps in the TCP as pointed out by NTCA and get the TCP approved.
2. Earlier studies by WII indicate that Bandhavgarh landscape covers an area of 2000 sq. km. and has tiger occupancy in approximately 75% of that area. The major tiger population is in and around Bandhavgarh Tiger Reserve. For Bandhavgarh to act as a source population in the landscape, protection and better management of the human-tiger conflict are needed.
3. Management should have a plan to integrate Bandhavgarh Tiger Reserve in the larger conservation landscape of the region, including connectivity to the forests in Uttar Pradesh, Chhattisgarh and Madhya Pradesh.
4. A long term, comprehensive and participatory plan needs to be developed and implemented for managing human-wildlife conflict situation in the region.
5. Department should fill the vacant positions of frontline staff for effective TR protection. The protection in the buffer areas needs to be strengthened.
6. Management should take steps for dealing with tourism pressures and for regulation of proliferating resorts around TR.
7. TR should follow the SOPs being issued by NTCA whenever required.
8. Ongoing eco-development programme needs to be strengthened to build support of local communities for TR.
9. Issue-based research programme should be strengthened in the park. In addition, it is suggested that a weed eradication programme be carried out systematically.
10. The wildlife and cultural values of Bandhavgarh Tiger Reserve need to be documented better and disseminated to the general public.

KANHA TIGER RESERVE, MADHYA PRADESH

Evaluation Period
May, 2017

05

Management Strengths

1. Kanha is home to range of carnivore species such as the Tiger, Leopard, Wild Dog, Jungle Cat, Jackal, Fox and Sloth Bear and to ungulates such as the Gaur, Spotted Deer, Barking Deer, Four-Horned Antelope and Barasinga. Area is also important from the point of view of species recovery programme for barasinga. Similar recovery programmes have also been done for Gaur and Blackbuck in the recent past.
2. A large part of the species recovery in Kanha was found to be due to quality management of grassland habitats. The frontline staff as well as the mid-level and senior officers of the Tiger Reserve were found to be proficient in grassland management and had knowledge of each and every species.
3. Kanha presently also serves as a source population for tigers and ungulates for repopulating some of the other Tiger Reserves in central India.
4. Kanha is one of the finest conservation complex in the country. The forests of Kanha are connected to Achanamkar through the Kanha-Achanakmar corridor, to Pench, Madhya Pradesh, and beyond to Pench Tiger Reserve and Nawegaon Nagzira Tiger Reserve, in

Maharashtra, through the Kanha-Pench corridor. The Kanha-Pench corridor is one of the first wildlife movement corridors in the country to have a Corridor Management Plan by involving all the stakeholders, including line departments of the Government, civil society organizations, academic and research institutions and local communities. This corridor faces many threats; however, it is also the one that gets the maximum attention in terms of conservation.

5. Kanha has its Tiger Conservation Plan in place. Over time, the reserve has developed a good information database based upon a number of valuable studies, research programmes and documentation. The Indian Institute of Forest Management (IIFM), Bhopal, conducted a study of the ecosystem services of Kanha Tiger Reserve and reported that besides conserving wildlife, this reserve also provides a range of associated economic, social, cultural and spiritual benefits. A total of 25 such ecosystem services were assessed by IIFM, and it was found that for evey rupee spent on management costs, flow benefits of approximately Rs.273 were realized in and around the Tiger Reserve. Nearly 10% of the flow benefits from the reserve accrued at the local level, 49% at the national level and 41% at the global level. The estimated benefits from the ecosystem services of Kanha were valued at Rs. 16,451 million.
6. Phase III and Phase IV monitoring of tigers, co-predators and prey are being conducted regularly at Kanha Tiger Reserve. Documentation of other wildlife has been carried out using M-STrIPES, transect monitoring and bird and butterfly surveys. In addition, it was found that documentation, assessment and monitoring of grass and herb species for grassland recovery had been carried out regularly. Similarly, threats faced reserve are also well documented, and the management was aware of the threats.
7. No human interference except electrocution problem, is seen. The villagers are found to be largely satisfied with their association with the management of the Tiger Reserve, and there was a sense of trust. Major stakeholders are involved in the management.
8. An adequate number of patrolling camps were found in both the core and buffer of the Tiger Reserve. The physical infrastructure, including anti-poaching camps and the living quarters of the frontline staff, is very well maintained. Family hostels were available for staff members posted in patrolling camps, and there was even a school bus facility for the children of the staff members who stay in the forest camps.
9. The management of Kanha has set up a primary health centre in the premises of the forest department office complex, which caters to the staff of the forest department and to villagers from the vicinity. This is a facility unique to this Tiger Reserve. It helped build confidence among the villagers greatly. It was learnt that if a villager or a daily wager needed specialized treatment subsequently, the Kanha authority would arrange for this treatment to be provided at a district hospital or speciality centre.
10. The management has also set up a waste segregation and bio-composting plant outside the reserve that caters to all the vegetable and food waste from the resorts around the reserve. This is an innovative initiative and needs to be replicated in other similar areas.
11. Kanha TR Authorities have created a Park Development Fund (PDF) and all revenues earned are deposited in this fund and money generated is being used for various TR activities and Staff welfare.
12. Finally, the motivation of the staff was found to be at the highest level in Kanha. They even received State-level awards, and the reserve received a national award from the Hon'ble Prime Minister in 2016 for active management of wild animals.



Management Weaknesses

1. One of the emerging threats was found to be that from electrocution of animals. While the management is coordinating with the Madhya Pradesh State Electricity Board to ensure that power transmission lines are monitored regularly and that any breach would be checked and repaired, these efforts need to be strengthened.
2. In Madhya Pradesh, instead of separate tiger conservation foundations for individual Tiger Reserves, there is a State-level setup in form of the Madhya Pradesh Tiger Conservation Society, chaired by the Hon'ble Minister of Forests of the State Government. The Madhya Pradesh Tiger Conservation Society seeks donations and raises funds to carrying out infrastructure development and staff welfare activities in the Tiger Reserves as well as around the buffer areas. The fund flows to the buffer areas is not adequate and it needs to be increased.
3. Even though all the sanctioned posts of Forest Guards are filled, the gaps reported for the posts of Foresters and Deputy Rangers need to be filled.
4. Tourism resorts are proliferating around Kanha, and the pressures of tourism are paramount. The growth of resorts needs to be regulated.

Immediate Actionable Points

1. Set up a sniffer dog squad at Kanha on the lines of other Tiger Reserves in Madhya Pradesh to check poaching and illegal trade in wildlife in and around the park.
2. Fill up the gaps in the positions of mid-level officers and implement the recommendations of the security audit
3. Strengthen the coordination with the electricity department and District Administration to check the poaching-by-electrocution of wild animals.
4. Steps should be taken for protection of the corridors leading to adjoining Tiger Reserves.
5. Matters related to proliferation of resorts should be discussed in LAC, and a regulatory mechanism needs to be put in place.
6. The use of fuelwood by resorts should be restricted.
7. Ongoing ecodevelopment programme need to be strengthened.
8. Notification of the ESZ needs to be pursued and implemented.
9. Release of funds on time from the State treasury should be ensured for timely implementation of activities.



Shantanu Sharma

PANNA TIGER RESERVE, MADHYA PRADESH

Evaluation Period
August, 2017

06

Management Strengths

1. Panna Tiger Reserve is a representative conservation area of Vindhyan mountains with its unique geographical features of frequent undulations, deep gorges and plateaus. River Ken, which flows from south to north is the lifeline of the reserve. The area has a rich assemblage of carnivore species like Tiger, Leopard, Rusty-Spotted Cat, Jungle Cat and Porcupine. Nilgai, Chinkara, Four-Horned Antelope, Cheetal and Sambar are the major ungulate species. The Marsh Crocodile, or Mugger, and Gharial are found in the Ken river ecosystem. Scientists have estimated that Panna Tiger Reserve holds 25 to 30 tigers, and dispersal of tigers from the reserve to adjoining areas has been reported recently
2. Area has evolved as a centre of learning for species recovery programmes. The recovery of tigers in Panna is a success story that is now known widely. However, other aspects such as grassland management and vulture conservation programme, including the Critically Endangered White-Rumped Vulture, are laudable but less known outside. The grassland management work carried out by the frontline staff and officials of the Panna management is another area which can offer learning to the conservation community.
3. The management of Panna has started a number of vocational training programmes for local communities. So far 98 beneficiaries from buffer villages have been trained in the recent past.

Management Weaknesses

1. Study carried out by WWF India for Panna has identified the existing corridors or connectivities between Panna and adjoining territorial forest divisions. Many severe threats were noticed during this study in the form of fuelwood collection, cattle grazing and lopping of trees. These activities are affecting the vegetation and habitat quality of Panna forests.
2. The Tiger Conservation Plan of Panna is yet to be submitted to the NTCA, and an indicative plan is in place.
3. During our visit, it was found that some of the daily wagers involved in monitoring were from the local villages and that there was no clear criterion or protocol regarding confidentiality of information. With radio-collared tigers around, it is necessary to keep information about the movements and locations of the big cats secret and to have a protocol for sharing information.
4. A substantial number of posts of forest guards and foresters are vacant.
5. The core area of Panna still has three villages, which need to be shifted and rehabilitated.
6. SH 46 and NH 75, passing through Panna, pose challenges for protection in the reserve, however, it is beyond the control of TR Management Authorities. Moreover, the chances of wild animals getting killed on the highways cannot be ruled out.
7. Ecodevelopment programme is weak and the EDCs were reportedly not working well.



Immediate Actionable Points

1. It is critical to identify potential habitat and needs of tigers and this should be incorporated in the development plans of the region in order to provide a safe passage for wildlife between Panna Tiger Reserve and other protected areas.
2. While involving local people in the activity of monitoring of tigers, all their antecedents must be checked and extreme caution be exercised. A strong protocol needs to be put in place about the locations of tigers, radio-collared and otherwise.
3. The TCP needs to be submitted to the NTCA as soon as possible.
4. The lease of National Mineral Development Corporation, Panna, which lasts till 2020, needs to be revoked after the present period, as the presence of the extensive infrastructure is detrimental for the long-term conservation of the reserve.
5. A strong programme must be put in place for engaging with the District Administration, Rural Development Department and civil society organizations for rehabilitating the Pardhi and Kanjar communities so that they move away from hunting wildlife. The programme should be backed by strong enforcement actions
6. Ecodevelopment programmes need to be strengthened and EDCs made more proactive. Capacity building programmes of Panna need to be scaled up with the involvement of NGOs and corporates. It is the support of the local people that is greatly needed for the recovery of Panna's tigers and their long-term survival.
7. Conservation and livelihood-oriented rather than project-based research needs to be strengthened.
8. Existing wireless communication network within and around the park need to be improved.
9. For the safe movement of tigers from Panna to adjoining territorial forests, the tiger landscape conservation strategy and action plan should be prepared incorporating national and regional social and economic development plans.

PENCH TIGER RESERVE, MADHYA PRADESH

Evaluation Period
December, 2017

07

Management Strengths

1. Pench was found to be one of the best documented parks. There is a system in place for robust monitoring of the biodiversity through the M-STrIPES and Phase IV assessments.
2. TR has good studies on invasive species such as Parthenium and Lantana, which form a good basis for management of invasive species.
3. The management was found to have conducted registration of firearms from the area within 5 km of the boundary of the Tiger Reserve as a precursor to a security audit.
4. In terms of strengthening the security, Pench was found to be ahead of other parks in having strategized a season-wise biodiversity protection plan. The flying squads were found to be

operational, and tactical patrolling was also reported. The security plan was found to have been recently updated, and there were specific targets with regard to foot patrolling and beat inspection. M-STrIPES was found to be used robustly and systematically assessed, and changes in security details were made accordingly.

5. There is a team of young and energetic frontline staff. Most of the frontline staff positions were also found to have been filled in Pench.
6. An important finding in Pench was the existence of an effective system to monitor court cases, especially those filed under the Wildlife (Protection) Act, 1972. A legal advisor was found to have been hired on a retainership basis who visits the park 2 days each month and is always available for consultations. All cases in the courts are being meticulously followed, with the concerned files being updated regularly with the statements of the witnesses as they are recorded in court.
7. As far as human-tiger conflicts are concerned, an effective system is in place for early detection of livestock kills. All efforts are made to make ex-gratia payment timely. The MP Public Service Guarantee Act lays down a maximum time period of 1 month. A scheme to provide affected cattle owners monetary relief to the tune of Rs.1200 immediately is in place with support from WWF India.
8. There are regular "Charwaha Sammelan" programmes, which are outreach programs, wherein the cattle graziers in each village are sensitized and equipment/other materials such as umbrellas, school bags and water bottles are provided to them and their school-going children.
9. The management was also found to have systematically carried out the voluntary relocation of villages from within the park, and no human habitations were present in the core area. The legal notification of the 411.3 sq. km. core area and 768.3 sq. km. buffer area was also found to be in place.
10. Local people from the adjacent areas were found to be involved in conservation. Monthly meetings of village-level committees, tourist guides, vehicle owners, resort owners and managers, representatives of departments other than the forest department and NGOs and interdepartmental meetings with adjacent territorial divisions, including those in Maharashtra, are reported to be taking place regularly in Pench and help in maintaining a cordial relationship between the management of the reserve and local stakeholders.
11. It was mentioned by the management that the unanimous support of the local communities for the creation of the buffer zone is a testament to the relationship between the local people and the management of the reserve. One of the reasons for this support from the villagers could be the fact that one-third of the proceeds from tourism are given to the villages for use by the village committees.
12. There are frequent meetings, consultations and sessions for seeking the opinion of local communities. As a result, the trust between the people and the managers has been maintained.
13. LAC meetings are organized regularly. EDC meetings are conducted at least once in 6 months. Decisions on fund disbursement through the Park Development Fund are made at EDC meetings.
14. The receipts from tourism are all available to the park as the Park Development Fund. This has been the arrangement since 1996 in the State of Madhya Pradesh. There is a lot of flexibility in the use of this fund, and all proposals for use of this fund are processed by a high-level committee constituted for the purpose at the State level. Since, the fund is with the park manager, there is no delay in releasing money from it.
15. The tiger population in Pench is reportedly increasing. Being a source population for the Central India Satpura-Maikal Landscape tiger metapopulation, Pench has a larger role to play in the landscape.



Management Weaknesses

1. Electrocution-related deaths of wild animals, including tigers, are a concern in and around Pench.
2. Illegal fishing in Totladoh Reservoir is a major problem. It often results in antagonistic relationships between the villagers and the frontline staff of the forest department, however TR authorities are working hard to stop this illegal activity.
3. NH 7, passing through Pench Tiger Reserve and bisecting the Kanha Pench Corridor, has been a cause of wildlife deaths.

Immediate Actionable Points

1. Implement the recommendations of the security audit to strengthen the protection in and around the reserve.
2. The interstate coordination between Madhya Pradesh and Maharashtra needs to be institutionalized, and NTCA and civil society organizations need to be part of the discussions.
3. The tourism in the buffer areas needs to be strengthened.
4. Measures need to be taken to reduce accidents on NH 7.
5. The corridors are fragmented. The landscape conservation strategy and action plan need be implemented.
6. Research related to the biodiversity of the park needs to be strengthened.
7. Frontline staff be given specific refresher training from time to time on protection and conservation.

SANJAY DUBRI TIGER RESERVE
MADHYA PRADESH

Evaluation Period
April, 2018

08

Management Strengths

1. Sanjay Dubri Tiger Reserve (SDTR), encompassing Sanjay National Park and Dubri Wildlife Sanctuary, with a total area of 1674 sq. km., has a core area of 812.581 sq. km.. There is excellent mixed and Sal forest on undulating terrain in Sanjay National Park and Sal forest with grassland over flat land in Dubri Wildlife Sanctuary. There are unique riparian forests of high-quality Sal and bamboo along the rivers and streams (mainly Gopad and Banas) on the eastern and western sides. These forests are visited by elephants from Guru Ghasidas National Park (Chhattisgarh). Thus, SDTR is the only Tiger Reserve of Madhya Pradesh in which elephants are found.
2. SDTR has tourism potential in terms of biodiversity and numerous scenic sites, which enthrall visitors. Besides, there are sites of religious importance and of historical values. Sidhi Bhoomi was famous as a meditation place and as the birth place of Banbhatt (a great poet) and Birbal, one of the renowned Navratnas of Emperor Akbar. Further, caves and cave paintings depicting hunting with bows and arrows dating back to the Stone Age have been found

here. Buddhist stupas of the seventh century A.D. and various temples of great cultural richness are found here. Fossils (teeth) of Cervus unicolor, antlers with burrs, brow tines and beams of C. duvauceli belonging to the Upper Pleistocene have been found in Son Valley. Numerous plant fossils have been found inside the Tiger Reserve. However, ecotourism should be restricted to the normatives issued by the NTCA.

3. SDTR provides potential habitat for threatened species. For instance, Giddha Pahar, near Majholi, is a large nesting site of vultures. There are various natural rock shelters that form a very good habitat for the sloth bear in Sanjay National Park.
4. The area connects Bandhavgarh-Guru Ghasidas National Park (Chhattisgarh) with Palamau (Jharkhand), towards the east.
5. The local people in general are cooperative. The various EDCs that have been formed always participate in protection activities.
6. Human-wildlife conflicts are very common and lead to injury, loss of human life and cattle deaths, but the management of SDTR has been able to tackle and finalize ex-gratia cases promptly, and hence the people in general are supportive of SDTR management.
7. An ESZ around SDTR was notified on March 31, 2016 to regulate activities detrimental to wildlife.

Management Weaknesses

1. Approval of the TCP is pending for want of clarification or amendments sought by NTCA regarding various issues, this needs to be expedited.
2. Only six of the 41 villages located inside the core and buffer area, have been relocated. The remaining villages are affecting the development of the Tiger Reserve.
3. Presence of 22 kmts. of railway track, two railway stations (Dubri and Kanchanpur) and an 11 KVA power line in the Tiger Reserve are causes of concern for the protection of wild animals.
4. The shortage of man-power, especially of the frontline staff (143 posted against 198 posts), hampers the protection strategy.
5. Inadequate infrastructure, mainly vehicles including motor bikes, the lack of a water tanker and shortage of GPS are a hindrance to the effective management of park.
6. Newly recruited forest guards have good academic background and maintain GPS locations of animals properly. However, inadequate orientation towards wildlife management affects desirable outcomes.
7. It was observed that monitoring of wildlife status was being done properly. Patrolling camps are not being utilized properly. It was observed that the protection staff is deputed for other duties. Such lapses affect proper protection of wildlife in this TR.
8. There are almost no visitor facilities, and tourism management has not been prioritized in the management of SDTR.
9. SDTR has poor prey base and accordingly, suppressed predator populations.
10. A Chital enclosure has been constructed in the Bulandol area to facilitate breeding of chital and increase their numbers, but the breeding rate is low.



Immediate Actionable Points

1. The management of SDTR should obtain approval of the TCP from NTCA at the earliest. In absence of approval of the TCP, developmental and even protection works are suffering.
2. Relocation of the villages inside the core area should be the topmost priority in the interest of conservation of SDTR.
3. Infrastructure, including accommodation/patrolling camps, communication facilities, water facilities and equipment such as GPS and WT handsets, should be provided on priority.
4. The vacant posts among the field staff, particularly the frontline staff, need to be filled up.
5. Development of ponds and grasslands should be prioritized in Dubri along with removal of invasive species from grasslands and other areas that are important for herbivores.
6. Daily monitoring of wild animals needs to be carried out in compliance with NTCA guidelines and SOPs issued for strengthening protection. The deployment of ex-servicemen for improving protection needs to be reviewed by the management of SDTR. Full-fledged implementation of M-STRrIPES will ensure attendance and patrolling by the staff.
7. Tourist facilities should be developed in accordance with the tourism plan. Eco Zone 2 (Badkadol side) should be developed on priority by constructing an interpretation centre and by providing elephant rides and other facilities for children near the entry gate. Later on Eco Zone 5 (Gopad side) should be developed taking advantage of the Gopad River flowing through the area. These should be in conformity with Guidelines issued by NTCA.
8. The buffer area of SDTR has good forests and is an extension of Bandhavgarh Tiger Reserve where frequent movements of wild animals, including tigers, are reported. The buffer area needs to be protected fully and activities appropriate for wildlife management and conservation should be taken up.
9. Inter-State coordination and liaison between the Field Director, SDTR, and concerned authorities of the Chhattisgarh Forest Department are needed to monitor elephants visiting SDTR from Guru Ghasidas National Park and to develop appropriate habitats in SDTR.
10. The efforts to augment the chital population by constructing an enclosure need to be reviewed by the management of SDTR. The soil in the enclosure and the water supplied to the animals need to be tested by an accredited lab and consultations need to be held with technical institutes such as WII, Dehradun, or SFRI, Jabalpur, because the chital population is not increasing as desired.
11. It was noticed that the field staff are diverted frequently for duties not related to TR management. This affects the protection of wildlife within the TR area and is also a violation of NTCA guidelines. The Field Director should ensure that the frontline staff of SDTR, especially from the core area, is not diverted for duties elsewhere.
12. The SDTR landscape has a problem of heavy dependence of communities of the fringe areas on the forest for fodder and fuel wood. Steps must be initiated to alleviate the dependence by biomass use reduction, substitution and production.
13. Because SDTR is a socio-economically backward area with a problem of bush-meat hunting, adequate steps must be taken for awareness generation, providing alternate livelihoods/subsistence, intelligence gathering and enforcement.
14. The impacts of the increase in labour force in SDTR, towards Singrauli, needs to be reviewed periodically.
15. TR Authorities facing the problem of labour scarcity for execution of work, therefore, the possibility of mechanized interventions and trained Elephants may be explored.

SATPURA TIGER RESERVE, MADHYA PRADESH

Evaluation Period
February, 2018

09

Management Strengths

1. Satpura Tiger Reserve (STR) is tiger habitat of the Central Indian Highland ecosystem with representative and diverse faunal and floral elements. Due to it's geographical location, it harbours elements from the Himalayas and Western Ghats.
2. Due to the steep gorges, vertical scarps and the large Tawa reservoir, it makes the terrain very difficult to negotiate. This has an advantage as pocahers can be easy detected or prevented before reaching the Tiger Reserve. This situation of natural advantage has been supplemented by establishment of 160 patrolling camps at strategic locations. The manpower, including forest guards, is equipped with WT sets, either moving by patrolling vehicles, thereby providing an effective protection system. The eco-sensitive zone of STR has been notified recently. Therefore, undesired activities will automatically be under control.
3. STR has relocated 42 villages from Satpura National Park, Pachmarhi Sanctuary and Bori Sanctuary. Rehabilitated villagers are satisfied because now they are part of the mainstream. The management of STR is actively involved in livelihood resource development in collaboration with other departments, especially olericulture and floriculture.
4. STR supports the natural linkage between Pench Tiger Reserve, on the eastern side, and Melghat Tiger Reserve, on the south-west, even though the forests are fragmented due to habitations, railway lines and coal mine operations outside the area.
5. Thirty-three hard ground Barasingha were translocated successfully in STR. They are maintained within a fenced enclosure in the Bori area. They were strictly monitored, and the population has grown to 68.
6. Because of cooperation from the local people and prompt action by the STR management with regard to release of compensation for loss of human life or grievous injury or disability of human beings or loss of cattle as per guidelines of the Government of Madhya Pradesh, there have been no reports of human-animal conflicts.
7. Various EDCs from all around STR come forward voluntarily to help the STR management when there are fires and in other instances.
8. The STR management has installed solar lamps in 60-70% of the camps. The management has installed solar pumps to provide drinking water not only in camps, but also in other areas wherever water holes have been dug. Thus, solar energy is being appropriately utilised under its conservation policy.
9. STR has developed grasslands of palatable grass species over relocated villages sites. Manpower has been deployed for regularly weeding out undesired species in accordance with advice of a grass expert. The grasslands and drawdown areas were found to be free of weeds.
10. The STR management has also identified places for water development for animals. Ponds and dykes have been constructed or are being constructed to hold water for long durations during summer. Nesting sites are also being developed.



Management Weaknesses

1. The MEE team was informed that while the final notification for core area has been issued, the local people have been given rights to fish for local consumption in Tawa Reservoir. Despite the fact that protection is strong, considering the large area of the reservoir illegal fishing cannot be ruled out.
2. A huge number of pilgrims visit Pachmarhi during February/March, causing a lot of disturbance in the protected area.
3. Although the present manpower is sufficient for the core area, because of a large buffer this may not be sufficient and more staff strength may be needed.
4. The MEE team observed that STR has an insufficient number of WT sets. In case of untimely repair, field officials in remote areas have to face problems related to communication.
5. Betul-Bhopal highway passing through Satpura-Melghat corridor hinders the movement of wild animals.

Immediate Actionable Points

1. The 795 sq. km. of good forest added to STR as a buffer needs to be improved by deploying additional manpower for management and protection.
2. The management of STR has to create various visitors' facilities so as to develop the buffer as a tourist zone to divert the tourist from core area. One interpretation centre and other tourist facilities need to be developed in the new buffer or Madai to attract visitors.
3. STR should tap the potential to diversify and develop non-vehicular tourism as Periyar Tiger Reserve has done.
4. The corridor plan, approved by the NTCA, needs to be executed in a time-bound manner for safety and movements of animals.
5. Rigorous surveillance is required at Tawa reservoir to control illegal fishing. Garbage, viz. plastic bags, left behind by visitors needs to be removed.
6. The management of STR should follow up the allotment of new wireless frequencies by the competent authority of the Government of India through the Government of Madhya Pradesh and purchase new WT sets so as to improve the communication, which is the need of the hour.
7. STR would exist as a source population for other habitats outside the reserve in case the corridor plan, which has been approved, is implemented in a time-bound manner. This needs immediate action.
8. A large extent of good forest (795 sq. km.) has been handed over to STR. This will act as a buffer for STR and tourist facilities can be developed in it. This will keep the core area undisturbed.
9. Area receives a large number of pilgrims. Because this practice has been prevalent for a long time and sentiments are attached to it, restricting it completely will go against the park management. But taking advantage of a court order issued earlier, the movements of the pilgrims can be regulated in consultation with the administration and law enforcement agencies.
10. Due to relocation of villages from core area, authorities are facing the problem of labour scarcity for execution of work, therefore possibility of restricted mechanized interventions may be explored.



Vinit Arora

CLUSTER THREE

4.3

S. No.	Name of Tiger Reserve	Abbreviations	State
1.	Nagarjunasagar Srisailam	NSTR	Andhra Pradesh
2.	Valmiki	VTR	Bihar
3	Palamau	PaTR	Jharkhand
4.	Satkosia	SkTR	Odisha
5.	Similipal	SmTR	Odisha
6.	Amrabad	AmTR	Telangana
7.	Kawal	KTR	Telangana

List of Tiger Reserves included in Cluster Three

The Team

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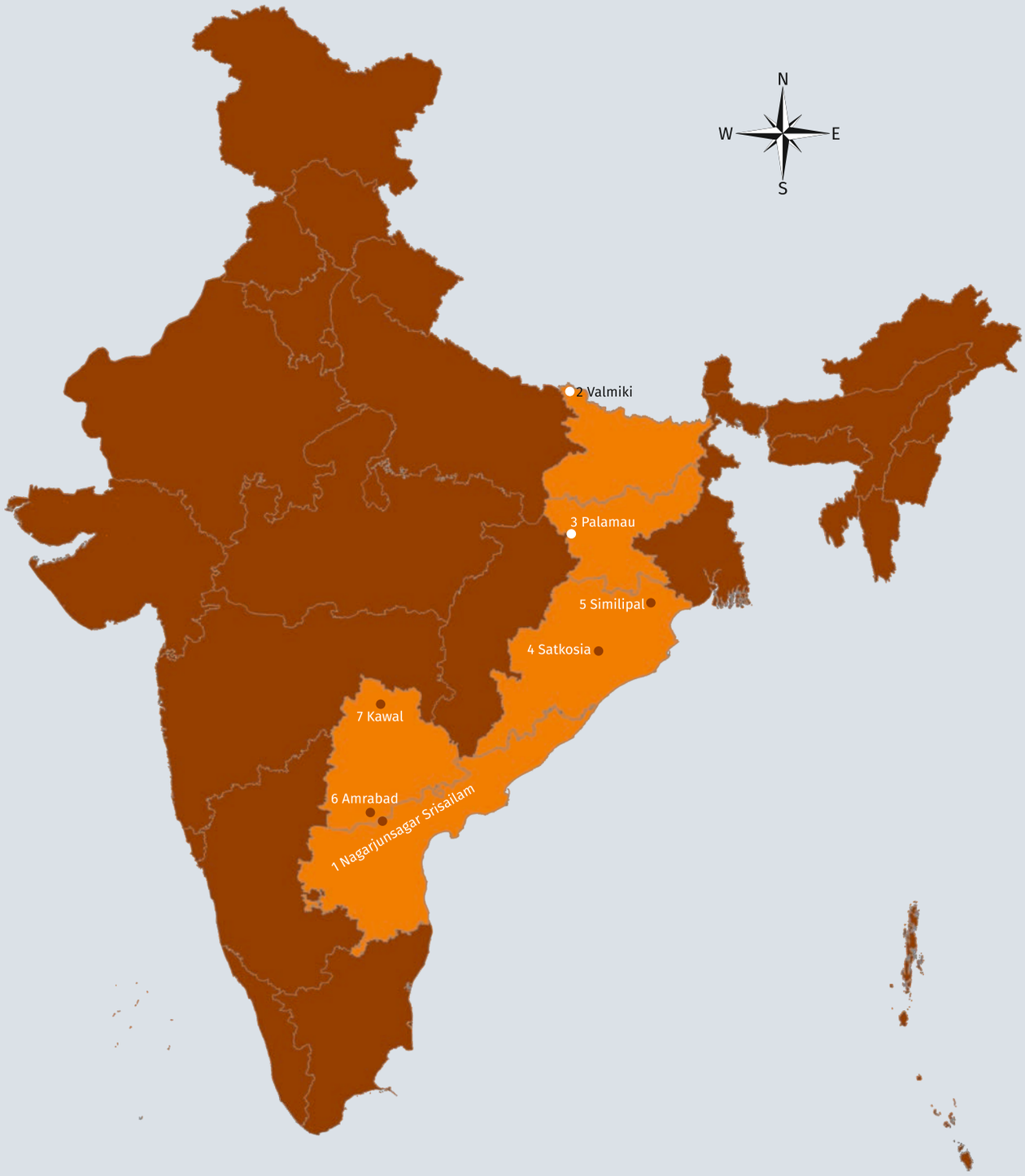

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NAGARJUNASAGAR SRISAILAM TIGER RESERVE, ANDHRA PRADESH

Evaluation Period
February, 2018

01

Management Strengths

1. Nagarjunasagar-Srisailam Tiger Reserve (NSTR) is the largest Tiger Reserve in India (area 3728 sq. km.). It has excellent tiger habitat under a fairly effective protection and management regime.
2. NSTR is located in the extremely beautiful, pristine cultural and natural landscape of the Nallamalla Hills of the Eastern Ghats in Andhra Pradesh, India.
3. NSTR (Rajiv Gandhi Wildlife Sanctuary and Gundla Brahmeswaram (GBM) Wildlife Sanctuary provides an approach to landscape conservation as it is contiguous with Amrabad Tiger Reserve (Telangana) in the north (Nallamalla Forest) and Lankamaleswara Sanctuary and Sri Venkateswara National Park, extending southwards up to Tirupati.
4. NSTR is endowed with a rich floral diversity, including around 1521 species of angiosperm (with 29 species of grass and 353 species of medicinal plant). The faunal diversity includes 50 mammal species, 200 bird species, 54 reptile species, 18 amphibian species, 55 fish species, 89 butterfly species, 57 moth species, 45 coleopteran beetle species and 30 dragonfly and damselfly species.
5. The vast collection of museum specimens, ranging from plankton and invertebrates to mammals, in Srisailam Research Lab is the result of commendable work done by the NSTR team. The biodiversity of NSTR has been documented and preserved comprehensively in this lab and is visited by students from all across India.
6. The ecotourism management at NSTR is good and ecotourism centres have been developed at Bairluty and Thummalabailu. NSTR has a remarkable bio-park at Srisailam. The evolutionary history of the animal kingdom is depicted here, and it is an excellent ecotourism site.
7. NSTR has documented all individual tigers using unique Ids. Camera trap records and direct sightings have been used.
8. The protection strategy of NSTR has increased in its effectiveness due to the implementation of M-STrIPES for patrolling. There is a security plan in place. There are 63 base camps in the Tiger Reserve (Atmakur, 23; Markapur, 24; Nandyal, 9; Giddalur, 7), which are manned by protection watchers from local tribal groups, particularly the Chenchus. The staffing of the camps is a very good example of the involvement of local communities in protection. Two dog-squads, two strike force teams and two river patrolling parties play a key role in protecting NSTR effectively and preventing illegal hunting/poaching of wild animals.
9. NSTR has a systematic habitat management strategy in terms of water management and fire management. There are around 337 saucer pits, which meet the requirements of water during periods of scarcity. There are 16 solar pumps for providing water in the remote areas of the Tiger Reserve. Fire lines and view lines are maintained regularly every year to prevent the spread of fire. Watch towers have been constructed for early detection of fire. Fire watchers are engaged for 5 months during the fire season. The wireless networks have been improved to make communication better. Other management actions include grassland maintenance, weed removal and soil moisture works.

Management Weaknesses

1. NSTR is facing a severe problem of jurisdiction issues because the entire Tiger Reserve is not under the unified control of the Field Director, NSTR. The core and buffer of Rajiv Gandhi Wildlife Sanctuary are under the unified control of the Field Director, NSTR. GBM Wildlife Sanctuary is managed by four divisions, namely Atmakur, Nandyal, Giddalur and Markapur divisions. However, Nandyal and Giddalur divisions are not under the control of the Field Director, NSTR.
2. Due to jurisdiction issues of Nandyal and Giddalur divisions which lie in the southern part of GBM Wildlife Sanctuary (an extended core of NSTR), these parts are vulnerable and face severe anthropogenic pressure. A railway track passes close to GBM Wildlife Sanctuary, which enables a timber mafia to indulge in illegal wood collection.
3. There are 15 villages inside the core area of NSTR, with a population of 5650 households and 2977 cattle. There are 69 villages in the buffer, with 1,26,000 cattle. There is a high dependency of the villagers on NSTR for fodder, fuelwood, NTFP and bamboo. However, this is mainly a problem in the buffer, as in the core many villages are small Chenchu hamlets, called "gudems".
4. Illegal fishing activities in the backwaters of the multipurpose dams that have been constructed across the River Krishna at Srisailam and Nagarjunasagar, forming large reservoirs within the boundaries of the core of Tiger Reserve, are a major concern.
5. Crop damage by wild animals and cattle lifting by predators are the main reasons for the conflict between the reserve and the people. Though compensation is paid to villagers, there are chances of retaliatory actions. There is a delay of up to 3-4 months in the payment of the compensation money.
6. Death and injuries to human beings are not common. Attacks on human by wild animals are mostly not intentional, but accidents happen, and sometimes people get injured by sloth bears and leopards.
7. Because there are various stakeholder departments in NSTR, notably the hydro-electric department, Integrated Tribal Development Agency (ITDA), the migrant fishing community and other resource users, there is every possibility of conflict between the conservation interests and individual interests/non-compatible developments.
8. Out of 251 sanctioned posts of Range Officer, Section Officer and Beat Officer, 80 are vacant, amounting to a shortage of about 32% in the frontline staff.
9. There is a lack of adequate infrastructure such as vehicles and buildings, hampering some of the activities. Android mobiles are required to use M-STrIPES for patrolling.
10. There is a lack of trained and motivated frontline staff members as there is no regular programme to build capacity in wildlife management.
11. The rescue and rehabilitation facility, conflict mitigation strategy and veterinary services are lacking or inadequate.
12. The funds under the centrally sponsored Project Tiger are released late to the Tiger Reserve due to the LOC/PAO system of the State Government.
13. NSTR has a functional corridor as it is contiguous with Amrabad Tiger Reserve (Telangana) in the north (Nallamalla Forest) and with Lankamaleswara Sanctuary and Sri Venkateswara National Park southwards up to Tirupati, but this has not been identified by the management of the Tiger Reserve and therefore, it is vulnerable to hunting, poaching and other anthropogenic pressures.
14. Famous temples such as Srisaila Mallikarjuna Swamy Temple, Akkamahadevi Temple, Nagaluty Veerabhadra Swamy Temple, Rudrakoteswara Swamy Temple and Ishtakameshwari Temple are located in the core area of NSTR. A large number of pilgrims (2-3 lakhs) from Karnataka and Maharashtra visit these temples during Mahasivarathri and Ugadi, disturbing the habitat and wild animals, increasing the vehicle pressure, creating litter, intensifying man-animal conflicts



and generating forest fires. Controlling the pilgrimage is a challenge to NSTR.

15. The Dornala-Srisailam highway passes through the core of NSTR, posing a threat to the wildlife and habitat management.
16. There are large stretches of Bambusa arundinacea clumps in the central part of the reserve. These stretches are a unique ecosystem of the Nallamalla Hills. Clump improvement works are not being taken up, and as a result a large number of clumps are dying and getting degraded due to congestion. This makes the area vulnerable to fire, and there is a severe threat to the habitat.

Immediate Actionable Points

1. The issue of a single line of control for the entire NSTR under the Field Director, NSTR needs to be resolved immediately to strengthen the security apparatus of the reserve. High-level intervention by the State Government is needed. Nandyal and Giddalur divisions, in the southern portion of GBM Wildlife Sanctuary, do not fall under the control of the Field Director, NSTR (although they are a part of NSTR) and are facing severe anthropogenic pressure. The base camps under these divisions are not managed properly and have inadequate protection measures. It is recommended that both these divisions be brought under the control of Field Director Project Tiger (FDPT) NSTR urgently, so that this area is provided adequate protection.
2. Vulnerability due to illegal fishing. The Srisailam water reservoir is an excellent aquatic habitat. It is highly threatened due to a large group of fishermen who fish illegally there. This group has become recalcitrant and fish illegally with impunity. Their involvement in poaching of animals in the future cannot be ruled out. Fishing needs to be banned immediately, and subsequently the huts of the fishermen need to be translocated outside the Tiger Reserve. These fishermen can be involved in various activities such as the running of the EDCs and employed under schemes such as MNREGA to so that they have alternative livelihoods outside the Tiger Reserve.
3. Although the NSTR management is trying to engage some Chenchus as protection watchers, there is a huge population of this local tribe living inside NSTR that is totally dependent on forest resources for their livelihoods. These Chenchus can be involved in various eco-development (EDC) activities, ecotourism, etc. to reduce their dependence on NSTR. Converting some small hamlets of the Chenchus into protection camps by involving them fully in protection can be considered. EDCs need to be created immediately in all the villages in the vicinity of the Tiger Reserve. A list of ecodevelopment activities to be carried out by the villagers outside the reserve can be drawn up in consultation with the villagers.
4. Since NSTR has communities that are heavily dependent on the forest in the core and buffer, there is a need to study their willingness to be relocated. After the study, the relocation process needs to be taken up on a priority basis to make the core free of human pressure.
5. Based on the threat perception, the present beat size (30 sq. km.) is fairly large. It needs to be less than 25 sq. km. for protection to be effective.
6. The posts that are vacant at present (32%, 80 staff members) need to be staffed immediately.
7. The lack of adequate infrastructure and equipment such as vehicles, buildings, wireless sets, mobile handsets and GPS needs to be addressed on a priority basis.
8. Android phones are needed to run the latest version of the M-STrIPES application. These phones need to be provided on an urgent basis to all the Protection Watchers, Beat Officers and Range Officers.
9. The NSTR-Sri Venkateswara corridor is a potential tiger corridor, needs to be secured through financial and technical inputs from the NTCA. The width of the

corridor may be increased or decreased by 0.5 km with a view to avoiding village lands. This has specific reference to the width of the corridor at Badvel, between Nandyal Division and Lankamaleswara Sanctuary. The corridor, despite being 2.5 km broad at this point, serves the purpose of a proper corridor.

10. Presently the Tiger Reserve has one mobile animal rescue vehicle, but no regular veterinary staff member of the forest department is available to man the rescue vehicle. It would be prudent to establish a mobile veterinary service unit along with engaging the the services of a veterinary doctor to deal with wildlife-related rescue emergencies in the reserve.
11. There is a delay in receiving the central budget of Project Tiger due to the State Government administration. This needs to be overcome immediately for the effective management of NSTR.
12. The payment of compensation money to local communities needs to be institutionalised so that money is released quickly to tackle the human-wildlife conflict issues.
13. The aptitude for wildlife conservation needs to be improved by providing training to the frontline staff, including Beat Officers, on aspects of wildlife and wildlife management. It is recommended that short orientation programmes and courses in building capacity in wildlife management, with durations ranging from 7 to 15 days, be arranged regularly for different levels of the field staff, including Beat Officers, of NSTR to maintain their motivation and aptitude for protection and conservation. The State Government may explore the possibility of scaling up the technical capacity at Srisailam into a full-fledged "Wildlife Capacity Building Centre", running regular in-house programmes for Andhra Pradesh as well as Telengana.
14. Since, NSTR is facing heavy pressure from pilgrimage tourism, this needs to be managed properly to prevent any inappropriate activities posing threats to the reserve. Through various awareness activities and capacity building programmes, the pilgrim-tourists can be motivated to practise responsible, sustainable and green tourism.
15. The floristic composition of the Tiger Reserve is unique. The vegetation provides a safe and favourable habitat for several species of endemic arthropods. The vagaries of global weather changes as well as the dynamic anthropogenic pressure on the reserve need to be included carefully. The focus on observation of impacting climate requires a dynamic management strategy. The State Government may partner with an NGO to conduct some field trials to develop a habitat security protocol.



VALMIKI TIGER RESERVE, BIHAR

Evaluation Period
June, 2017

02

Management Strengths

1. The values and of the TR and threats faced by it have been documented and assessed well, and a TCP approved by the NTCA is in place. The TR safeguards a large number of threatened species under the umbrella of tiger conservation (species such as the Wild Dog and Gaur, found nowhere else in the Indian Terai, Clouded Leopard, Serow and Wolf).
2. The TR has been able to manage human-wildlife conflict to a significant extent with the active participation of NGOs such as WWF and WTI. Valmiki Tiger Reserve (VTR) is well integrated into a wider ecological landscape, and periodic trans-boundary meetings with Nepal are held. It also has effective tiger, co-predator and prey monitoring programmes covering the TR systematically and periodically.
3. The monitoring results also indicate a stable to increasing trend of the populations of endangered and threatened wild animals. The infrastructure in the reserve is good. It is better than that found in most reserves, particularly ones related to ecotourism.
4. Ecotourisim is ongoing as per the comprehensive guidelines of the NTCA.
5. Several anti-poaching camps have also been constructed recently, and the part-time anti-poaching staff have started to get basic training. A good GPS-based patrolling system is also in place. Monthly reports are generated, analysed and used for better management.

Management Weaknesses

1. Though VTR is being managed effectively by the existing staff, more than 90% of the members of the park staff are contractual staff members-this is the biggest weakness of the reserve.
2. While there is no human habitation in the core, there is still some biotic pressure/interference due to villages situated in the centre (26 revenue villages with a population of over 60,000 humans and several cattle) and from villages along the southern boundary (over 150 villages). The TR needs to work more with the village communities for alternate livelihoods, alternate energy and reducing the biotic impact and to look into a participatory approach for relevant aspects of management.
3. VTR needs to assess the impacts of Phoenix and other weeds, which have covered a significant part of the TR, and how to manage them better.
4. Climate change mitigation and adaptation measures need to be planned and implemented.
5. VTR does not have a veterinarian in place, nor trained elephants are in place to deal with human-wildlife conflict. The porous border with Nepal poses a threat in terms of poaching of tigers, prey and other threatened species.



1. VTR must engage ex-service men including gunmen to be deployed at sensitive APCs for strengthening protection mechanism on an urgent basis.
2. The enforcement training/capacity building of the existing staff must be enhanced, with a special focus on intelligence gathering, combing/raiding operations, offence case preparation, etc. on a priority basis, with assistance from the Wildlife Crime Control Bureau (WCCB), Special Task Force, police, etc. An informer network needs to be established by the TR management to prevent poaching and illegal wildlife trade. Transboundary anti-poaching efforts with Nepal need to be strengthened.
3. The western part of the TR (area of Madanpur Range) has a unique riverine ecosystem that is rare in the region. This ecosystem is separated from the rest of the TR by agriculture fields. Thus, the habitat is fragmented. It is urgent and important to delineate optimum agriculture land/ area as a part of the corridor/ interlinking area and take up its acquisition with the involvement of revenue authorities on an urgent basis to restore corridor connectivity.
4. The effect of Phoenix species and other weeds, viz. Mikania and Eupatorium species, on the TR needs to be scientifically evaluated, and suitable mitigation measures need to be tested and implemented. It has been found that the prey density is not at the optimal carrying capacity, and suitable habitat development/management interventions for enhancing the proportion of palatable vegetation needs to be taken up with the help of relevant experts on a priority basis to augment the prey.
5. It is recommended that the adjoining PA, viz. Sohagibarwa Wildlife Sanctuary, Uttar Pradesh, as well as the Bettiah and Maharajganj divisions, Uttar Pradesh be included in the All India Tiger Estimation 2018. Training programmes have to be conducted by the VTR management in coordination with WII, Dehradun on a priority basis for the requisite capacity building of the personnel of these divisions.
6. One or two villages (pilot scale) need to be taken up on a priority basis to showcase the benefits of voluntary relocation. Exposure visits to the successful relocated/rehabilitated sites need to be undertaken on a priority basis. Village relocation process may be scaled so as to include all villages in the future.
7. A trained veterinarian and two or three kumki elephants need to be brought to the TR to manage human-wildlife conflict on a priority basis.
8. The concerned wildlife authorities of Uttar Pradesh need to be engaged with urgently for inclusion of Sohagibarwa Wildlife Sanctuary within VTR.
9. The DFOs of the two divisions of VTR have their headquarters at Bettiah District Headquarters, which is around 100 km from their jurisdictional western and eastern parts. So their headquarters need to be shifted closer to the TR, to any suitable place such as Bagha.
10. The western part of Madanpur Range adjoining the revenue areas of Kushinagar, Uttar Pradesh, is a good habitat for the one-horned rhinoceros and has a high tourism value due to its proximity to Gorakhpur. The possibility of rhino reintroduction may be explored to foster regulated ecotourism in this area according to guidelines of the NTCA. This will further boost conservation breeding efforts and also promote regulated ecotourism.

Immediate Actionable Points

Nilanjan Chatterjee

PALAMAU TIGER RESERVE, JHARKHAND

Evaluation Period
November, 2017

03

Management Strengths

1. The TR has a comprehensive and relevant TCP, duly approved by the NTCA.
2. The area of the TR is compact, with good tiger habitat. There is access by road, and the local communities are supportive of conservation.
3. Small but focused actions can contribute towards improving the status of the tiger and other wildlife. About 361 points have been identified in the reserve for development as water holes. Attention is also being given to increasing the area under grasslands. The intelligence network with the local villagers has been strengthened to control poaching.
4. Weeds such as Parthenium and Lantana camara are hindering the regeneration of native species of grass. But grassland and water harvesting programmes taken up in small areas near Garudohar, Bhaisadohar etc., under the expert guidance of Dr. Muratkar, from Maharashtra, have shown promising results and need to be expanded to larger areas of the reserve.
5. In the past this TR was a model of a meticulously planned and developed tourism zone in the country. Currently some exceedingly good work is being undertaken in Betla Range to augment the flow in the streams for the wildlife.
6. The extent of the areas that are under the control of left wing extremists and therefore, are inaccessible has reduced (almost 15%), and consequently the area available for executing habitat improvement measures has increased.

Management Weaknesses

1. The adjoining Mahuadanr Wolf Sanctuary has not been included as a buffer of Palamau Tiger Reserve.
2. The gradual decline and local extinction of the mouse deer Moschiola indica, four-horned antelope Tetracerus quadricornis, slender loris Loris lydekkerianus, Wild Dog (Cuon alpinus), etc. is alarming. There is no breeding or reintroduction plan in place for conservation. The technological interventions adopted, such as animal tracking and camera traps, are grossly inadequate.
3. There is a clear reduction in the numbers of prey species in the TR. The sambar and spotted deer reintroduction programme does not follow a standard protocol, and the involvement of WII is peripheral. There was no need to construct an enclosure for breeding sambar. Hard release could have served the purpose, and construction inside the core could have been avoided.
4. The construction activities (100 watch towers cum patrolling camps for field staff) inside the CTH are very obtrusive for wildlife. The constructions need to be shifted out to peripheral areas and redesigned. The very tall structures of the present design use RCC and are not appropriate.
5. Though the frontline posts have been filled recently in compliance with orders of the Hon'ble High Court of Jharkhand, the personnel have been deployed haphazardly. As a result, the shortage of trained, skilled and equipped field personnel has not been adequately addressed. Knowledge about the diurnal movements of ungulates, elephants and tigers and the areas frequented by these animals is poor,

mainly because of an inadequacy of vigilance, infrastructure and systematic patrolling.

6. An aptitude for wildlife conservation is missing among staff members. Their orientation towards wildlife is very weak, and this needs to be strengthened.
7. There are eight villages inside the core/ critical habitat. Village relocation has been planned; however, the efforts made to motivate/ mobilize villagers to be relocated outside the TR have been inadequate.
8. Veterinary capability, animal rescue and rehabilitation facilities and protocols are inadequate.
9. Signs of biotic interference such as illegal felling of trees, overgrazing and infestation of weeds are visible in some places in the TR.
10. As with the tiger, the elephant population has declined based on the last census, held in May 2017.
11. The reserve is fragmented into four quadrants due to the east-west railway line and the north-south State highway cutting across it. Large numbers of wild animal mortalities are reported because there are no speed regulations.

Immediate Actionable Points

1. Relocation of villages in the core of the TR: Relocation of two villages has been planned, but this needs to be speeded up. Relocation of these villages will certainly improve the habitat and its prey base and, consequently, the tiger population in the TR. The village of Kujrum has voluntarily appealed to the State to be relocated and rehabilitated. Mainstreaming the other ongoing schemes of the Government of India and the State Government in the district, such as drinking water and rural electrification schemes, would boost the prospects of relocation greatly and make it sustainable.
2. It is recommended to advise the State Government to immediately initiate the process of relocating eight villages in the CTH at the highest level, and provide assistance to the management of Palamau TR, to enable them to relocate these villages as early as possible.
3. Training and reorientation of staff: Proper wildlife training/capacity building programmes will not only build the capacity of the field staff to manage the wildlife and habitat of the PTR but will also help raise a core team of wildlife managers in Jharkhand for managing other wildlife areas. The newly recruited staff members need to be trained in different aspects of wildlife management on a priority basis and should be deployed in the field and assigned specific tasks for on-the-job learning. It is advised that the capacity building measures for the frontline staff need to be given highest priority and the services of retired and experienced staff members may be utilized in the development of course curriculum of the existing forest college.
4. Concrete structures: Concrete structures need to be discouraged in the core area. The existing concrete watch towers overlooking waterholes may be camouflaged by using native climbers and paintings in earthy colours.
5. Strengthening of veterinary facilities/services: Palamau TR is the only TR in Jharkhand and does not have permanent veterinary services.
6. Adequate rescue and conflict mitigation capability and infrastructure: It is recommended that a full-time veterinary position be appointed along with at least the minimum support staff of handlers and wildlife rescue facilities be deployed in Palamau TR on a priority basis.
7. Paramilitary forces: The CRPF presently in the TR should be sensitized through short training programmes about the protection of forest and wildlife. It is strongly recommended that the State Government have joint meetings with the paramilitary forces to make them aware of tiger conservation and protection.



8. Institutionalization of people's participation: It is recommended that a list of ecodevelopment activities to be carried out by villagers outside the TR be drawn up in consultation with villagers. Also, major stakeholders should be involved in the peripheral management interventions in the TR. Livestock grazing pressure needs to be reduced and stall feeding of Buffaloes in particular needs to be encouraged.
9. The vehicular speed on the State Highway/ Railway line passing through the TR needs to be regulated: It is recommended that there be laws in place and speed guns be deployed to identify violators passing through the TR. Check posts need to be established at end points with barriers. It is also recommended that a road kill study be conducted and heavy vehicles stopped at night. Alternative routes bypassing the reserve should be explored and developed for long-term sustainability.
10. Isolation: The reserve is slowly getting isolated due to infrastructure development all around it. The focus must be on developing/strengthening the connecting corridors (notably the Palamau-Sanjay-Bandavgarh, Palamau-Badalkol-Achanakmar-Kanha and Palamau-Garhwa-Kaimur corridors) for long-term connectivity for tigers and wildlife.

SATKOSIA TIGER RESERVE, ODISHA

Evaluation Period
April, 2018

04

Management Strengths

1. Satkosia Tiger Reserve (SKTR) is one of the unique Tiger Reserves in the country representing biodiversity from both the Deccan Peninsula and Eastern Ghats. It has a magnificent long gorge (22.5 km) of the Mahanadi River encompassing the aquatic biodiversity of the Eastern Ghats.
2. SKTR has an area of 963.87 sq. km., including a core of 523.61 sq. km. It was notified as a Tiger Reserve in 2007 with two sanctuaries, Satkosia and Baisipalli. It spreads over four districts in Odisha, namely Angul, Cuttack, Nayagarh and Boudh. The area also forms part of Mahanadi Elephant Reserve.
3. The area is dominated by tropical moist deciduous forest, and the floral diversity includes more than 400 plant species comprising 126 tree species (Sal, Cycas), 98 shrubs, 125 herbs (orchids) and 51 climbers, and the faunal diversity includes 38 species of mammal, more than 200 species of bird, 27 species of reptile, four species of amphibian, 183 species of fish and many invertebrate species. The flagship species among the fauna includes the Tiger, Leopard, Wild Dog, Elephant, Gaur, Chowsingha, Sambar, Barking Deer, Giant Squirrel, Gharial and Mugger and four species of endangered turtles (Chitra indica, Lissemys punctata punctata, Kachuga kachuga, Trionix gangeticus).
4. The closing of the State road in the core zone and diverting the road outside the core is an excellent work done by the management of the Tiger Reserve to create an inviolate space for wildlife.
5. The strengthening of all anti-poaching camps with basic amenities, providing enforcement instruments and continuous cycle patrolling in all the nine ranges of the Tiger Reserve have sent out a message to poachers about the presence of Tiger Reserve personnel, which helps the overall protection and management.

6. Due to the efficient patrolling and active protection measures, a large number of wildlife offence cases have been detected by the management of the reserve, and lawful trials are following in the courts. The protection system includes nine ranges, 86 permanent patrolling camps, 21 temporary patrolling camps, one sniffer dog, 24,000 km of foot patrolling each year using M-STrIPES app, 592 staff members, vehicular patrolling, wireless communication through 58 VHF base stations, 14 vehicle-mounted base sets, 138 walkie-talkies and 95 mobile cell phones, a river squad, intelligence informers, etc.
7. The recent relocation of Raigoda village outside the Tiger Reserve as New Raigoda Village, providing all necessary arrangements by mobilising resources from the major line departments, is commendable work by the management. The facilities provided to the relocated Raigoda include an approach road, lands, temporary tribal huts and pucca houses under Indira Awas Yojna, solar lights, electric connections, water tanks, bore wells and pipes, ex gratia payments in bank accounts with 5 year FDs, sanitation under SBM, banking facilities, medical facilities, anganwadis (community centres), veterinary facilities, cattle sheds, education facilities, vocational training, food rations, seats under banyan trees, sewing machines, gas and smokeless chulhas, common kitchens, etc.
8. The eco-development committees in the villages located in the core are very supportive because facilities have been provided by mobilising resources from Central Government schemes and involving major Government departments. The involvement of local communities in forest protection and eco-development activities to help the reserve in protection and management is commendable work done by SKTR.
9. Good habitat management practices such as meadow management, soil moisture conservation works, weed management and efficient patrolling of land and water make the area a good refuge for breeding and congregation of wildlife.
10. Contiguous forests on all sides of the Tiger Reserve, including Nayagarh Forest Division, Athamallik Forest Division, Athagarh Division, Dhenkanal Division and Angul Division, are providing a very good habitat for wildlife movement and acting as corridors. These divisions are under the Regional CCF and Field Director SKTR, which is an excellent arrangement for conservation and management at the landscape level.
11. There is a plan of reintroducing six tigers in the core zone with the help of Wildlife Institute of India and NTCA.

Management Weaknesses

1. The presence of a large number of human habitations (four villages in the core, 116 villages in the buffer, 234 villages in the surrounding impact zone) in and around the Tiger Reserve poses a threat to it and is highly detrimental to the effective management of the reserve.
2. The proximity of Angul to the northern boundary of the Tiger Reserve, which is a big industrial township of Odisha, attracts a large number of labourers, causing a serious issue of human intervention in the reserve.
3. Although there are protection measures, due to the large number of human settlements (tribal and non-tribal communities), hunting and poaching continue, posing a challenge to the management of the reserve.
4. The several roads in the core and buffer, frequent fires set off by trespassers and presence of a large number of cattle are causing serious regressive impacts on the Tiger Reserve.
5. Malaria, a lack of adequate staff, a lack of motivation among the frontline staff and lack of trained manpower are the major issues and challenges faced by the park.



6. Due to the closing of the road passing through the core zone, a large number of people have become opposed to the management of the reserve due to media hype. To get them around is another challenge to the conservation and management of the Tiger Reserve. One village, i.e. Marada, in the core has become particularly hostile due to the closure of the road and this reaction is getting negatively reinforced by the media.
7. The research activities are poor. A total of 800 gharials were released in the river, but due to lack of monitoring, the effort was wasted.
8. Because good facilities were provided to the relocated village, Raigoda, the village of Sarauli, located outside the reserve, has become hostile and is demanding similar facilties. Villagers of Sarauli are harassing the relocated households. Resolution of the conflict on a priority basis will check a downslide of the relocation programme.

Immediate Actionable Points

1. Since, Satkosia has fascinating natural beauty, research work is to be carried out at the landscape level for retaining the integrity of this ecosystem mosaic on a sustainable basis, so as to evolve appropriate management model for Satkosia. The research monitoring programme needs to be enhanced, and detailed habitat management-related research at the landscape level is required.
2. The large number of human settlements presents in and around the Tiger Reserve (four villages in the core, 116 villages in the buffer, 234 villages in the surrounding impact zone) poses a serious threat to the Tiger Reserve and is highly detrimental to the effective management of the TR. The Government should make an urgent relocation plan of at least four villages in the core, with arrangements similar to those made for the Raigoda relocation plan.
3. Due to the large number of human settlements in the buffer, there is a great opportunity for eco-development activities in that zone. Various EDC programmes need to be taken up on the periphery of the reserve because of the greater stake of local communities in conservation and management of the reserve. Currently ecotourism is being carried out with the involvement of local tribes in the core zone. Because of the excellent facilities provided to the translocated village of Raigoda, Sarauli, nearby, also needs to be involved in various EDC activities lest it becomes antagonistic. Renewed and continuous engagement with the local villagers and fringe communities should be taken up immediately, so as to build confidence among local stakeholders.
4. It was found through discussions that there are no funds available with the present EDCs. Therefore, it is recommended that certain livelihood improvement programmes be started at the earliest under centrally sponsored schemes such as MNREGA, AJEEVIKA, RKVY and NGSDP.
5. The area is facing intense pressure due to forest fires caused by trespassers. Stricter management measures are required to deal with this fire crisis.
6. Satkosia gorge provides an excellent habitat for the breeding and nesting of riparian biodiversity. It is recommended that the Tiger Reserve also create and develop shallow water, marshy areas to support other forms of biodiversity.
7. It was observed that the management of the Tiger Reserve is pumping ground water for irrigation for meadow management. This practice need to be stopped immediately. Only those grasses need to be planted that do not require water to regenerate other than rainfall.
8. The higher officers placed in the reserve are trained, but the frontline staff and protection staff need adequate wildlife management training. Also, the EDCs running ecotourism facilities at ecotourism centres are trained in hospitality management but lack training in wildlife conservation and awareness. Therefore, the management of the Tiger Reserve should arrange some basic wildlife training for all the lower-level staff, including EDCs, so that



Shantanu Sharma

their interest and motivation levels remain high.

9. The ecotourism is running entirely by EDC and visitor register placed in the rooms. It was observed that tourists have given good recommendations for the management of the reserve and request some basic facilities for their stay. It is recommended that the management of the reserve address the complaints and follow-up good recommendations for effective management. Some of the services need to be scaled up to meet international tourist standards. Nature guides and interpreters for visitors can be introduced. Tourists visiting the Sun Temple and travelling on the Buddhist circuit can be attracted to Satkosia. A professional travel agency may be engaged to promote high-end tourism in the buffer areas. As in the case of other TRs, the entire proceeds of revenue earned from the ecotourism to be ploughed back to the TR.
10. Existing ecotourism activities in core area needs to be carefully monitored and a comprehensive them plan needs to be include in the TCP. Also, any further expansion of tourism should take place only in buffer areas.



SIMILIPAL TIGER RESERVE, ODISHA

Evaluation Period
April, 2018

05

Management Strengths

1. Simlipal Tiger Reserve (STR) is a unique Tiger Reserve. It was on the first list of Tiger Reserves declared in India, in 1973. SMTR is the fourth largest Tiger Reserve in India (2750 sq. km., with a core of 1195 sq. km.) and the largest Tiger Reserve in Odisha. It is part of an elephant reserve and the Biosphere Reserve Network and is home to unique melanistic tigers.
2. The area lies in the Deccan Peninsular Bio-geographic zone and harbours a unique blend of Western Ghats, Eastern Ghats and eastern Himalayan biodiversity. The floristic composition indicates a connecting link between south Indian and north-eastern sub-Himalayan species, with a large sal forest. It is at the confluence of two forests types in India, which makes it a unique terrestrial wonder. The landscape supports 7% of the plants (1352 species), 8% of the orchids (94 species), 7% of the reptiles (62 species), 20% of the birds (361 species) and 11% of the mammals (55 species) of India. There are many species of rare and threatened animals such as the Tiger, Elephant, Gaur, Mahseer, Hornbill, Chowsingha, Mouse Deer, Giant Squirrel, Flying Squirrel, Striped Necked Mongoose, Mugger, Rufous-Tailed Hare and Civet.
3. The excellent salt licks and meadow management attract large herds of ungulates such as the gaur, sambar and chital at different times of the day. This is unique to STR, especially in Devasthali and the Upper Barakahmda (UBK) meadows.
4. The deployment of STPF at Bhanjabasa, Gurguria and Jenabil in for protection against Akhand Shikar and for night patrolling is commendable.
5. Ecotourism activities are well organised and through the involvement of local communities. These activities are generating good revenue and support the livelihoods of forest-dependent communities. A revenue of more than Rs.1 crore was received in a year from ecotourism. For example, the tourism complex of Gurguria Range has six cottages maintained by tribal communities, similarly Kumari has 15 cottages and machans and Jamuani has 9 tribal cottages and 1 bamboo cottage
6. The protection system includes 194 anti-poaching camps (APCs) and temporary machan camps (TMCs). There are 85 APC+18 TMC=103 camps in the core and 82 APC+9 TMC=91 camps in the buffer.
7. Each APC also serves as a base camp. Each APC has an average beat size of 15-20 sq. km. to monitor, with one Forest Guard (FG) and five Protection Assistants (Pas). The VHF network, GPSPDA patrolling, elephant patrolling, foot patrolling, dog squad and fire management system are good.
8. The orchidarium at Gurguria Tourism Complex, with 66 species of orchid, adds value to STR.
9. Veterinary services hired from Wildlife Trust of India at Rs.15 lakhs each year meet the animal rescue and rehabilitation requirements of the reserve.

Management Weaknesses

1. Most of the anti-poaching camps cum base camps are under construction, using CAMPA funds. Due to lack of smokeless chulhas, the APCs are full of smoke, and the walls are black due to the continuous smoke. This may cause hazard to the protection watchers living in the APCs.
2. The buffer anti-poaching camps lack solar lights, cots and other equipment. The resources are meager, and there are no ration allowances for the daily wage Protection Assistants.
3. The STPF are placed at Bhanjabasa, Gurguria and Jenabil Range. They lack training in the use of arms and have no arms. They have no food allowance, and their deployment needs to be planned. The Similipal TR STPF has 58 members, including 21 female guards, and have only basic forestry training.
4. There are 112 posts under STPF (1 ACF+3 RO+81 FG+27 FW), of which 63 are working (1 ACF+3 RO+59 FG). 22 FG posts are vacant, and there is no notification for recruitment of 27 FW.
5. There is regular patrolling mostly for only half a day, with one Forest Guard/Forester and three or four Protection Assistants.
6. The frontline staff lack basic wildlife training.
7. Similipal has a unique forest composition, but no systematic study has been conducted on the diversity of the vegetation of Similipal. Forest patches that have died due to frost are seen. Grasslands and other areas in the core are infested in some patches with undesirable Phoenix regeneration.
8. The outbreaks of malaria are causing the staff to be out of action at times.
9. There are 64 villages in the buffer and one village Bakua with three families in the core (Jamunagarh), which are posing a threat in terms of illicit firewood collection, illegal trade, Akhand Shikar, poaching, forest fires and NTFP collection.

Immediate Actionable Points

1. Steps need to be taken urgently to complete the construction of the anti-poaching camps.
2. All the buffer APCs need to be provided adequate facilities and basic amenities such as smokeless chulhas, cots, mosquito nets, tables, chairs, torch lights, field gear, GPS and mobiles for use of patrolling apps like M-STrIPES. Some model antipoaching camps in other states should be visited in order to replicate them in STR and improve the standards and upkeep of the APCs to motivate the field staff.
3. Similipal has a unique forest composition, but no systematic study has been conducted on the vegetation diversity of Similipal. Forest patches have died due to frost. The ground has extensive Phoenix regeneration in patches. The forest diversity, understory regeneration, Phoenix management, grassland management, frost management, meadow development and cause of the mixed forest complex need to be studied scientifically.
4. Merely placing a STPF is not helping protection as they lack basic arms training and arms. It is strongly recommended the STPF be deployed for rigorous patrolling after providing good arms training and wildlife training.
5. Relocation of the village Bakua and Jamunagarh from the core and Khejuri from the buffer will provide a large inviolate area for wildlife movement. Hence, the relocation needs to be done at the earliest.
6. A large number of human settlements are present in the buffer, i.e. 64 villages. The villagers need to be involved in various EDC activities. Currently only 62 EDCs are operational. The large number of villages is posing threat to the protection of STR.
7. There are 18+9 TMCs in the core and buffer that need to be converted to permanent APCs for effective protection.

8. The patrolling efforts need to be enhanced. The half-day patrolling being carried out is not adequate to prevent the tribal hunting and poaching activities.
9. There are 22+27 Forest Guard vacancies under the STPF, and 26% of the posts of the frontline staff are vacant. The large number of vacancies need to be filled urgently.
10. Improvement in aptitude of field staff is required for wildlife conservation. It will be essential to expose the field staff to basic training in wildlife management to reorient them properly to wildlife conservation and management. It is recommended that short orientation and capacity-building courses with durations ranging from 7 to 15 days be arranged for different levels of the field staff of STR.
11. The field staff are frequently struck down with malaria, which is causing difficulties in protecting and managing the Tiger Reserve. It is recommended that a medical doctor be placed permanently to look after all malarial cases and the staff be made aware of the precautionary measures required to control malaria. Adequate medical facilities and quick reimbursement of medical bills of the staff should be ensured.
12. The complexity and variety of the animals and plants found in the Tiger Reserve call for thoughtful planning for the future. It would be appropriate to consider appointing a task force in order to divide the entire ecosystem into two smaller Tiger Reserves for more efficient long-term management. It is considered imperative to have more scientific input. The protection of the unique flora and fauna will get a boost while the future threats of climate change will be safeguarded against, with the anthropogenic pressure growing day by day.

AMRABAD TIGER RESERVE, TELANGANA

Evaluation Period
February, 2018

06

Management Strengths

1. ATR is one of the largest TRs in India (area 2611 sq. km.). It has a compact, unfragmented and large landscape with one of the finest bamboo forests in the Eastern Ghats and Deccan Peninsula. ATR is a good habitat for tigers, co-predators and prey.
2. ATR is endowed with diverse flora and fauna. The amazingly rich floral diversity encompasses rare, endangered and medicinal plants such as Dendrocalamus strictus, Terminalia tomentosa, Terminalia alata, Boswellia serrata and Ficus sp., which form the major species of the forest. The faunal diversity includes 80 species of mammals, 303 species of birds, 54 species of reptiles, 20 species of amphibians, 55 species of fish, 101 species of butterflies, 57 species of moths, 45 coleopteran species, 30 odonate species and numerous other insects.
3. The reserve has two large fresh water reservoirs that are today unpolluted by international standards. The indigenous aquatic fauna of the River Krishna has not yet been fully catalogued. It is potential wealth for the future.
4. Many ancient Hindu temples and caves are located inside ATR, endowing it high heritage value, such as the Saileshwaram, Uma Maheshwaram, Maddimadugu, Akkamahadevi Caves, Kadilivanam and Mallela Theertham temples. These temples offer great opportunities for ecotourism.
5. The undulating terrain, two big water reservoirs, Octopus View Point, etc., which add natural values to ATR, are very important in terms of ecotourism management involving Chenchus, a local tribe.
6. The deployment of Chenchus as base camp protection watchers and tiger trackers for wildlife monitoring by the ATR management is commendable. Many issues have been resolved by doing this, such as involving the people in management, addressing livelihood issues of forest-dependent communities, motivating support for conservation, reducing human-wildlife conflict and retaliation and reducing other anthropogenic pressures.
7. ATR earns much revenue from the 60 km stretch of highway passing through the core. The revenue is used for implementing protection and management strategies.
8. The successful reintroduction of mouse deer in a closed area in ATR is an excellent effort towards the recovery of the population of the species in its former distributional range.
9. Community-based Ecotourism (CBET) and Environment Education Centre (EEC), at Mannanur, provide good ecotourism facilities for visitors.
10. The Tiger Calling Study Tour for School Children, supported by ATR, is very effective in raising awareness among school children and motivating them towards TR conservation.
11. A series of habitat improvement measures is also being taken up by the TR management.



Management Weaknesses

1. Uncontrolled and illegal fishing is a major concern in the backwaters of the multipurpose dams that have been constructed across the River Krishna at Srisailam and Nagarjunasagar. Large reservoirs have been created by these dams within the boundaries of the TR. These are excellent habitats for aquatic wildlife, but this wildlife is highly threatened due to the large number of fishermen who have settled illegally on a semi-permanent basis and practice fishing inside the core of the TR. They are also introducing fingerlings of exotic carps, thus threatening the population dynamics of indigenous fishes of the River Krishna.
2. ATR is facing severe anthropogenic pressures due to a number of human settlements inside the core (around 70 Chenchu Tribal hamlets and 2 major villages, having a population of 63,000). These villages pose enormous biotic pressures in the core of ATR, with 90,000 grazing cattle. Poaching and smuggling attempts are also reported.
3. There are threats such as invasive species (Lantana), the passage of national highway through the area (59 km in the core and 13 km in the buffer), a hydroelectric power project, erection of high-voltage power lines and heavy pilgrimage tourism. There are no management measures to reduce the disturbance caused by the free movement on the national highway inside ATR. The State Government is planning to widen the road. This will pose greater challenge in near future for the ATR management.
4. Considering the number of threats, the protection strategy is not very effective. The M-STrIPES patrolling has not been updated with the current methodology. ATR lacks field gear and patrolling equipment, which hampers adequate protection. Considering the vastness of the area and types of threats, the total of 23 base camps, four strike forces and three check posts employing a total of 141 protection watchers is meagre for protecting ATR effectively.
5. There is an abysmal shortage of frontline staff personnel. Out of a sanctioned strength of 367 frontline staff (Range Officers, Section Officers and Beat Officers), only 96 staff are in place, and 271 posts (about 74%) are vacant. The lack of adequate infrastructure such as vehicles and buildings is hampering protection activities. There are no Android phones and no GPS using patrolling for M-STrIPES.
6. The rescue and rehabilitation facility, conflict mitigation strategy and veterinary services are inadequate.
7. There is a lack of trained and motivated frontline staff members as there is no regular capacity building programme for wildlife management in the State.
8. Famous temples such as the Saileshwaram, Uma Maheshwaram, Maddimadugu, Akkamahadevi Caves, Kadilivanam and Mallela Theertham temples are located in the core area of ATR. A large number of pilgrims (2,00,000-3,00,000) from Karnataka and Maharashtra visit these temples during the Mahasivarathri and Ugadi festivals, creating a lot of pressure in the form of disturbance to the habitat, disturbance to wild animals, vehicle traffic, littering of waste, man-animal conflicts and forest fires, posing a challenge to ATR to control the pilgrimage. The TR management is undertaking some measures to control pilgrimage tourism and garbage disposal.
9. ATR being a central resource for various stakeholders, especially hydroelectric agency and Integrated Tribal Development Agency (ITDA), the immigrant fishing community, and other excessive resource users, there is every possibility of conflicts with conservation interests, individual interests and non-compatible developments.

Immediate Actionable Points

1. Stopping illegal fishing: Fishing rights cannot be permitted in the CTH of a TR. Large fishermen groups in the reserve have now formed mafia groups and are carrying out unregulated fishing. This activity needs to be banned immediately, and the huts of the fishermen need to be translocated outside the TR on a priority basis. These fishermen can be involved in various activities, such as through EDCs and MNREGA to provide alternative livelihoods.
2. Rehabilitation of Chenchus and institutionalization of people's participation: Although the ATR management is trying to engage some Chenchus as protection watchers, there is a large population of Chenchus living inside ATR who are heavily dependent on forest resources for their livelihoods. The Chenchus can be involved in various ecodevelopment (EDC) activities, ecotourism, etc. to reduce their dependence on ATR. It is recommended that small hamlets of Chenchus be converted into protection camps by involving them in protection. EDCs need to be created immediately in all villages in the vicinity of the TR, and a list of ecodevelopment activities to be carried out by villagers outside the TR needs to be prepared in consultation with the villagers.
3. Relocation of villages: Since the ATR has forest-dependent communities in the core and buffer, there is a need to study the willingness of villagers to be relocated. After the study, the relocation process needs to be taken up on a priority basis to make the core inviolate. Currently, two villages, Kudichentalabailu and Saralapali, are willing to be relocated. If these villages are relocated, a large inviolate area will be available for tiger recovery. Therefore, it is recommended that these two villages be relocated at the earliest for creating at least a little area that is inviolate for tigers and other animals.
4. Deployment of field staff and strengthening of infrastructure: The present acute shortage of frontline staff members of around 74% (271 staff members) needs to be addressed immediately by recruiting Range Officers, Section Officers and Beat Officers. There are no alternatives to protection but trained and well-structured manpower for a TR. Therefore, the State Government should fill the vacant posts on a priority basis through a special recruitment drive. The inadequacy of infrastructure and tools such as vehicles, buildings, wireless sets, mobile handsets and GPS must also be addressed on a priority basis.
5. Provision of Android phones: To run the latest version of the M-STrIPES application, Android phones are required. These need to be provided urgently to all protection watchers, Beat Officers and Ranger Officers for effective protection. The M-STrIPES register needs to be revised and updated with the recent version provided by WII.
6. Adequate rescue and conflict mitigation capability: Presently the TR lacks veterinary services for rescue and rehabilitation. It is recommended that a mobile veterinary service unit be established by enlisting the services of dedicated veterinary doctor to deal with wildlife-related rescue emergencies in the TR.
7. Capacity building in wildlife management: The aptitude for wildlife conservation needs to be improved by providing knowledge and training about wildlife amongst the frontline staff, including the Beat Officers. It is recommended that short orientation and capacity building courses in wildlife management of 7 - 15 days' durations be arranged for different levels of field staff, including the Beat Officers of ATR on a regular basis to maintain the motivation and aptitude for protection and conservation. Both Andhra Pradesh and Telangana should consider establishing a training academy for the frontline staff of the two states at Srisailam, where infrastructure that was created by the efforts of a dedicated forest officer, Dr. Tulsi Rao, exists.
8. Control of pilgrim tourism: Since ATR is facing heavy pressures due to pilgrimage, this needs to be managed properly to prevent tourism related threats to the TR. Through various



awareness activities and capacity building programmes, tourists can be motivated to practice responsible, sustainable and green tourism.

9. Ecotourism: ATR, with its beautiful river systems and their well-forested watersheds, has immense tourism potential. Important streams, springs and water falls in the core area of ATR, in Nagarkurnool District are excellent ecotourism destinations. It is recommended that the ATR management should promote effective ecotourism, by involving local communities, the Chenchus and the Lambadas, in accordance to guidelines of the NTCA.
10. Extending the area of the buffer: ATR has an opportunity to increase the buffer area towards Achampet Forest Division, beyond the TR boundary. It is recommended that the western boundary be expanded up to the entire Achampet Division as an extended buffer under ATR. If extension in the TR is not possible, this area can be taken under the ecosensitive zone (ESZ). At present, an area of 1 km uniformly around the ATR has been demarcated as ESZ. This zone needs to be extended up to Achampet Divison.

KAWAL TIGER RESERVE, TELANGANA

Evaluation Period
December, 2018

07

Management Strengths

1. The area has excellent tiger habitat and responds to good management practices such as watershed and grassland management and invasive weed control.
2. KTR is a unique potential habitat for the larger tiger landscape of Tadoba-Kawal-Indravati. The surplus tigers in Tadoba-Andhari TR, in the north, can find their way into KTR through the Tadoba-Kawal corridor and connect with the larger habitat linked with Indravati Tiger Reserve through the Chimur and Kagaznagar divisions. Apart from Tadoba-Andhari TR, Chaprala Wildlife Sanctuary also allows secure tiger movements through the corridors towards Maharashtra.
3. Scientific management of weeds such as Hyptis suovalensis and Cassia tora is facilitating habitat restoration for herbivores, which supports the prey base of the tiger and consequently improves the tiger habitat and its population.
4. The use of percolation tanks, seepage pools and other water bodies to supply water to water holes is a worthwhile experiment, and it has improved the availability of water in the TR.
5. There are 37 villages inside the core of KTR. The inhabitants of five villages located inside the TR are ready to be relocated outside the reserve. In the meetings that the MEE group had with the villagers in the villages of Rampur and Maisampeth on 27 December 2017, there was demand that they be relocated as quickly as possible.
6. The practice initiated by the Forest Department of enrolling local villagers for work in base camps for general patrolling and anti-poaching activities is proving to be a popular and effective protection measure. It has sent a positive signal to members of the local communities, who are mostly tribal and traditional hunters.
7. The vehicular traffic on the 40 km stretch of State highway through the core of the TR has been reduced by stopping heavy vehicles between 9 pm and 6 am.
8. The KTR management has identified two potential corridors, the Tadoba-Kawal and Kawal-Indravati corridors, which need to be mainstreamed and supported by additional funding for their management.
9. There is a three-tier protection strategy in KTR: (1) base camps having foot patrol staff, (2) a strike force that includes a protection squad provided with a vehicle and (3) an anti-poaching squad exclusively meant for core/critical areas. This strategy is proving to be very effective in controlling wildlife crime, illicit felling of trees and smuggling.
10. A tigress with three cubs is being monitored continuously by the Territorial Forest Division in Kagaznagar Division, which is a corridor. This has established a high level of motivation among the field staff.



Management Weaknesses

1. Shortage of field staff: There has been a recent revision of the beats of KTR. There are currently 203 BOs to manage the area of 2015.44 sq. km. of KTR, with 632 beats. About 429 additional BOs are required. This has resulted in inadequacy of field staff.

   On the basis of threat perception, it is considered appropriate that a forest base camp should not have jurisdiction of more than 25 sq. km.. This implies that a total of about 81 base camps are required to manage and protect KTR effectively. However, at present, only 38 base camps are functional in KTR, with an average area coverage of 53 sq. km., which is larger than ideal.
2. Poor wireless communication: Some base camps are not connected to the communication network and are using mobile phone networks. The response systems were also found to be poor on the basis of the register records maintained at the range offices. Thus, the safety of the camp staff is at jeopardy, in the absence of an efficient communication system for help or reinforcements in the case of an emergency during incidents of poaching or attack by wild animal.
3. Institutionalization of people's participation: Van Sanrakshan Samitis (VSSs), which were created under the World Bank (WB) financed Forestry Project, have now become inactive. The VSSs having no orientation for wildlife have been converted into 63 EDCs. This has affected the quality of the people's participation in the protection and conservation of the forest and wildlife in KTR.
4. Presence of villages inside the core of the TR: A total of 37 villages are located inside the core, five of which have been identified by the FD staff for relocation. Incursions by the inhabitants and cattle of these villages into the TR adversely impact the habitat and wild herbivore population, consequently reducing the chances of tiger rehabilitation and the building up of the population in the reserve.
5. Rescue, rehabilitation and human-wildlife conflict mitigation: The KTR management has inadequate strength to manage rescues and rehabilitation and human-wildlife conflict mitigation capabilities and infrastructure, including dedicated veterinary services.
6. Unified control of TR under Field Director: Two divisions of KTR, i.e. Asifabad and Utnoor divisions, are not under the unified control of the Field Director, KTR, since October 2017, after the reorganization of districts. Also, the Field Director has additional charge of Territorial Kagazanagar Division.
7. Vehicular traffic: The traffic on the 40 km stretch of the State highway passing through the core of the TR has been reduced by stopping heavy vehicles between 9 pm and 6 am. However, no systems are in place to monitor the vehicular movements during the day time.

Immediate Actionable Points

1. It is recommended that the two divisions of the buffer of the TR, Asifabad and Utnoor divisions, be brought under the unified control of the Field Director at the earliest.
2. As per the discussion with the KTR management, vacant posts are going to be filled very soon as the process of recruitment has been completed. The department should expedite the appointment of trained forest guards.
3. Based on good practices of other states, the area under a base camp should not be greater than 25 sq. km.. A total of about 81 base camps are required for effective and efficient patrolling and protection to KTR. Therefore, the State Government is recommended to establish an additional 43 base camps in the TR.
4. Wireless communication: It is recommended that the Forest Department provides every base camp

with wireless equipment on top priority. This requirement may be appropriately incorporated in the TCP of the TR. If required, the NTCA may provide financial assistance for the purpose.

5. The TR management has minimal resources in terms of field gear, such as GPS, leaf litter blowers for fire control, arms and basic amenities for guards and watchers.
6. It is recommended that the necessary field gear be provided at the earliest, especially GPS, solar lights, air blowers, arms, water filters and cots.
7. Institutionalization of people's participation: The role of each EDC has to be defined, and active involvement in planning is needed on priority to reduce the human and cattle pressure. It is recommended that ecodevelopment activities of EDCs be carried out by the villagers outside the TR, who may be selected in consultation with the villagers.
8. Presence of villages inside the Core of the TR: Five villages located inside the TR have been identified by the department for relocation. It is recommended that the State Government submit the proposal to the NTCA for financial support after due scrutiny and approval.
9. Animal rescue and conflict mitigation capability: Presently the TR has one mobile animal rescue vehicle, but no regular veterinary staff members of the FD are available to man the rescue vehicle. It is recommended that a mobile veterinary service unit be established to deal with wildlife-related rescue emergencies in the TR by enlisting the services of a veterinarian and one veterinary assistant.
10. Declaration of the Kagaznagar corridor as a satellite core of KTR: The continuous presence and breeding of a tigress in Kagaznagar Reserve Forest Block necessitates protection and improvement of the habitat. The tigress has naturalized there and has four cubs. It is recommended that a suitable area in Kagaznagar Division be surveyed, demarcated and proposed to the NTCA as a satellite core of KTR, or that the dispersing sub-adult cubs be collared and relocated to KTR.
11. Reintroduction of tigers in KTR: As per the TCP, after 5 years, if breeding females do not establish themselves in the reserve, the possibilities of reintroduction from the surplus population of Tadoba must be explored. The TCP was made in 2012, and females have possibly not covered the long distance of 130 km due to an absence of good cover in the corridors. Hence, after the relocation of five villages, an inviolate area of around 200 sq. km. would be available in a single stretch. The reintroduction plan may be prepared in consultation with the NTCA and WII, as was done in Sariska, Rajasthan. It is also recommended that a security audit of the TR be conducted before the reintroduction.
12. There is a possibility of increased pressure from infrastructure development and development imperatives and times to come. Managing the TR in such a scenario will be a big challenge which calls for careful landscape level planning and management.



CLUSTER FOUR

4.4

S. No.	Name of the Tiger Reserve	Abbreviations	State
1.	Bandipur	BaTR	Karnataka
2.	Bhadra	BhTR	Karnataka
3.	Biligiri Ranganatha Swamy Temple	BRT	Karnataka
4.	Kali (Dandeli-Anshi)	DATR	Karnataka
5.	Nagarhole	NTR	Karnataka
6.	Parambikulam	PmTR	Kerala
7.	Periyar	PTR	Kerala
8.	Anamalai	AnTR	Tamil Nadu
9.	Kalakad¯Mundanthurai	KMTR	Tamil Nadu
10.	Mudumalai	MTR	Tamil Nadu
11.	Sathyamangalam	StTR	Tamil Nadu

List of Tiger Reserves included in Cluster Four

The Team

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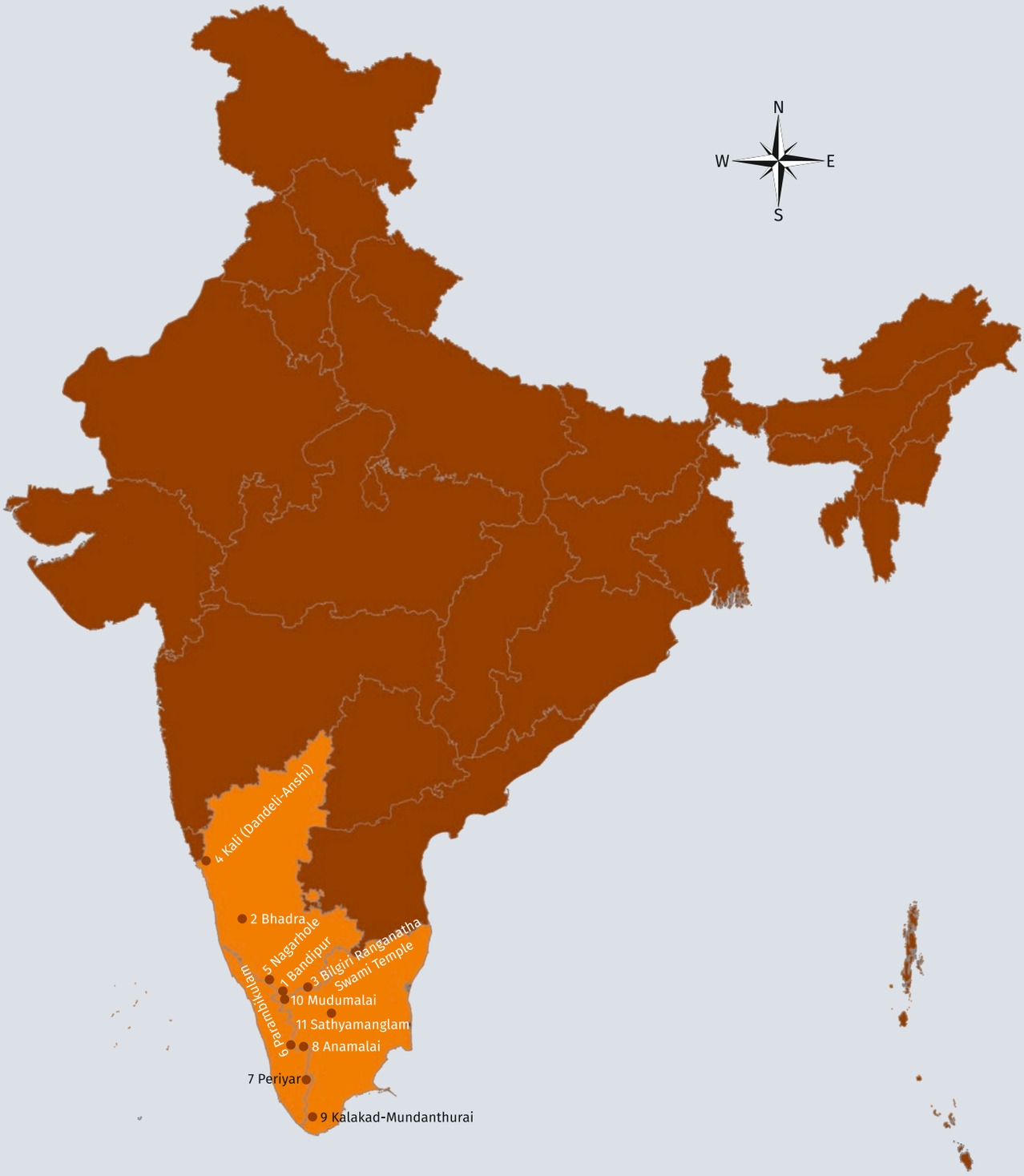

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BANDIPUR TIGER RESERVE, KARNATAKA

Evaluation Period
July, 2018

01

Management Strengths

1. Bandipur Tiger Reserve is surrounded by Karnataka's Nagarhole National Park in north-west, Tamil Nadu's Mudumulai Tiger Reserve in south and Sathyamangalam Tiger Reserve in east, and Kerala's Wayanad Wildlife Sanctuary in south-west. These four protected areas are part of the famous Nilgiri Biosphere Reserve and the larger Western Ghats Landscape. This landscape, located in three states (Karnataka, Tamil Nadu and Kerala), is vast, with an adequate prey base and contiguous habitat, providing enough opportunities for animal movements, specifically those of flagship species such as the tiger and elephant. This landscape is home to the single largest Asian elephant population in the world.
2. The Kaniyanpura elephant corridor has been consolidated by notifying the forest area under the control of the revenue department under Section 4 of the Karnataka Forest Act, 1963.
3. A length of 220 km along the northern boundary of the park was secured by declaring and notifying an eco-sensitive zone in 2012. Thus, activities in conflict with the interests of wildlife or having direct impact on wildlife in this zone are regulated. This is the first Tiger Reserve where an eco-sensitive zone was notified.
4. The core and critical wildlife habitat is entirely free of human settlements.
5. The Karnataka Government has been proactive and has provided funds for 48,000 LPG connections so far in the fringe villages of the buffer zone. This has gone a long way in reducing the fuel dependency of the villagers on the reserve.
6. The State Government-funded Chinara Vana Darshan programme for school children, aimed at creating awareness about forests and wildlife, is a commendable effort.
7. On account of good infrastructure and accommodation, this Tiger Reserve is a good eco-tourism destination.
8. Traffic restriction in two national highways, NH 181 and NH 766, pass through the reserve between 9 pm and 6 am has result in significantly reduced road kills due to vehicular accidents.
9. Similarly, the flow of traffic to the famous Gopalswamy Temple, situated on a hillock inside Bandipur, is regulated. All private vehicles are left at the bottom of the hillock, and from there, the passengers are taken to the temple at the top in a Karnataka State Government Bus.
10. There are a number of research organizations in and around Bangalore. Whose services can be utilized for carrying out research studies pertaining to specific management issues.

Management Weaknesses

1. The northern boundary of Bandipur Tiger Reserve is dotted by around 150 villages, of which 112 villages are in the buffer zone. These villages have a human population of around 1.5 lakhs and a cattle population of around 1 lakh. So, the anthropogenic pressure on the park resources is considerable and increasing.
2. There is significant level of human-wildlife conflict in the reserve. During 2016-2017 alone, there were four human deaths, 298 cattle deaths and 2416 cases of property loss. The animals involved in crop loss are elephants and wild pigs. Human deaths, human injury and cattle deaths are due to elephants, tigers and leopards.

3. The number of eco-development committees (EDCs) is only 22 even though there are 112 villages in the buffer zone. Moreover, funding from Tiger Conservation Foundation to these EDCs is not enough. As a result, the participation of the local people in the management of the park is poor.
4. One invasive species, Lantana camara, has spread and occupied nearly 50-60% of the Tiger Reserve.
5. There are stands of dead bamboo culms in the forest due to gregarious flowering 4 years back. The entire bamboo crop has died without much regeneration of culms. This has resulted in reduction in good fodder for elephant and has the potential of fire hazard.
6. There is heavy tourist traffic throughout the day on the two national highways passing through the Tiger Reserve, particularly the one leading to Ooty. The movement of vehicles poses a serious problem to the movements of wild animals.
7. The transition of people in the buffer villages from traditional to commercial farming systems poses problems to the management.
8. Even though hunting and poaching have been greatly reduced, there is a continuous threat of poaching of herbivores by the local people.
9. Most of the staff members are not properly trained in wildlife management.
10. There are a large number of vacancies among the frontline staff.

Immediate Actionable Points

1. EDCs may be formed in all the fringe villages. According to the suggestion of the APCCF (Project Tiger), Karnataka, each EDC may be provided with Rs. 50,000 as seed money from the Bandipur Tiger Foundation to make them functional and effective.
2. A concrete HRD plan may be prepared to provide training to the frontline staff in wildlife law, management and conservation in a time-bound manner.
3. Steps may be taken to fill up the existing vacancies (35%) in the Tiger Reserve immediately. Specifically, the vacancies at the levels of Deputy Range Forest Officer (50%), Forest Guard (33%) and Forest Watcher (36%) should be filled up on priority.
4. Forest rights have not been given to displaced/relocated villagers, but applications for community rights are received in the Hediyala, N. Begur, Omkaa and Gundulupet ranges. These land right disputes, raised under the Forest Rights Act, may be settled quickly in consultation with the PCCF (WL), Karnataka, and the NTCA, New Delhi.
5. Presently the software Hejje has been given to each anti-poaching camp to monitor and coordinate its daily activities. Steps may be taken to adopt the use of M-STrIPES for ecological monitoring and patrolling as prescribed by the NTCA.
6. A specific patrolling strategy may be formulated for the Special Tiger Protection force (STPF) for patrolling in border areas, core area and sensitive zones situated in and around the reserve.
7. The mass mortality of bamboo that took place due to gregarious flowering 4 years back and the non-regeneration of bamboo culms yet is a major problem since bamboo is fodder for elephants. Though a meagre amount was provided in 2014-2015 for sowing of bamboo seeds among grasses, there was no provision of funds in 2015-2016 and 2016-2017. A detailed plan showing the steps to be taken for bamboo regeneration may be prepared and scrupulously implemented.
8. Two research reports have been produced on the management, eradication and restoration of Lantana camara-invaded forests, but the suggestions in these reports have not yet been tried in the field. These recommended actions may be implemented at the earliest.
9. Though many threatened species are found in the Tiger Reserve, no



systematic and scientific population assessments of these species, except the elephant, have been carried out regularly. Such assessments may be carried out in accordance with the established protocol.

10. The services of trained guides having knowledge of field botany and birds may be made available in the departmental safari vehicle.
11. The authorities of reserve may initiate outreach programmes through the tiger conservation foundation for various target audiences to create awareness and to promote conservation education.

BHADRA TIGER RESERVE, KARNATAKA

Evaluation Period
February, 2018

02

Management Strengths

1. Bhadra Tiger Reserve is located in Malnad region of Western Ghats of Karnataka and it forms a part of a large landscape with its connectivity to Kudremukh National Park and Shettihalli Wildlife Sanctuary.
2. The TR has high habitat heterogeneity comprising mostly of moist deciduous forest on the Western Ghats side, but also dry deciduous forest, semi-evergreen forest with grassy patches and shola forests. The biodiversity of the TR is very rich.
3. Tiger reserve forms the catchment of perennial Bhadra River and its tributaries, thereby holding larger watershed significance for the region.
4. The habitat in Bhadra Tiger Reserve is dominated by bamboo species. In fact, Bhadra is called a "Valley of Bamboos". The bamboo provides good fodder for elephants. There is no dearth of water since 12 perennial streams flow through the reserve.
5. Bhadra is the first TR in the country to complete a village relocation programme successfully. The original relocation plan, which was introduced in 1974, was implemented by 2002, when 26 villages in the reserve were successfully relocated.
6. The TR authorities have implemented M-STrIPES and Phase IV monitoring successfully.

Management Weaknesses

1. The corridor connectivity or linkage with other sanctuaries and reserves except Shettihalli Wildlife Sanctuary is fragile and disjointed due to the presence of a number of revenue villages and coffee estates in the buffer areas.
2. Human-animal conflict, particularly with elephants, occurs frequently in the buffer area and fringe villages.
3. The TCP specifically mentions that the effects of the Bhadra reservoir on the overall climatic conditions of the TR are to be studied. But, no study has been conducted yet. No specific research report could be found on the flora and fauna of Bhadra Tiger Reserve. Thus, there is an information gap in implementing science based conservation actions.
4. Invasive species such as Lantana, Eupatorium, Parthenium and Cassia spectabillis are spreading in the reserve.

5. The participation of the local people of the fringe and buffer villages is not encouraging. Out of 18 EDCs, only one is functioning properly.
6. There are vacancies in frontline staff such as the positions of watchers and forest guards. The professional training relating to wildlife management imparted to the staff members is not adequate.
7. EDC formation where relocation has taken place is still under consideration.
8. There is discontent among villagers outside the PAs due to various disputes relating to land and income generation activities.

Immediate Actionable Points

1. Staff development training programmes related to wildlife management, protection and monitoring are to be planned and implemented systematically, with the objective of building the capacity of the frontline staff.
2. Vacancies in frontline staff should be expeditiously filled.
3. Consistent efforts are to be made to bring buffer areas under unified control of the Field Director, so that protection measures in the landscape can be consolidated and corridors can be restored.
4. Since the level of participation of local people in the park management is not encouraging, efforts to involve them in park activities, intelligence sharing, ecotourism, etc. are necessary.
5. Constant interaction is required between the TR forest personnel and villagers relocated to MC Halli, which is 50 km away from the reserve. There should be frequent/regular interactions among villagers relocated previously so that there is cooperation and knowledge sharing in solving problems.
6. The protection afforded through anti-poaching camps and patrolling by boats in the Bhadra reservoir needs to be improved.
7. Five villages still remain inside the reserve, around a religious organization, the "Paradeshppana Mutt" that needs to be persuaded for relocation.
8. A large number of resorts and home stays are coming up in the coffee estates between the buffer zones. These need to be regulated to minimize their threats to the TR.
9. Except for a fire management plan, there are no other management plans such as plans for eradication of invasive species or monitoring schedules for different threatened animals. A staff development plan and all other management plans need to be prepared and implemented meticulously.
10. The number of tourists vegetation has increased three-fold in the last 3 years. This growth should be regulated by defining ecotourism zones according to guidelines of the NTCA.
11. The Chinara nature camp scheme of the Karnataka Government for exposing Government school children to nature is a good scheme for raising awareness, and can be extended to students of schools adjoining to the Tiger Reserve.
12. There must be regular technical training programmes related to the use of M-STrIPES, Phase IV monitoring, big cat carcass disposal protocols and wildlife behavior for the field staff, from Range Officers to Beat Forest guard positions.
13. Research based findings need to be documented. A broad agenda must be prepared to carry out research on various aspects of Bhadra TR, such as endangered animals and plants, habitat management and man-animal conflicts.



BILIGIRI RANGANATHA SWAMY TEMPLE (BRT) TIGER RESERVE, KARNATAKA

Evaluation Period
April, 2018

03

Management Strengths

1. The landscape complex around BRT Tiger Reserve is home to an amazing assemblage of biodiversity. The single largest population of tigers in India is within this landscape, comprising the complex of Nagarhole-Mudumalai-Bandipur and Wayanad. The recently created Sathyamangalam Tiger Reserve in Tamil Nadu also shares a long boundary with the BRT Tiger Reserve. The regional connectivity of the Tiger Reserve enables free movement of the tiger, elephant and many other species.
2. BRT is a unique bio-geographical unit that is situated in the middle of the bridge between the Western Ghats and Eastern Ghats complex, where the forest types range from tropical thorn jungle and scrub jungle to evergreen forests. The area is endowed with a rich diversity and abundance of animal life also. The area has a number of endemic species and endangered species.
3. The shola forest in the higher ranges of the reserve is the lifeline of perennial streams and forms the catchment area for many rivers and dams. The water is abundant in all seasons.
4. Besides NTCA funding, funding from State Govt. side is quite encouraging. The State Government seems to be quite proactive, having introduced the "Chinara Vana Darshan" scheme for school children.
5. BRT acts as a hub for ecological research. Around 46 research publications have come up over the years.
6. Diverse habitats, beautiful landscape and healthy population of wild animals. A good number of Indians and foreigners visit the reserve. The reserve offers wonderful opportunities for birdwatching and photography.

Management Weaknesses

1. There are around 57 tribal settlements within and on the fringe of the Tiger Reserve. There are 10 Sholiga tribal settlements in the core area, which pose a major and permanent threat. They were issued with patta/occupancy rights under the Forest Rights Act (FRA). Their population has been increasing over the years, and the demand of the Sholigas for roads, electricity, a school and a hospital as well as community forest rights (which have not yet been granted) is a constant headache for the authorities of the reserve.
2. Major roads such as the Sathyamangalam-Chamrajnagar road and Kollegal-Hasanur road pass through the reserve. Vehicle movements in this road disturb the free movement of elephants and other wild animals.
3. Nearly 30% of the sanctioned posts among the frontline staff, such as Forest Guards and Watchers, are vacant. Further, the average age of these frontline staff members is above 50.
4. Absence of properly trained wildlife staff and posting of officers and staff who do not have an aptitude for wildlife management. This is a major weakness.
5. The non-plan funds, especially the funds for maintaining buildings and vehicles, are quite insufficient.
6. Around 60% of the Tiger Reserve is covered with invasive species, specifically Lantana.
7. Except for some majestic forest guest houses from the Maharaja's time that are located at strategic points, the facilities available for visitors seem quite inadequate. There is no interpretation centre or visitor centre for ecotourism.

8. The BRT enclosure around the temple, spreading over 500 acres, has become a commercial centre, attracting pilgrim tourists, devotees and other land grabbers, who create resorts and homestays.
9. The presence of five big coffee estates and the labour force engaged there are also detrimental to conservation efforts.
10. None of the top-level staff have been trained by WII or properly trained in wildlife management. The staff also lack training and skills in enforcement, especially in legal matters.
11. A large portion of the boundary is at an interface with village settlements, making the reserve vulnerable to various threats such as illegal grazing, timber theft, hunting for bush meat and large-scale man-animal conflicts.
12. The VFC/EDC structures are not functioning properly.

Immediate Actionable Points

1. There must be constant effort from the reserve authorities to convince Sholiga tribes having settlements in the core area to opt for the voluntary relocation programme. More efforts must be made to engage personnel from the Sholiga settlements in forest activities such as patrolling, eradication of invasive weeds and serving as protection watchers.
2. Steps must be taken immediately to fill up the vacancies (30%) that exist among the frontline staff (Forest Guards and Watchers).
3. Establishment of an interpretation centre/nature education centre/visitors' centre can help create awareness among all categories of people.
4. Since, the terrain of the TR is undulating and is inaccessible at many places, good medical and education facilities are not available at the Range headquarters. This affects morale of the staff posted there. Action may be initiated to overcome these difficulties.
5. Since, the porous inter-State border with Tamil Nadu has had a long history of poaching and timber (Chandan tree) smuggling, ever since, as the days of Veerappan, there must be regular interaction and coordination with Tamil Nadu for maintaining a better vigil along the border.
6. More funds must be allocated for removal of invasive species under habitat management since they cover more than 60% of the reserve. The present allotment for weed eradication seems to be quite insufficient.
7. A proper HRD plan must be prepared for training all categories of field staff members in different aspects of wildlife management, and this plan must be scrupulously followed.
8. Efforts must be made to declare the proposed eco-sensitive zone as quickly as possible to put a stop to the negative development activities of all kinds taking place around the Tiger Reserve.
9. Managing the pilgrimage tourism is a big challenge for the authorities of the Tiger Reserve. This issue may be addressed proactively.
10. The authorities of the Tiger Reserve are successfully implementing the HULI programme for monitoring the protection activities of APC watchers. They are advised to shift to M-STrIPES, as prescribed by NTCA for maintaining uniformity.



KALI (DANDELI-ANSHI) TIGER RESERVE, KARNATAKA

Evaluation Period
October, 2017

04

Management Strengths

1. In 2016, Dandeli-Anshi Tiger Reserve was renamed Kali Tiger Reserve as it falls mostly in the catchment of the Kali River. It is a part of the Malenad-Mysore Tiger Landscape, which extends from the Kali Tiger Reserve, in the north, to the Cauvery Wildlife Sanctuary, in the south.
2. The reserve is situated amidst the Western Ghats Natural World Heritage site inscribed by the UNESCO, one of the global biodiversity hotspots.
3. The reserve does not face a serious threat in terms of poaching and hunting.
4. The reserve has a contiguous habitat that is inaccessible and is well connected with the southern and northern forested areas. In the north it is connected to Bhimgarh Wildlife Sanctuary, which is further connected to the Radhanagari and Koyna wildlife sanctuaries of Maharastra. Towards the west, there are protected areas of Goa, i.e. Cotigao Wildlife Sanctuary, Netravalli Wildlife Sanctuary etc.
5. The reserve has adequate manpower and is in the process of hiring additional staff.
6. The tourist influx of the reserve is limited, but the tourist infrastructure is adequate. The nature camps give a feel of staying amidst Nature.
7. Corridors have been identified systematically.
8. Minimal conflicts have been reported in the reserve with respect to animals in last 2 years.
9. The critical tiger habitat has been identified as per notification FEE/245/FWL/2015 dated 20 December 2007.
10. There is a sniffer dog squad for combatting illegal activities, detecting poaching, etc.
11. The interpretation facilities are well developed, mostly in nature camps.
12. There are good surveillance systems in terms of wireless networks.
13. There is no vehicle movement on the State roadways from 6 pm to 6 am as eight check posts have been placed.
14. The award-winning staff are highly motivated to take up protection and other activities in the Tiger Reserve.

Management Weaknesses

1. There is a need for a weed management plan and other thematic or zone plans instead of ad hoc interventions according to budgetary provisions.
2. The relocation efforts have a long way to go even though there have been constant efforts. Though the critical tiger habitat was declared in 2007, there are 52 villages/hamlets in the core area that need to be relocated.
3. The relocation efforts have to be conducted in a comprehensive and holistic manner so as to ensure complete integration of the families with their new surroundings and society.
4. There is a need to streamline the research activities and get regular feedback from the researcher community and to analyse continuously how the research findings can be used as input for better management of the habitat of the Tiger Reserve.
5. A comprehensive long-term garbage disposal plan is needed.
6. During summer, there is a scarcity of water in some pockets of the reserve.

This needs to be addressed immediately.

7. The core area is exposed directly to fringe villages, particularly in the southern and south-eastern parts. Since, these fringe villages have dense human and cattle populations, the reserve faces serious anthropogenic pressure.

Immediate Actionable Points

1. Training through formal wildlife courses conducted by reputed institutes such as WII is recommended for enhancement of skills. A vertical training of staff for at least a week is proposed.
2. Regular seminars and workshops related to research activities are needed on an annual basis.
3. Besides the tiger and elephant, other threatened species are found in the Tiger Reserve. Scientific assessment of tigers and other taxa and record/library needs to be ensured. Also, prey populations need to be monitored systematically. SOPs for conflict animals need to be followed for both large and small animals.
4. A mechanism for obtaining feedback from tourists through a formal system is needed to improve the visitor facilities.
5. The connectivity of the forests must be maintained by employing good practices and using surveillance systems such as drones.
6. The role of Tiger Reserves in climate change at a landscape level must be assessed and the economic valuation done by NTCA-IIFM should be extended to this Tiger Reserve also.
7. New vehicles must be procured for patrolling and for rapid responses. Less noisy vehicles must be used for safari activities.
8. EDCs have been constituted in only 29 villages. All the other fringe and core area villages should be brought under EDCs.
9. Relocation and settling of rights of communities need to be resolved at the earliest as these are potential threats.
10. Planned and formal settings for various issues relating to water, fire, weeds, research and training. In addition, the reserve must have a formal security plan for dealing with various issues.
11. Mitigation measures for future linear development infrastructure may be taken.
12. Tiger populations need to be scientifically assessed along with minimum-number estimations as done in Phase IV monitoring protocol.



NAGARHOLE TIGER RESERVE, KARNATAKA

Evaluation Period
June, 2018

05

Management Strengths

1. The famous Nagarhole Tiger Reserve (NTR) lies on the border where the Western Ghats meet the Deccan Plateau. Nagarhole is bordered by Kerala's Wayanad Sanctuary in the south-west and the Kabini reservoir in the south-east, which connects to Karnataka's Bandipur Tiger Reserve. The three protected areas, together with Tamil Nadu's Mudumulai Tiger Reserve and Kerala's Silent Valley Reserve constitute the Nilgiri Biosphere Reserve. This complex provides a large landscape matrix for conservation of wide-ranging mega mammals such as tigers and elephants.
2. A special feature of NTR is the swampy marsh habitat known as the hadlu. Hadlus are unique ecosystems that hold water for a major part of the year and thus, attract large numbers of wild ungulates during summer.
3. NTR is a world-famous destination for wildlife tourism. There is a variety of habitats due to the ecological variations, from dry deciduous forests in the eastern regions to tropical forests in the western part, interspersed with the unique grassy swamps, the hadlus. This variety of habitats contributes to the phenomenal abundance and enormous diversity of wildlife in the Tiger Reserve throughout the year. Being a part of the Western Ghats, NTR is a hotspot of biological diversity, with a high level of endemism, and supports many rare, endangered and threatened species of the Indian sub-continent.
4. There has been a ban on vehicular traffic on the national highways passing through Nagarhole between 9.00 pm and 6.00 am since 2010. There is also a ban on vehicular movements on SH 33 (Mysore- Mananthavady road) and district roads between 6.00 pm and 6.00 am to manage human-elephant conflict.
5. GASTHU technology has been implemented to monitor vehicular movements inside this Tiger Reserve. GASTHU is a mobile-based vehicle monitoring app used to regulate the traffic, which in turn, helps to prevent road kills and illegal activities on the roadside.
6. The State Government-funded Chinara Vana Darshan is an effective programme designed to create awareness among school students about forests, wildlife, the environment and ecology. This programme is completely free of cost for Government school students.
7. Inter-State border meetings are conducted regularly between officials of the forest and police department of Kerala, Tamil Nadu and Karnataka to exchange intelligence and gather information regarding trans-border illegal activities.
8. NTR is located at a very strategic place that has corridors/connectivity links with more than one source population of tigers in the Western Ghats Landscape complex. This strong connectivity is very significant for tiger conservation and the viability of tiger populations, as well as for sustaining a good number of Asiatic elephants.
9. The strong protection measures implemented by deploying the Special Tiger Protection Force (STPF) staff over and above the anti poaching camps are an added advantage. The STPF was constituted by the Government of Karnataka during 2010-2011 as per the National Tiger Conservation Authority (NTCA) guidelines of 2009 to provide special protection around Nagarhole and Bandipur Tiger Reserve.

Management Weaknesses

1. The greatest weakness is the space crunch, with the tiger population growing in NTR. The park has a perimeter of 220 km, of which a large portion, i.e. 150 km, has human habitations. The eastern and western boundaries of the reserve do not have any buffer and are surrounded with villages. Thus, human-animal conflicts are increasing.
2. As a result of the presence of tribal settlements inside the core area of the Tiger Reserve, there is considerable biotic pressure. There are about 33 tribal settlements, with 1461 families, in the core area. Further, there are 96 villages on the periphery of the Tiger Reserve. In addition, there are coffee estates, that form an enclosure inside the Tiger Reserve. The considerable pressure exerted by these settlements on the natural resources is exerting negative impacts on the populations and habitats of wild animals.
3. Passing of State highways such as Mysore-Mananthavady and Hunsur-Kutta totaling 75.30 km across the core and critical tiger habitat area pose a serious problem for free movement of animals, resulting in road hits.
4. Considerable vacancy in the staff strength poses a major problem in T.R. management. Out of 386 total staff strength, 122 posts (31%) are vacant. More vacancy exists in frontline staff such as Dy. Forest Range officer and forest watchers.
5. Excepting few top level officers, other staff are not properly trained on wildlife protection and management issues.
6. Delay in notification of proposed buffer zone around the western side of the Tiger Reserve. Core and Buffer are not under unified administrative control.
7. Although 80 Eco-Development Committees have been formed, most of them are defunct and not helpful or supportive to TR management.
8. Although Nagarhole TR is famous for wildlife tourism, the absence of any interpretation or visitor centre for imparting nature education and for creating awareness among the students and wildlife tourists, is glaring.
9. Even though there are 33 Anti poaching camps, the protection mechanism and staff strength is not adequate to keep a constant vigil over large and porous interstate border with Kerala.
10. Quantum of annual removal of invasive species, specifically Lantana camara is not adequate, in view of the extent of the problem.
11. There are monoculture plantations with a total area of 107 sq. km. (teak 92.3 sq. km.; eucalyptus 5.3 sq. km.; miscellaneous species 9.4 sq. km.) inside the Tiger Reserve. These plantations were established before 1984 and are a threat to wildlife habitats.

Immediate Actionable Points

1. The successful relocation of tribal families from the core area to Nagapura and Shettymally may be replicated in future. Efforts should be made to expedite voluntary relocation of remaining families.
2. An elaborate staff development plan may be prepared to provide training on wildlife management, protection and conservation to the entire field staff, systematically.
3. Action to bring the core and buffer areas under the unified control of the Field Director is required.
4. Tourism activities may be regulated as per the guidelines issued by the NTCA.
5. Because of the large number of dormant EDCs, ensuring participation of the local communities in protection and conservation activities inside the Tiger Reserve has not been possible. Moreover, not all villages have EDCs, and most of the EDCs formed previously have become inactive due to a shortage of funds. This may be looked into, and the defunct EDCs may be revitalized.
6. The mushrooming of home stays around the Tiger Reserve in Kodagu District is a threat. Changes in the land-use system should be compatible with the objectives of Tiger Reserve management. This issue may be reviewed.



7. Since NTR landscape has high tiger density, monitoring tiger source population is an important issue and should be carried out regularly.
8. The other important issues that need immediate attention are intelligence-based enforcement, deployment of the STPF in vulnerable localities, and strengthening of anti-poaching operation.
9. An interpretation visitor center should be developed as per the prescription in the TCP to create awareness among public.
10. Although many threatened species are found in the reserve, no scientific population assessment has been conducted. Since, there are many reputed research organizations around Nagarhole, their services may be utilized for such studies.
11. A constant vigil may be mounted on the high voltage line and the sagging electric lines running through the reserve. Otherwise, more elephant deaths could happen due to electrocution.
12. A proper response system may be institutionalized to ensure that all grievances /complaints/feedback regarding any issues is addressed and corrective measures are taken accordingly.

Nilanjan Chatterjee

PARAMBIKULAM TIGER RESERVE, KERALA

Evaluation Period
November, 2017

06

Management Strengths

1. Parambikulam Tiger Reserve, Kerala is nestled in the picturesque and extensive Anamalai-Nelliyampathy landscape of the Western Ghats in Palakkad and Thrissur districts of Kerala. To the west are Peechi Wildlife Sanctuary and Chimmony Wildlife Sanctuary. On the east are Anamalai Tiger Reserve and Indira Gandhi Wildlife Sanctuary, of Tamil Nadu. To the north is Nemmara Forest Division, which is partly in the buffer and partly exposed. Thus, the TR has forest contiguity for animal dispersals.
2. Parambikulam TR is endowed remarkably with rich habitat heterogeneity and high diversity of species. The habitat comprises of predominantly mixed deciduous, evergreen, semi-evergreen and shola forests. Other unique habitats, such as marshy grasslands, locally known as vayals, and deep freshwater ecosystems created by three reservoirs, add to the habitat diversity.
3. The three reservoirs and a few perennial streams make sufficient water available for the animals throughout the year.
4. Presently, the core area is completely free of settlements. Earlier, there were nearly 1100 cattle grazing in the core area. These have now been completely removed.
5. The core/critical tiger habitat is legally largely inviolate and devoid of biotic interference. No tourism is encouraged in the core area. All ecotourism activities are confined to the buffer zone.
6. The TR has a strong participatory eco-development programme in the fringe villages. This programme contributes to the villagers' livelihoods and enlists their active participation in conservation and ecotourism.

Management Weaknesses

1. Out of the total core area of 390.89 sq. km., a significant portion, i.e. 145.76 sq. km., is not a part of the national park or sanctuary and is mostly not protected. Similarly, out of the total buffer area of 252.77 sq. km., only 39.87 sq. km. extent is protected, and the remaining 212.90 sq. km. is not protected.
2. The core and buffer are not under the unified administrative control of the Field Director. The buffer is spread over three forest divisions. A part of the northern portion of the TR is completely unbuffered.
3. Field staff are not formally trained in wildlife management except for some short term in house training programmes.
4. The people of the fringe villages in the buffer zone mostly depend on NTFP collection from the reserve areas. Regulating this activity is a major issue for the authorities.



Immediate Actionable Points

1. A large chunk of the core area, spreading over 145.76 sq. km., does not fall within any PA, and is simply a reserve forest. As suggested in the TCP, this area needs to be declared as wildlife sanctuary immediately.
2. An extent of 145.76 sq. km. of the core area and an extent of 252.77 sq. km. of the buffer are still under the administrative control of three territorial divisions. The entire core and buffer area need to be consolidated under the administrative control of TR authorities.
3. Human-animal conflicts, specifically with elephants, are frequent in the buffer areas and fringe villages. Efforts should be made to reduce the conflict, and compensation should be paid in a timely manner.
4. Sincere efforts should be made to provide ecologically sustainable livelihood options to local people and monitor wild animals, thereby addressing the human-wildlife interface and providing protection to flagship animals.
5. Research on eradication of invasive species, and an appropriate management plan are urgently required.
6. Although, the core area is free of biotic interference, there are six tribal hamlets/settlements in the buffer area. So, efforts should be made to relocate these people voluntarily. Until they are relocated, efforts are needed to address their livelihood issues, improving the infrastructure of hamlets (it was learnt that LPG has already been supplied to all tribal families) and addressing issues related to health and education of villagers.
7. The EDCs, specifically those manned by tribal women, seem to be more active. Efforts have to be put by the park authorities to keep their morale up in pursuing various livelihood-generating activities. More vocational trainings need to be carried out for the tribals.
8. Efforts are to be made to create more solar pump-based water holes in the western part of the TR, where the water scarcity is severe during summer.
9. The declaration of eco-sensitive zone around the park must be expedited.
10. Efforts need to be made for training of staff in various aspects of wildlife management and specifically in legal matters, pertaining to the WLP Act, 1972.
11. The assistant for education provided to tribal students by project authorities from the fourth standard to the eighth standard needs to be extended to higher standards.

PERIYAR TIGER RESERVE, KERALA

Evaluation Period
May, 2018

07

Management Strengths

1. Nestled in the Cardamom and Pandalam Hills, Periyar Tiger Reserve (PTR) is the largest and oldest protected area in Kerala, with hills and forested valleys around a large lake with myriad streams. The eastern side of PTR is bounded by Tirunelveli Forest Division, of Tamil Nadu, and in the north-east is Meghamalai Wildlife Sanctuary.
2. PTR is one of the single largest blocks in the southern Western Ghats, and it plays a key role in maintaining regional connectivity with other forest tracts.
3. Out of the extent of 881 sq. km. of core area, more than 50%, i.e. 495 sq. km., is covered by evergreen forest, i.e. West Coast Tropical Evergreen Forest (305 sq. km.) and West Coast Semi-evergreen Forest (190 sq. km.). As such, PTR forms one of the richest assemblages of evergreen forests in the entire Western Ghats, which are rich in biodiversity, with a high degree of endemism.
4. The entire core area is free from human settlements and the biotic interference is negligible.
5. The tiger population is stable at around 25 individuals. With the tiger being the flagship species for biodiversity conservation, its stable population indicates that the population of its prey species, i.e. herbivores, is also stable.
6. The Tiger Reserve is very rich in rare, endangered and threatened (RET) species of animals and birds (nearly 20 species of threatened birds), as well as endemic plant species.
7. The rivers originating from the forested tracts of PTR, namely the Periyar, Pamba, etc., are lifelines for millions of people of Kerala and Tamil Nadu. The unique man-made Periyar lake, spreading over 20 sq. km., is an important source of water for Tamil Nadu for the purpose of irrigation, drinking and power generation.
8. PTR is a globally renowned tourism destination, but tourism inside the core area is strictly prohibited. At some places, tourism is managed by community-based EDCs.
9. The relationship between the park authorities and local people was fostered through the India Eco-development Project (IEDP) which started in PTR in 1996.
10. The participation of local people living in the buffer and fringe areas is visible everywhere and in almost all forest activities. Old poachers have turned protectors because of successful EDC activities.
11. The Bio-diversity Conservation and Rural Livelihood Improvement Project (BCRLIP) which aims at developing and promoting new models of conservation at the landscape level through enhanced capacity and institution building, is also implemented in this Tiger Reserve.
12. The voluntary participation of the all-women protection group Vasanta Sena, which started in 2002, is an innovative endeavor.

Management Weaknesses

1. Out of the total extent of 881 sq. km. of the core area, 733 sq. km. is a protected area and the rest (148 sq. km.) was carved out from Ranni Forest Division, which is not part of any protected area network.
2. The long interstate boundary (about 90 km) with Tamil Nadu is porous and has 18 illegal entry points.
3. Pachakanam, a private estate and a plantation of Karnataka Forest Development Corporation is located in the core area.
4. Many parts of the reserve become inaccessible during the monsoon, making foot patrolling extremely difficult.

5. One of the major threats is the invasive species, Lantana camara. The grasslands and vayals (fields) are gradually getting infested with woody invasive species.
6. The spread of invasive woody species in the grasslands/vayals and progressive infestation of the Tiger Reserve by exotic alien weeds such as Lantana are a concern.
7. Licensed gun holders within 10 km from the boundary of the protected area with the authorities are not registered with the Tiger Reserve.
8. A total of 1-1.5 crore devotees visit the Ayyappa temple of Sabarimala, situated right inside the core, over a span of 2 months each year. This exerts a lot of biotic pressure on the natural resources.
9. Non-adherence to the Sabarimala Master Plan by the Travancore Dewasom Board also threatens ecology of the Tiger Reserve.

Immediate Actionable Points

1. The committee was informed that a recommendation was made at the fourth State Wildlife Board meeting, held on 30 November 2010, to declare an extent of 148 sq. km. of non-protected area as part of the core and a wildlife sanctuary and that the recommendation was handed over to PTR on 23 December 2010. Action on this recommendation needs to be expedited.
2. The rest of the peripheral areas of Ranni and Kottayam forest divisions bordering PTR should immediately be declared as buffer areas under the Wildlife (Protection) Act,1972 and efforts made to bring these areas under the administrative control of the Field Director, PTR, for better protection and management.
3. Due to the existence of a long interstate boundary with Tamil Nadu (90 km), there should be an initiative to hold co-ordination meetings with forest officials of Tamil Nadu regularly as outlined in the SOP of the NTCA on the subject.
4. Though the biotic pressure from tourism and other activities has been reduced considerably, the pilgrimage pressure of 1-1.5 crore devotees to Sabarimala during the festive period persists.
5. Some incentives such as insurance, health and educational facilities need to be provided to members of the voluntary all-women protection group Vasanta Sena and their families.
6. Though lot of research activities are taken up in the reserve, there is a need conducting long-term studies on ecosystem resilience and stability with respect to processes in PTR. Various permanent vegetation plots need to be set up and monitored regularly.
7. The safety of tourists is a major concern in the park as various nature walks are conducted in areas where the likelihood of elephant and gaur encounters is high. It is suggested that proper precautions be taken and adequate arms be used for such events.
8. Around 5000 people belonging to the Manan, Paliyan, Urali, Malampandaram, Ukdar and Malayan tribes depend on PTR greatly for their livelihoods. Action should be taken to provide them alternate livelihood provisions/avenues, keeping their eco-cultural association with the forest intact.
9. When visiting the Periyar lake, the MEE team learnt that there is a proposal to increase the height of the Mullaperiyar dam. The water- storage and level will increase if the proposal is carried out. Contingency plans should be prepared and kept ready to face and mitigate any adverse impacts.
10. An exclusive HRD plan may be prepared to train the entire frontline staff in wildlife management and protection.
11. Re-organization of the ranges and establishment of 18 more Anti-poaching camps (APCs) at vulnerable points are planned. These plans needs to be implemented at the earliest.
12. Implementation of the Master Plan for management of Sabiramala Pilgrimage and involve EDCs in the process.
13. Promote Financial Aid and Encouragement to women voluntary groups like 'Vasanta Sena' and the same may be extended to all frontline staff.

ANAMALAI TIGER RESERVE, TAMIL NADU

Evaluation Period
June, 2018

08

Management Strengths

1. Anamalai Tiger Reserve (ATR) lies south of the Palaghat Gap, in the southern Western Ghats landscape. It is surrounded by protected areas such as Parambikulam Tiger Reserve, on the east (Kerala), Chinnar Wildlife Sanctuary (Kerala) and Eravikulam National Park, to the south-west. Since the area is well buffered with forest divisions and wildlife reserves and shares a boundary with Parambikulam Tiger Reserve, it facilitates migration of long-ranging animals.
2. The reserve is rich in both floral and faunal biodiversity. It is endowed with west coast tropical evergreen forests. Significant populations of the Tiger, Elephant, Lion-Tailed Macaque and Nilgiri Tahr are found here.
3. The Government of India awarded ATR a certificate of excellence for developing an effective communication strategy in 2015. All the Rangers are provided with vehicles and communication equipment.
4. Anti-poaching camps have been established at 23 vulnerable points. A total of 85 local tribal youth are camping 24×7 in groups and walk around in the surrounding areas to protect the animals from poaching and stop illicit felling of sandalwood and other timber. Poaching and smuggling of timber have come down drastically in recent years.
5. A large number of NGOs and voluntary organizations are working in co-ordination with the authorities of the Tiger Reserve for the cause of conservation.
6. ATR has got a potential research base. A lot of scientists/biologists and institutions of repute have been attracted by ATR to carry out research in various fields.
7. In the upper plateau of the Tiger Reserve, in Valparai, Manambolly and Ulandy, there are a number of perennial streams and rivers that supplies water for animals throughout the year.
8. A toll-free number has been provided to receive information related to human-wildlife conflicts, and there is an early warning system of lights and sounds. E-surveillance cameras have been installed to monitor movements of humans, elephants and others is an innovative experimentation.

Management Weaknesses

1. Patrolling the entire reserve is very difficult due to very steep and undulating terrain. Because of the inaccessibility of the areas, chances of anti-social elements indulging in Ganja cultivation and poaching of animals cannot be ruled out.
2. There are 33 tribal settlements with 1839 families are in core area of the Tiger Reserve. The settlements are spread out over a large area of the forest. In order to make the core area inviolate, the tribal people need to be relocated voluntarily.
3. The staff of ATR are mostly middle-aged to old-aged, and most of them have not been trained in wildlife management at recognized institutes.
4. Nearly 50% posts of the sanctioned staff strength are vacant in different categories. The level of vacancies among the frontline staff is alarming: 33 Foresters (out of a sanctioned strength of 45), 47 Forest Guards (out of 106) and 36 Forest Watchers (out of 62). Out of a total sanctioned strength of 355 posts, 166 posts are vacant (46.76%).



5. The buffer area is not under the unified control of the Field Director.
6. There is a problem of road kills of wildlife, especially in the Valparai plateau, on the Pollachi-Valparai-Chalakudy road. The animals killed include Schedule I species such as the Leopard Cat and the Lion-Tailed Macaque.
7. Due to an extensive network of roads, pipelines and power lines, a major reservoir and hydroelectric projects inside the reserve, the habitat of the elephants and other major animals is fragmented. The isolation of the Lion-Tailed Macaque population by fragmentation of the habitat has reduced the viability of the population.
8. Non-availability of adequate funds and late release of funds are major problems. Considerable difficulties are experienced in carrying out essential and timely operations for effective management of the reserve, including patrolling.

Immediate Actionable Points

1. The eco-sensitive zone (ESZ) has not yet been notified. Expeditious steps should be taken to notify the ESZ.
2. Buffer areas of the Tiger Reserve should be brought under unified control of the Field Director immediately for better administration and protection.
3. This Tiger Reserve, with its unexplored wet evergreen forest (rain forest) and rich floral and faunal diversity, offers excellent scope for scientific research. The anthropological diversity is also rich due to the presence of six ethnic tribal communities, because of which there is scope for research on tribal from the social, economic and human genetic angles. The possibility of involving more researchers and reputed institutions needs to be explored.
4. Since, ATR shares a long interstate boundary with Kerala, frequent coordination and contact with adjacent officials of the Kerala Forest Department are needed so that joint raids may be organised against poaching, Ganja cultivation and Sandalwood smuggling.
5. Steps may be taken to acquire private estates in Valparai plateau that are essential for providing vital corridor and foraging grounds for elephants and other animals.
6. A human resource development plan is to be prepared to chalk out a concrete staff training programme related to issues in wildlife management in the reserve.
7. Voluntary relocation of tribal settlements from the core area should be carried out in a phased manner. Since, the services of NGOs and voluntary organizations are available for creating eco-awareness among the public, these organizations may be involved in the smooth voluntary relocation of the tribal people.
8. Though the State Steering Committee has been formed, no meeting has yet taken place. The meeting of the State-level Steering Committee should also be expedited.
9. Steps may be taken by the Government to fill up staff vacancies, which is around 50%. With more recruitment, average age of the staff will also come down.
10. Tribal youths should be utilized as anti-poaching watchers to organize frequent patrolling in the most vulnerable areas, and this step will ultimately strengthen the protection of the Tiger Reserve.

KALAKAD MUNDANTHURAI TIGER RESERVE, TAMIL NADU

Evaluation Period
May, 2018

09

Management Strengths

1. Kalakad Mundanthurai Tiger Reserve (KMTR) forms an important part of Agasthiyamalai Biosphere Reserve, which is recognized as one of the five important centres of plant species diversity in India. KMTR is also one of the three megacentres of endemism in India. The level of endemism of vascular plants of KMTR as well as that of the vertebrate taxa is high. All the five primates of peninsular India are found in this reserve. Specifically, it serves as a habitat for the endangered Lion-Tailed Macaque and Niligiri Langur. This Tiger Reserve has been declared one of the 35 global biodiversity hot spots.
2. The Tiger Reserve was declared a World Natural Heritage Site in 2012 and incorporated in the World Network of Biosphere Reserves by UNESCO in 2015.
3. KMTR, with 14 rivers and 11 dams, is considered a major water resource of three districts of Tamil Nadu, i.e. Tirunelveli, Kanyakumari and Tuticorin. Besides providing drinking water to wild animals, the Tambraparni is major perennial River that sustains agriculture in the buffer areas indirectly.
4. KMTR serves as an ecological benchmark and provides excellent opportunities for biological and ecological research. The biological research carried inside the reserve provides valuable inputs for good management and conservation practices.
5. Well-established eco-development committees i.e., village forest committees (VFCs) around the eco-development buffer zone/fringe villages of the Tiger Reserve (228 VFCs) are the strength in ensuring protection and minimizing biotic pressure. The co-operation from these committees facilitates, protection and conservation efforts of the Forest Department.
6. The Agasthiyar Field Learning Centre, constructed under the Biodiversity Conservation Rural Livelihood Improvement Project (BCRLIP) serves as a learning centre both for field staff and local people. More than 60 training programmes on wildlife management, enforcement of legal provisions, eco-development initiatives, population estimation, habitat monitoring, fire prevention strategies, etc. were conducted in 2015-2016.

Management Weaknesses

1. KMTR is characterized by a mountaineous rugged terrain with an altitude range of 50-1850 m. The vastness of the area and presence of mountaineous geographical features make many parts of the sanctuary inaccessible from the point of view of patrolling.
2. There is a proposal to create a road from Papanasam to Trivandrum passing through the pristine Tiger Reserve territory. If this materializes, biotic pressure on the reserve will increase tremendously.
3. There are three major pilgrimage centres inside the reserve. These religious places are Nambikoil, Agasthiarkoil and Gorakhanathar temple. These places are visited by a large number of piligrims, and the biological values of the reserve have already been affected a lot.
4. The 56 km Inter-State boundary with Kerala adds to the biotic pressure.
5. Four Kani tribal settlements, with 129 families and spreading over an area of



29.52 ha, three non-Kani forest dwellers' settlements, two electricity board colonies and a few tea estates exert continuous pressure on resources of the forest.

6. Almost the entire eastern periphery and the villages adjoining this area are vulnerable to conflicts with wild animals, the human-wildlife conflicts include crop damage by elephants, wild boars and other herbivores.
7. The strength of the frontline staff is not adequate.
8. Although senior officials such as the Field Director and Deputy Director have undergone capsule/short-term training at WII, none of them have undergone a regular diploma course in wildlife.

Immediate Actionable Points

1. Ecotourism infrastructure may be improved vis-à-vis NTCA Guidelines.
2. During the last year, only 20 new beats were created, and many posts of the Beat Forest Officers have not yet been filled. This may be filled up quickly. The existing infrastructure, such as old buildings, needs to be renovated quickly. Old vehicles need to be replaced immediately.
3. Though the authorities of the Tiger Reserve plead for a symbiotic existence of tribal people and the forest, to make the core area completely inviolate, all the settlements and enclaves in the core and critical wildlife habitat need to be relocated through constant persuasion in a time-bound manner. Though a meeting of the State Board of Wildlife was held recently under Chairmanship of the honourable Chief Minister, no meeting of the State-Level Steering Committee has been held under the chairmanship of the Chief Minister so far. Actions may be initiated to hold a State-level steering committee meeting as quickly as possible.
4. Tourist facilities such as good cottages, attractive packages, a good interpretation centre, books and brochures need to be developed according to guidelines of the NTCA, since, the reserve has excellent tourist potential.
5. EDC/ VFC (90% of the VFCs are headed by women) activities have been carried out since 1995 with involvement of indigenous communities. These are conservation activities and offer the community alternate livelihoods. This is commendable. The lessons learnt in KMTR through eco-development practices will be disseminated to other Tiger Reserves as the World Bank has chosen KMTR as a role model and a field learning centre was established in 2011. In future, more conservation practices may be taken up with people's participation for providing sustainable ecological services, mainly water.
6. A systematic HRD plan may be chalked out for conducting capacity building. Programmes and short-term training courses in wildlife management for the field staff to enhance their technical skills, should be initiated.
7. For benefit of communities some cess needs to be levied for access to religious pilgrimage places, which may subsequently be given to concerned EDCs.
8. Innovative methods may be incorporated in the management policy of religious places, keeping an eye to the carrying capacity.

MUDUMALAI TIGER RESERVE, TAMIL NADU

Evaluation Period
June, 2017

10

Management Strengths

1. It has been scientifically demonstrated that the Nagarahole-Mudumalai-Bandipur-Wayanad-Sathyamangalam Conservation Landscape is one of the largest PA network where the populations of the tiger and its prey are viable in the long term.
2. Mudumalai Tiger Reserve (MTR) is part of the Nilgiri Biosphere Reserve (~5000 sq. km., spread across three states), which provides an extensive range for biodiversity and has a relatively small interface with human land-use.
3. MTR supports an intact assemblage of prey species that supports at least three charismatic carnivores (the tiger, leopard and dhole). MTR is one of India's few high-density TRs, with more than 20 tigers per 100 sq. km. (in the core area).
4. The biodiversity of MTR is very rich. The reserve harbours a large number of plant and animal species.
5. Seasonally waterlogged grasslands (vayals) are ecosystems unique to the landscape and are now found only inside PAs such as Mudumalai. In addition to providing various ecological services, these vayals are valuable habitats and food sources for many insects, amphibians, reptiles, birds and herbivores.
6. MTR has sizable scientific databases on diverse themes relating to biodiversity and wildlife management, accumulated through field research and studies carried out by various individuals and institutions. These databases can aide in enhanced and efficient management in future.
7. MTR has an institutionalized mechanism of smart patrolling and anti-poaching surveillance that is now established well across all the administrative strata.
8. Novel approaches to regulating tourism, such as the closure of the national highway during night and the use of department-run vehicles for tourism, are being practiced.
9. Technological applications are common at all administrative levels, and innovations are included in all operations such as patrolling using suvadu, solar-based water holes and the use of mobile networks for communication.
10. The relatively gentle terrain and the good network of well-maintained roads afford greater access to all parts of MTR for better management.
11. The local community has shown great tolerance towards human-wildlife conflicts, and the tourism is regulated, with general awareness among the people visiting the PA.

Management Weaknesses

1. The first approved TCP, which had a plan period of 5 years (2012-2017), has expired.
2. Relocation of hamlets from the core area to alternative areas has been initiated, but the process of shifting the people is slow and people and their livestock continue to exert pressure on the resources within the core area of MTR.
3. About 40% of the frontline staff positions are vacant. Hence, anti-poaching camps inside the forest are usually manned by casual staff. There has been limited augmentation of the number of anti-poaching camps inside the park.
4. Over 60% of the core area is infested with invasive species such as Lantana camara, Chromolaena odorata, Opuntia spp. and Parthenium spp.



5. There is no unified command for the core and buffer areas of MTR. Mukurthy National Park, which holds a significant population of the endemic Nilgiri Tahr, is currently under the administrative control of MTR, although it is not considered a part of the core area.
6. Material and signage that will improve awareness, especially about MTR's designations such as Biosphere Reserve, World Heritage Site, Elephant Reserve and IBA, need to be encouraged.
7. No elephant breeding has been reported in the elephant camp at Theppakadu during the past few years, and the factors responsible for the same need to be ascertained.
8. There are overaged subordinates among the frontline protection staff. Most of the work is being handled by such staff members such as dealing with human-elephant conflicts, forest protection and traffic regulation.

Immediate Actionable Points

1. Completion and approval of the TCP for the plan period 2017-2027 at the earliest
2. The proposed relocation of villages in three phases (Phase 1, Bennai and Nellikarai; Phase 2, Puliyalam, Mandakkarai and Nagampally; Phase 3, Muduguli and Kundithazh) needs to be implemented on an urgent basis
3. Buffer area needs to be brought under unified control of the Field Directorate
4. Mukurthy National Park needs to be considered as a satellite core of MTR
5. Forest frontline vacancies need to be filled up
6. Systematic mapping, planning and implementation of a management plan for eradication of invasive alien species such as Lantana camara are needed.
7. Ecological studies are needed to understand the impact of forest fires and changes in microclimatic conditions that may have led to the spread of invasive species.
8. Non-invasive physiological/hormonal studies related to stress conditions in camp elephants need to be conducted to assess the issue of non-breeding.

SATHYAMANGALAM TIGER RESERVE, TAMIL NADU

Evaluation Period
January, 2018

11

Management Strengths

1. Sathyamangalam Tiger Reserve is the largest wildlife sanctuary in the State. It is a part of a bigger tiger landscape and is also a part of the Nilgiri Biosphere Reserve.
2. The Tiger Reserve has about 60 tigers and 800 elephants, classified as Endangered by the IUCN. It also harbours 111 leopards (Vulnerable) and provides a habitat for all four species of vultures declared Critically Endangered by the IUCN.
3. Sathyamangalam Tiger Reserve is located at the strategic confluence of the Western Ghats and Eastern Ghats.
4. The Tiger Reserve provides water security to Erode District, of Tamil Nadu, and Chamarajnagar District, of Karnataka. The reserve is a part of the watershed of the Rivers Moyar and Bhawani.
5. The EDC activities in the fringe villages are encouraging.
6. The villagers of the EDCs are getting financial support from other departments of the Government of Tamil Nadu (Tribal Sub-plan, etc.).
7. The schemes of various line departments are dovetailed in the community development activities.
8. Both the core and buffer areas are under the unified administrative control of the Field Director.
9. The young group of officials of the Tiger Reserve are enthusiastic enough to bring about a remarkable change in the management of the park.
10. It has become mandatory for each school in the locality to have an eco-club.
11. The association of a number of NGOs in various project activities such as monitoring of tigers and conservation of vultures is really encouraging.

Management Weaknesses

1. The highway from Bengaluru to Coimbatore via Mysore, NH 209, runs through the core area of the park. Nearly 20 km of this section is a ghat road and has 27 sharp hairpin bends. Road kills are frequent in this stretch.
2. Invasive species such as Lantana, Prosopis, Eupatorium, Parthenium and Senna are present extensively. Around 25000 ha is covered by Lantana and 7000 ha by Prosopis along the bank of the River Moyar alone.
3. There are nine places of pilgrimage (temples) inside the core. Five of these attract greater numbers of visitors. Two temples are located in the high-density tiger area.
4. Legally, the seven tribal villages and 11 revenue villages were excluded from the core area notification, but because of the very presence of nearly 1700 families inside the core, it is not inviolate.
5. Much of man-animal conflict is noticed in the border villages, especially Bhawanisagar, followed by Talawady and Kadambur.
6. There are still vacancies to an extent of 40-60% in the cadre of Forest Guards and Forest Watchers.
7. A large number of cattle kills are reported from Talwady Range alone.



Immediate Actionable Points

1. Though the TCP has been revised as per the observations of the NTCA, the revised plan is with the PCCF (WL) of the State since January 2018. Action may be taken to get approval from the NTCA quickly.
2. The existing vacancies (more than 50%) in the frontline staff (Forest Guards and Forest Watchers) must be filled up immediately for better protection and management of the park.
3. The human resource development plan prepared by the authorities of the Tiger Reserve must be scrupulously followed so as to train different levels of staff in various aspects of wildlife management. The reward system introduced for the staff on the basis on their performance is quite encouraging, and this may continue with more vigour so as to lift morale of the staff.
4. In total, Sathyamangalam Tiger Reserve is a human-dominated landscape. The ethnic tribes living inside the core and buffer areas of the reserve mostly depend on forest resources, especially NTFP collection. Alternate livelihoods must be provided to these people through the network of EDCs and VFCs.
5. The authorities of the reserve have reported that the carbon stock of Sathyamangalam Tiger Reserve is roughly 7.5 million tons (equivalent to 3.7 million tons of carbon). Proper guidelines may be issued regarding how to go about quantifying the values.
6. Since, Sathyamangalam Tiger Reserve is a new Tiger Reserve, created in 2013, ecotourism activities are in infancy stage. The park authorities may involve communities to manage ecotourism. The Vannapurni ecotourism programme may continue.
7. Since, most of the reserve becomes dry during summer, the implementation of forest pond scheme, entirely funded by the State Government, is an encouraging development. During the current year, a sum of Rs. 45.0 lakhs was received from the State Government to develop nine ponds (Rs.5.00 lakhs/pond).
8. Removal of invasive species may be done aggressively in a time-bound manner. Removing 50 ha of Lantana or Prosopis each year will not serve the purpose. Allotment of more funds for this purpose is needed.
9. Sathyamangalam Tiger Reserve has always been a hub of research programmes, and currently 24 research programmes and studies are being conducted by scientists and research scholars. All these programmes must be properly monitored and research findings should be dovetailed to improve management of the park.
10. More anti-poaching camps with personnel are required to strengthen protection activities.
11. Human-Elephant conflict mitigation needs more allocation of funds for quick payment of compensation, construction of EPT or other barriers.
12. Linear intrusion and future expansion can be regulated through entry fees or time barriers (i.e. 5000 vehicles /day).
13. Financing of eco-development committees needs to be augmented.



Nilanjan Chatterjee

CLUSTER FIVE

4.5

S. No.	Name of the Tiger Reserve	Abbreviations	State
1·	Kamlang	KTR	Arunachal Pradesh
2·	Namdapha	NTR	Arunachal Pradesh
3.	Pakke	PkTR	Arunachal Pradesh
4.	Kaziranga	KzTR	Assam
5.	Manas	MTR	Assam
6.	Nameri	NTR	Assam
7.	Orang	OTR	Assam
8.	Dampa	DTR	Mizoram
9.	Buxa	BTR	West Bengal
10.	Sundarbans	STR	West Bengal

List of Tiger Reserves included in Cluster Five

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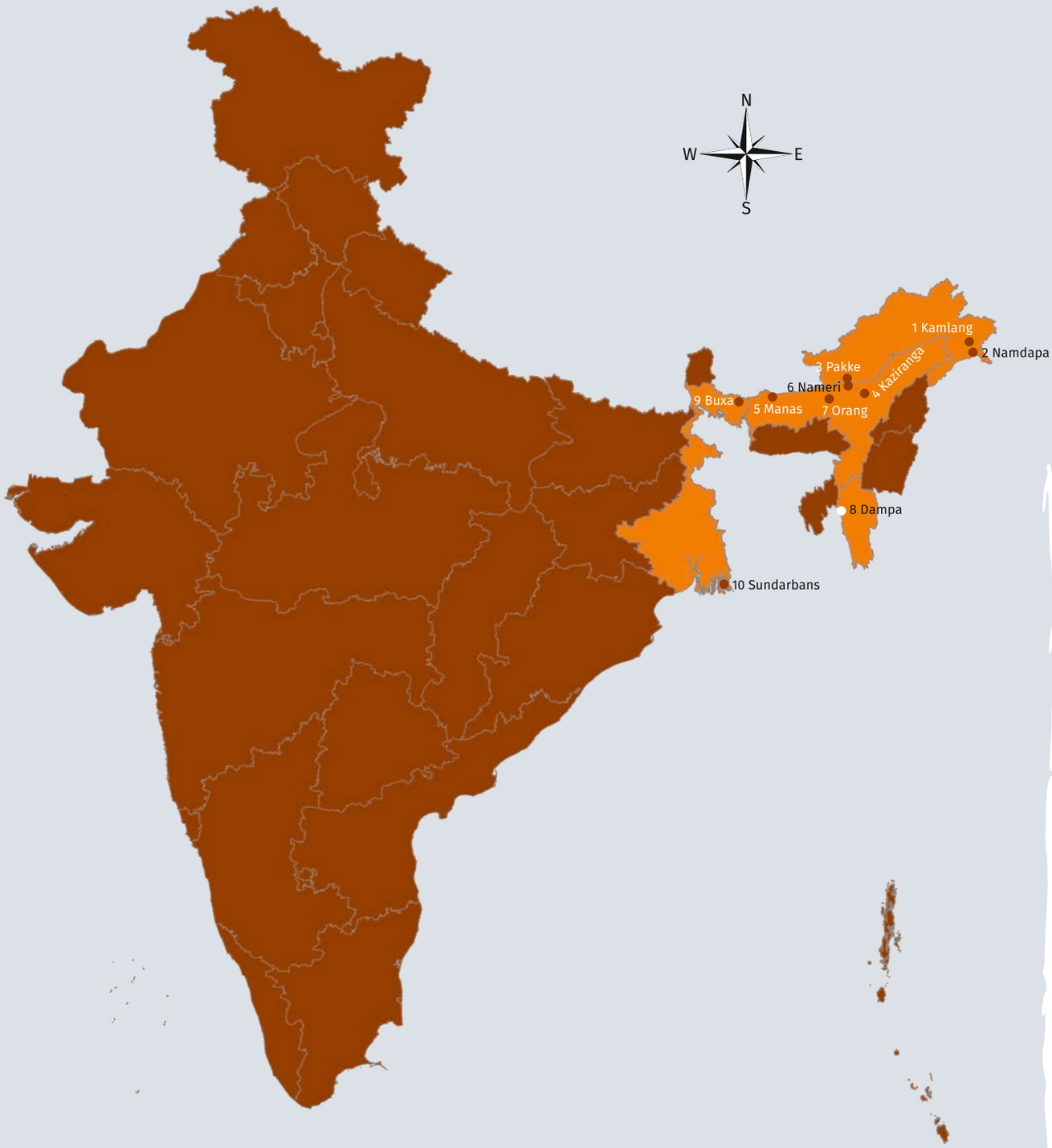

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KAMLANG TIGER RESERVE, ARUNACHAL PRADESH

Evaluation Period
October, 2017

01

Management Strengths

1. The Kamlang TR has a huge geographical advantage and is very well integrated into a wider ecological network of contiguous forests comprising of Hukawng Wildlife Sanctuary of Myanmar, Namdapha TR, forests of Namsai Forest Division, unclassified forests of Anjaw District, Mehao Wildlife Sanctuary, Dibang Sanctuary, and the reserve forests of Lohit Forest Division.
2. The TR is free from human settlements and devoid of anthropogenic pressure.
3. The TR is located in a hilly terrain and is not very prone to encroachments as opposed to the reserve forests of Lohit District and Teju Division and the adjoining Namsai Division.
4. The TR is a catchment area of the Kamlang, Lang and Lati rivers, which are tributaries of the mighty Lohit River, draining through the reserve forming prime habitats and riparian forests.
5. The TR is a rich natural forest with diverse plant and animal species. It is a habitat of many rare and endangered mammals, birds, fishes, amphibians and reptiles.

Management Weaknesses

1. There are only two anti-poaching camps in the entire TR, which is of 780 sq. km.. The patrolling staff of these camps cannot cover far flung areas of the TR, further due to lack of roads patrolling on foot is very difficult.
2. The communities residing in Wakro and other fringe villages depend upon the forests for timber and firewood. Some families also indulge in illicit removal of cane from the forests. The communities rear Mithun for meat which freely grazes in the forest and competes with wild herbivores.
3. Research and monitoring of flora and fauna of the TR, particularly the population of threatened animals including tigers is an important management function for which much greater effort is required.
4. Carrying of firearms and hunting of small game are common practices among tribal communities of Arunachal Pradesh. The main threat to wildlife is poaching by tribals using country-made firearms, bows, arrows, snares, nets and traditional traps. The Lisu hunters residing in Namdapha often cross over to Kamlang and poach wild animals. Since more than 95% of the TR is not accessible by road, consequently there are no staff in these areas, the poachers move freely in the reserve without any check.
5. The TR is free of permanent human settlements, however, there are instances of repeated attempts to encroach upon the area vacated by old settlers in the vicinity of Glow Lake. The local tribal had voluntarily vacated parts of the PA in the 1980s but are now increasingly staking claims to lands inside the reserve or seeking a resettlement package. Numerous representations have been made to the park management, and this issue can potentially develop into a management problem, unless it is resolved by negotiation.
6. The encroachment of forest land for opium cultivation is also rampant in some patches.

Immediate Actionable Points

1. There is need for a sustained awareness campaign to dissuade tribal groups from hunting wildlife.
2. The TR has inadequate staff to patrol the forest area as a result the poachers enter the area with impunity and hunt wild animals. The management should increase the strength of the frontline staff, deploy them in vulnerable areas for increasing security. Further, the road network should be improved to reach remote areas quickly and enhance security of the TR.
3. The prey base for Tiger appears to be low, the management should increase their efforts in monitoring of population of Tigers, co-predators and prey. The population monitoring exercise will provide information on animal abundance, based on which management strategies may have to be revised for recovery of animal population and restoration of habitats.
4. The TR management has to address the issues of inadequate patrolling in vulnerable areas and must monitor regularly any fresh encroachments or re-encroachment of vacated areas.
5. The grazing of Mithuns poses a potential threat of spreading diseases among wild ungulates. The Mithuns may be screened for diseases and vaccines administered.
6. Research and monitoring of flora and fauna should be taken up. Occupancy of Snow leopards in the alpine forests of the TR may be explored.
7. The TR should procure Vehicles preferably four-wheel drive Jeep, for use in the rugged terrain and for traversing marsh lands. A network of tracking/ monitoring path should be created in the TR.
8. The encroachments in forest land along the Namsai - Wakro road adjacent to Tiger Reserve should be vacated promptly



NAMDAPHA TIGER RESERVE, ARUNACHAL PRADESH

Evaluation Period
October, 2017

02

Management Strengths

1. Tiger Reserve is a part of very big ecological network connecting Hukawng Valley Wildlife Sanctuary in Myanmar in the east and Kamlang TR of north. Besides the TR is connected to Namsai Forest divison, Nampong Forest division and many un-classed forests.
2. Alpine and snow area of Namdapha range of the TR are the home for snow leopard.
3. The TR with an area of 1983 sq. km. is the catchment of Noa-Dihing River, Namdapha River and their tributaries. The floral diversity is very rich and needs to be preserved at all costs.

Management Weaknesses

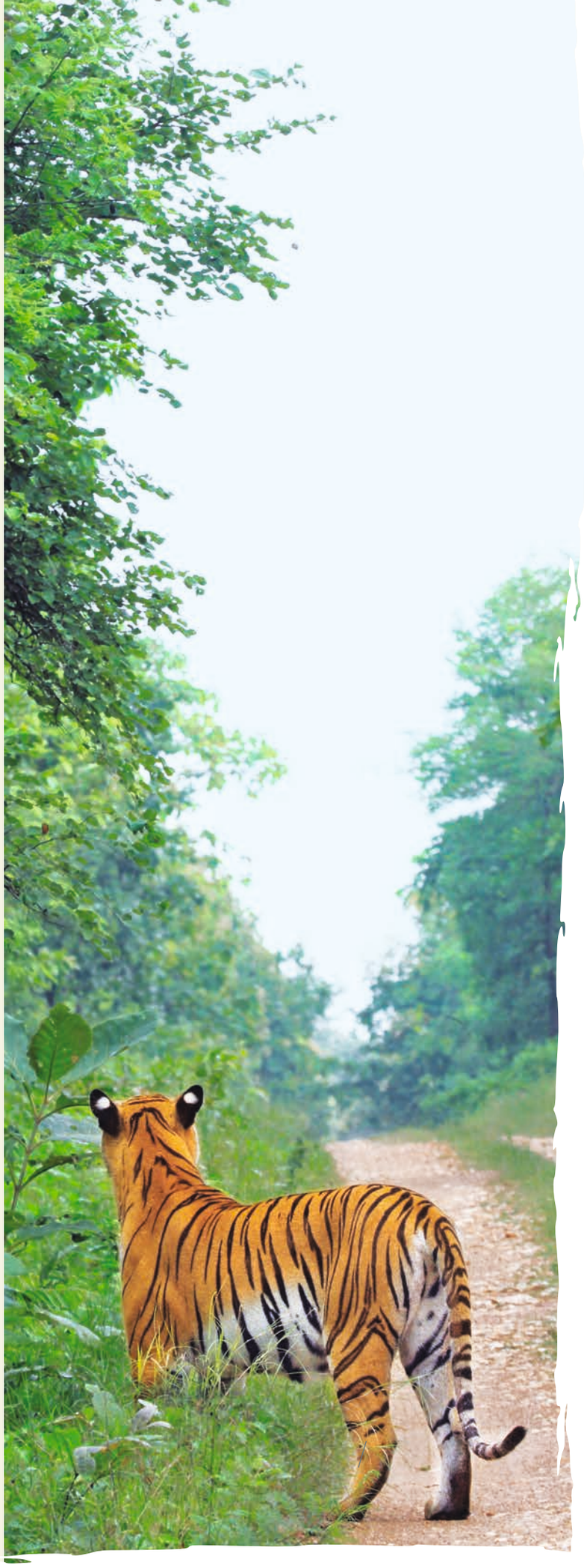
1. Poaching in the TR by communities residing in and around the TR such as the Chakama, Lisu and Mishmi tribes and hunting of large predators such as the tiger, leopard and musk deer by poachers from Myanmar are the biggest threat.
2. The number of Lisu settlements inside the TR has been increasing each year. There used to be 65 households in 2004-2005. The number had grown to 157 households in 2012. The Lisus convert forests into agriculture land and orchards. They also depend on the forest for their fuel and timber. As a result, the habitat is undergoing degradation.
3. The protection strategy is not effective. This is corroborated by the fact that only three cases of sambar poaching were registered in the TR during the last 3 years. Further, these cases have not been followed up and have been lost sight of.
4. The TR must have been the home range of wild elephants in the past. The elephants have migrated from the reserve. Lisus are hunters, and they are responsible for decrease in the wildlife population. It is said that one Lisu family owns a domesticated elephant in Vijaynagar. This family is believed to have the capability of capturing elephant calf from the wild and domesticating it. Thereafter, the trained elephant can be illegally transported to Myanmar or Thailand.
5. Lisus are demanding that the portion of the TR encroached by them be denotified. The bigger Lisu settlements in Vijaynagar and Gandhigram are also partly occupied by ex-servicemen from the Assam Rifles. It is said that when ex-servicemen were settled in Vijaynagar, some Lisu families were shifted who moved and occupied the TR. The Lisus are protesting and demanding the relocation of the retired personnel from these settlements. They are not willing to leave the area encroached upon by them in the TR.

Immediate Actionable Points

1. The Miao-Vijaynagar road is being upgraded by the State Government for the last 4 years. This road is the lifeline of two landlocked villages, namely Vijaynagar and Gandhigram. If this road is not made motorable, the Lisu settlements inside the park (TR) will continue to expand and the wild animals will continue to vanish. It was observed that very small stretches need to be upgraded to make the whole road operational. If the RWD (Rural Works Department) is delaying endlessly, the Forest Department must put their foot

down and take up the minimum repair of the bad patches to make the whole road motorable seeking required approvals whenever required. An all-weather motorable road from Deban to Farm Base via Hornbill needs to be constructed also.

2. Lisus are expert in craftwork, especially bamboo and cane work. They can manufacture furniture using cane and bamboo. The management can provide raw materials, which will serve as an additional source of livelihood. In this manner, the confidence of the Lisus can be won and they can be persuaded that they must be relocated outside the TR.
3. There is a helicopter service between Miao and Vijaynagar. The TR management should also be provided with helicopters. They should stay in Vijaynagar and protect the TR from there. This arrangement can continue till the MV road is made suitable for vehicles.
4. The alpine region and snow area, of the higher altitudes of Namdapha Range, should be monitored for snow leopards.
5. The weed Mikania is spreading in the reserve. This may choke all small clearings in the rain forest. The management may plan a strategy and execute it.
6. The conservation and management of the TR must be integrated with those of Kamlang Tiger Reserve and Hukawng Wildlife Sanctuary, of Myanmar, for conservation of the trans-boundary landscape.
7. The management should take up monitoring of Snow Leopard in this area.



Bilal Habib

PAKKE TIGER RESERVE, ARUNACHAL PRADESH

Evaluation Period
December, 2017

03

Management Strengths

1. Pakke Tiger Reserve extends over more than 800 sq. km. and occupies one-fifth of the geographical area of East Kameng District in Arunachal Pradesh. The Kameng River in the west, the Pakke River in the east and Nameri Tiger Reserve in the south bound it. The rivers make human entry difficult and serve as natural barriers. The limited northern boundary of the TR in Rilla Range is porous and can be guarded effectively.
2. The TR is connected to two sanctuaries, namely Eagle Nest Sanctuary (217 sq. km.) and Sessa Orchid Sanctuary (100 sq. km.), of Arunachal Pradesh and the 200 sq. km. core area of Nameri TR, of Assam. Together this is a big area for conserving tigers.
3. The core area of the TR is free of human and cattle populations.
4. Good efforts have been taken in community engagement in terms of conduction of State level Annual Pakke Paga Hornbill Festival.

Management Weaknesses

1. The buffer area of Papum Reserve Forest is in the control of the Territorial DFO, Kellong and that of Tenga Reserve Forest is in the control of the DFO, Bomdila. Illegal felling of trees is rampant in both these areas. The TR management is not able to control this.
2. The northern boundary of the TR is porous, especially along the Papu River, and it is suspected that miscreants enter the TR for hunting wild animals for meat. This may be the reason why the ungulate population is not building up in the TR. To make the matter worse, it has been proposed to divert the water through an underground tunnel for a hydroelectric project. If the project comes through, crossing the river will be easy, and the border will become more porous.
3. Generally, there is a shortage of funds for habitat improvement. As a result, targets for works such as weed control and prevention of tree species from invading grasslands are reduced.
4. Insurgency in the neighbouring State of Assam was a threat to wildlife protection. Hunting and illegal cutting of trees were common. The level of insurgency is now reported to have been reduced.
5. Because of the inhospitable terrain, the road network in the northern portion of the TR is poor. These areas also become inaccessible during the rainy season.
6. There is inadequate pursuance of legal matters in the courts.

Immediate Actionable Points

1. More funds should be provided to the TR for habitat improvement works.
2. Attempts should be made to improve the road network in the northern portion of the TR. Also, there should be some more anti-poaching camps in the region.
3. When the Power anti-poaching camp, at Sessa, Tippi Range, was visited, the rubber boat and life jackets were found to be gathering dust. It appears that these have not been used for quite some time. It is suggested that senior officers should monitor patrolling by their camp personnel. Unless stern



action is taken, undetected hunting will never allow the ungulate population to build up.

4. The Papu and Pasa rivers join at the northern periphery of the TR. It is proposed to execute a 90 MW hydroelectric project just 200 m below the confluence. Water is to be channelized through an underground tunnel and released in the upstream region of the Kameng River. The Papu River runs along the boundary of the TR for a distance of about 20 km from the site of the proposed project and joins the Kameng. It is this stretch of 20 km which makes the northern boundary porous. The stretch may become more porous and more easy to cross if the water is diverted through an underground tunnel. In that scenario, the threat faced by the TR would increase. The FD is opposing the project, and senior officers of the FD should take up the matter strongly with the State Government.
5. The FD and CWLW should organise a workshop so that all judges and advocates are sensitised about the importance of this TR and significance of conservation. Assam has met with some success in this regard. The Chief Justice of the Guwahati High Court may be requested to inaugurate the workshop.
6. Near the Nameri East anti-poaching camp, in Seijosa WL Range, natural salt is available in the Chiriya Pung area, in a stream. The place is frequented by wild animals. The management must make extra efforts to guard the place 24×7.

Vinit Arora



KAZIRANGA TIGER RESERVE, ASSAM

Evaluation Period
November, 2017

04

Management Strengths

1. Although Kaziranga is a TR, people (including the decision makers) of Assam are more sentimental towards protection of the rhinoceros. This helps formulation of strategies to apprehend poachers.
2. The TR is a World Heritage Site, draws the attention of international organisations, and is an important ecotourism destination in India.
3. As it is a pride for Assam, the State Government provides all support to it. The management faces no dearth of manpower, equipment and vehicles. Though adequate arms and ammunition are provided, the Government has decided to procure INSAS, SLR, GHAATAK, 9 mm pistol to combat the threat of poaching.
4. The density of ungulates is very high. As a result, the tiger density in the reserve is one of the highest in the country.
5. The buffer of the TR in the west has two sanctuaries, namely Laokhowa Wildlife Sanctuary and Burachapori Wildlife Sanctuary. The tigers from the core area of the TR move in these sanctuaries and establish home ranges. Sanctuaries can provide better security to the tigers compared with reserve forests.
6. Local people should be involved in tourism and anti-poaching activities.

Management Weaknesses

1. Although the rhinoceros is the pride of the people of Assam, there are anti-social elements who indulge in poaching. Nagaland and Manipuri poachers sneak into the TR from the Karbi Anglong Hills, along the southern boundary of the reserve. They carry AK-47 rifles and use them to poach rhinoceroses.
2. Karbi Anglong is a hilly district along the southern boundary of KTR. The forests of the district provide cover to poachers. The management of the district is under an autonomous council, and the forest officers there are not answerable to the PCCF/CWLW.
3. The poaching of three rhinos on 2 and 4 November 2017 took place in the night, barely 200 m from the Tunikati anti-poaching camp, in Budapahar Range, KTR. When there are 178 anti-poaching camps in an area of 911 sq. km. area, each camp has to protect an area of 5 sq. km.. Given the resources at the command of the personnel, it should not be difficult to guard the area effectively. Such poaching so close to the camp leads to a suspicion of the involvement of officials.
4. The maintenance of roads in the core and buffer was found to be inadequate in some cases. The earth is brought from borrow pits, and maintenance of the side drains is neglected. It is necessary to maintain the side drains and use the same earth for road formation. Borrow pits should not be excavated. The surface of the newly formed road in Burachapori Sanctuary is highly uneven. Fresh borrow pits are seen in the forests, and side drains are not maintained properly.
5. The continuous grazing that takes place in some parts of the core and most parts of the buffer is a matter of concern. Near Muruphuloni APC, of Bagori Range, in the core area, goats are found inside the TR despite a solar fencing having been installed to prevent

entry. Grazing is rampant in both Laokhowa and Burachapori sanctuaries.

6. KTR is a World Heritage Site. Families residing inside the Tiger Reserve need to be relocated.

Immediate Actionable Points

1. The KTR management should take support of forest officers working under control of the Karbi Anglong District Council as well as police officers working there to control rhino poaching effectively. The poachers hiding in this hill district can be flushed out by aggressive patrolling.
2. It is suspected that some staff may sometimes get involved in poaching by helping poachers. Suspected cases are to be scrutinised sincerely, and if accused officials are found guilty, stringent action should be taken against such officials.
3. In many anti-poaching camps, the protection staff are hired from different sources. This situation leads to conflicts among the staff. The forest guards and foresters are regular Forest Department staff members. Armed constables are from the Assam Forest Protection Force (AFPF). Home guards and daily-wage watchers, including staff members maintaining domestic elephants, are recruited by the Forest Department. They require psychological counselling to work as a unified team in the interest of anti-protection measures.
4. Many mounds are being constructed to provide shelter to wild animals during floods. It is necessary to plant grass on the slopes and some trees on the top so that these structures merge with the surroundings and are stable
5. Management must endeavour to ensure that there is no grazing and illegal fishing at least in the core area of the TR.
6. A 20 km long dyke bifurcates Laokhowa Sanctuary. Villagers consider the dyke as being the sanctuary boundary and have occupied a portion of the sanctuary. Attempts must be made to correct the perception of the villagers and evacuate the encroached land.
7. The reintroduction of rhinos in Burachapori Wildlife Sanctuary failed once. Probably the mother was diseased and the calf was too young. One more reintroduction attempt should be made by selecting a healthy pair under the supervision of expert veterinarians.
8. Tourism should be in conformity with the NTCA tourism guidelines, 2012.
9. Corridor between Kaziranga & Karbi-Anglong by creation of elevated road along with NH37-needs to be expedited.



MANAS TIGER RESERVE, ASSAM

Evaluation Period
August, 2017

05

Management Strengths

1. An area of 350 square sq. km. on the western border of the notified core of the TR has been recently notified as Manas Additional National Park. This area is presently in the buffer of the TR and is managed under Chirang Territorial Division.
2. Royal Manas National Park, along the international border with Bhutan, in the north of this TR, constitutes a very important landscape for wild animals. It provides a migratory route for long-ranging animals such as elephant and tiger. The managements on the two sides of the international border remain in touch, pass on intelligence to each other and carry on joint patrolling.
3. A small number of personnel from the Assam Forest Protection Force have also been deployed for protecting the TR. These personnel are young and have received commando training from the police. They have very good fitness.
4. There are three major rivers as we go from east to west (the Beku, Hakuwa and Manas). As these rivers and their tributaries flow down from the Himalaya, they change their courses frequently. The vegetation of Manas gives them stability. The vegetation also helps maintain the water regime. The rivers are the lifeline for people in the command area
5. The grasslands and the habitat, which is suitable for elephants, ensures that there are minimum conflict cases. There are nearly 1000 elephants in the 500-sq. km. national park. Another portion of the TR around Barnadi Wildlife Sanctuary has fragmented habitat and there are many conflict cases.

Management Weaknesses

1. The staff strength is insufficient. There are only two anti-poaching camps, which are inadequate for maintaining surveillance in every corner of the additional area. Fearing this, Field Director Manas in not taking over the area under his management.
2. The reserve has the disadvantage owing to the presence of a large number of villages on its southern boundary. The human and cattle populations in these villages are dependent on the forests. Cattle are often seen grazing inside the forests in large numbers up to 2 km from the southern boundary of the reserve. Firewood collection by the community in the forests also results in degradation of the habitat.
3. The Central Government has a proposal to construct a road all along the international border with Bhutan, 500 m inside India. It is also proposed to have a border security post every 4 km all along the proposed highway. This will break the international corridor of tigers and elephants and will also create a lot of disturbance in the TR, which is supposed to be inviolate.
4. There is sufficient area in the reserve under grasslands. It is observed that not all the grasslands are natural. Some artificial grasslands have been created by clearing trees, including very large ones, and burning timber and debris on the spot. The management has been following the practice of burning all the grasslands in winter so as to facilitate growth of fresh grass. During the visit of the team on 25 August to the Mathangudi area, in Banswadi Range, it was found that fresh forests were being cleared with a view to expand the grassland. The Field Director informed the team that the timber would not be transported from there but would be burnt with the debris on the spot.

5. More than 400 ha of forest land in the village Kokilabad, in the south-eastern corner of Manas National Park, has been handed over to the State Agriculture Department on lease for seed production. This department has also used the land in the past for several activities such as collection of semen from cattle and milk production. There are many old buildings that are not being utilised. The lease is due to expire this year, and in the last year of the lease, many new buildings are being constructed by Agriculture Department. The Forest Department should make efforts to retrieve the area after the expiry of the lease.
6. The Bodo agitation in the area had completely ravaged Manas National Park between 1989 and 2003. During this period, all large mammals, including the ungulates, were hunted and many valuable trees were illicitly extracted. The reserve became devoid of tigers, rhinos and elephants. The management had to start from scratch in 2003. Rhinos and some ungulates were reintroduced. Some members of the Bodo community volunteered to protect the forests and wildlife and took the lead in patrolling the jungle. The forest staff, who had vacated their headquarters in the remote areas, slowly started joining the volunteers. Though the management is making all-out efforts to revive the reserve, the sporadic incidents of poaching and hunting demoralises them. The miscreants had the upper hand again between 2009 and 2014, and instances of poaching/hunting came to light. Arms in the custody of the anti-poaching team at in Banswadi Range, were snatched by Bodo militants in 2014. Earlier, many camps were burnt down, forcing the staff to flee from remote locations.
7. During the field visit of the MEE team, the ungulate population was also found to be low.
8. There are vacancies especially at the forest guard level. Recruitment of foresters and forest guards has not been taken up by the State for quite some time. As a result, there is a dearth of younger faces among those on protection duty. The Assam Forest Protection Force are young, but in number is not adequate.
9. Invasive species and undergrowth in the forests have covered the area, making it difficult to visit every corner. Personnel from patrolling parties tend to walk only on established footpaths.

Immediate Actionable Points

1. An additional area of 350 sq. km. of the erstwhile Manas Reserve Forest has been notified as Manas Additional National Park. The area is still being managed under Chirang Territorial Division. The Field Director is hesitant to take over this area for want of adequate staff strength. The area is already part of buffer of the TR. It must be added to the core by notification and taken over under management of the TR.
2. The last recruitment of a forest guard is reported to have been in the year 2011-2012 and that of a forester in the year 2014-2015. There have been no RFO recruitments also after 2011-12. Recruitment and training should be made annual features so as to prevent accumulation of vacancies. Presently, 89 posts out of a sanctioned strength of 355 are vacant in the TR.
3. Expansion of grasslands by clearing tree growth should be suspended. Existing grasslands alone should be maintained.
4. Swamp deer (44 in number) have been introduced recently. The populations of swamp deer and hog deer need to be augmented further through appropriate management interventions.
5. As the forest is covered with undergrowth and invasive species, it is necessary to clear footpaths all over the reserve to enable patrolling parties to maintain surveillance everywhere.
6. Presently NGOs are engaged in education and awareness campaigns with the communities residing on southern fringes of the TR. The age-old traditions of collecting firewood and small timber from the forests and sending cattle there for grazing have to be checked. The management is trying



its best to check the menace with the support of EDCs and NGOs. These efforts should be stepped up.

7. The physical fitness of field staff and members of the Assam Forest Protection Forces Should be checked regularly so that they remain fit enough to perform their field duties effectively.
8. The State Government should take up recruitment and training of the frontline staff, especially forest guards.
9. It is necessary to make more foot trails for surveillance in all corners of the reserve.



Bilal Habib

NAMERI TIGER RESERVE, ASSAM

Evaluation Period
December, 2017

06

Management Strengths

1. The core of the TR is a small area of 200 sq. km. extent, but it is contiguous with Pakke Tiger Reserve in Arunachal Pradesh, and the combined area is more than 1000 sq. km. This area is viable for holding a sizable population of tigers, co-predators and prey.
2. Although a satellite core, in part of Sonai Rupai Sanctuary, is highly disturbed and has an extent of only 120 sq. km., it is connected to the core of Nameri through the forests of Arunachal Pradesh. The corridor also has two sanctuaries of Arunachal Pradesh, namely Eagle Nest Wildlife Sanctuary (217 sq. km.) and Sessa Orchid Sanctuary (100 sq. km.).
3. There are 39 anti-poaching camps, 25 in the core and 14 in the satellite core, with all necessary equipment such as vehicles, GPS, camera traps, arms and ammunition. There is a network of patrolling paths for intensive patrolling to ensure that the habitat and wild animals are protected.
4. The local courts have been sensitized and are helpful to the TR management. Out of 67 cases taken up in the court for prosecution, there were convictions in 36 cases. The courts collect some fines from accused persons and pass these fines on to the Chief Wildlife Warden (CWLW) for repairing the damage inflicted to the habitat. The CWLW in turn passes on this fund to the DFO Western Assam Wildlife Division and FD for taking up habitat improvement works.
5. There is a system in place to reward the staff for good performance in the field of conservation. The courts also reward the staff for links leading to successful prosecution.
6. Tiger reserve has important habitat in the form of riverine grasslands in both the core areas. The main core area of Nameri has an extent of 16.36 sq. km. under grasslands, and the satellite core has an extent of 10 sq. km. under grasslands.

Management Weaknesses

1. The forests of Naduar Reserved Forest of Sonitpur East Division and of Balipara Reserved Forest of Sonitpur West Division were degraded during the Bodo agitation. These areas are the buffer of the TR. The trees were cleared and wild animals were poached here. Bodo people have also occupied some areas of the TR. This has resulted in more human-elephant conflicts.
2. An extent of 5 sq. km. in the core area has been encroached. It has been occupied by nearly 150 families. Further, a 5 sq. km. area of the satellite core of Sonai Rupai Sanctuary is also under encroachment. The management does not have any plan to remove encroachments from either of the cores.
3. It was found that the tiger population in the core has been stagnant for a long time. The habitat in the core is generally good, and the area has the potential to hold more tigers. The prey population has also not built up. There is no system of monitoring prey in the TR. It is suspected that the prey population is unable to grow because of hunting pressure.
4. Tribal people with a hunting tradition inhabit the fringe villages of the TR.
5. The forest cover in the buffer areas has been lost completely.





Immediate Actionable Points

1. The management should plan to remove the encroachments from the main and satellite core areas. Unless these families are relocated, the TR will not achieve the objectives of conservation.
2. Trees invading the grasslands and invasive species spreading in the reserve are threats to the habitat. The TR management should take up more areas for habitat improvement works.
3. The personnel employed in the Assam Forest Protection Force (AFPF) are permanent employees of the Forest Department. The management has succeeded in getting free rations for them in the patrolling camps, which is a general practice among other forest personnel in the camps. The management has made a move for sanctioning a project allowance to the AFPF personnel on the lines of that received by the other forest staff, which needs to be pursued.
4. The management should introduce a system of monitoring the prey population, and understand the causes such as hunting behind the stagnation of the prey and predator populations.
5. Buffer areas that are not encroached can be planted urgently with suitable tree species for habitat restoration.
6. EDCs should be involved in Ecotourism, eco-development and livelihood generation activities.
7. Communities should be engaged in dealing with human wildlife conflict particularly Elephants.

Bilal Habib

ORANG TIGER RESERVE, ASSAM

Evaluation Period
December, 2017

07

Management Strengths

1. The key species of conservation importance in the TR are the Rhinoceros, Tiger, Hog Deer, Bengal Florican and Swamp Francolin. Though the area of the TR is small, managing the PA as a TR is critical to conserve these species.
2. There are 40 anti-poaching camps in 78.81 sq. km. of the core area. On average, each camp has a jurisdiction of <2 sq. km., which ensures adequate protection measures.
3. There is no human habitation in the TR. An area of extent 2.35 sq. km. under encroachment was evicted on 2 March and 11 April 2017, following the directions of the Hon'ble Guwahati High Court (vide their order dated 5 August 2013). In this process, 2151 persons of 343 families were evicted, and the TR is free from encroachments.
4. There are 30 captive elephants, of which 24 are adults and six are calves. The elephants are used for patrolling duty, especially during the rainy season. The protection staff can survey a greater area on elephant back, which is otherwise difficult due to tall grasses.

Management Weaknesses

1. There has been an alarmingly high number of tiger killings (17 since 1991), especially through poisoning, by fringe villagers in retaliation to cattle depredation in the park in areas where livestock are illegally grazed. Rhino population was counted in 1985, 1991, 1999, 2006, 2009 and 2012, and the number of individuals in the park was 65, 97, 46, 68, 64 and 100, respectively. This exercise was discontinued after 2012, and thus the present number is unknown. Poaching of rhinos appears to have been quite rampant between 1999 and 2009.
2. Biotic pressures in fringe areas have led to the degradation of habitat, and makes wild animals prone to various diseases that are present in domesticated animals.
3. Invasive species such as Mimosa and Mikania are spreading at an alarming rate in the park, reducing the habitat of rhinoceros and other herbivores.
4. Siltations of water bodies have caused scarcity of water for rhinos and other mammals.
5. There are 14 villages and other habitations across the Brahmaputra River in the zone of influence, with a human population of >50,000 and >30,000 cattle heads. The human population of the fringe villages and their cattle that graze in the park exert pressure on the habitat for their requirements of timber, fuel wood, and grasses.
6. TCP has not been prepared
7. TCF also have not been constituted.
8. The EDCs are non-functional.



Immediate Actionable Points

1. The management must ensure that all EDCs are functional and the communities residing in the 14 villages are educated and provided alternative livelihood options so that their dependence on forests is minimised and livestock grazing is controlled.
2. The management has moved a proposal for constitution of a Tiger Conservation Foundation that should be expedited by the Government.
3. The TR was notified in February 2016, and no effort has been made to write a TCP yet. The management must take ensure that the TCP is prepared.
4. Scientific grassland management needs to be carried out especially in context of removal of invasive species.
5. TCF constitution is in progress, needs to be taken on priority.

DAMPA TIGER RESERVE, MIZORAM

Evaluation Period
February, 2018

08

Management Strengths

1. The core area of the TR is free of habitation and is devoid of any biotic pressure.
2. The eastern boundary of the core area is along the River Sajek, which flows on the international border with Bangladesh. The border outposts are manned by BSF and they not only guard the border but prevent infiltration of poachers.
3. The TR forms a part of the landscape-level connectivity between Bangladesh and Myanmar.
4. DTR has a mosaic of vegetation including moist deciduous, tropical wet evergreen and tropical semi-evergreen forests forming a prime habitat for a variety of species including large cat species, numerous species of birds and 15 non human primates.

Management Weaknesses

1. The position of Field Director is vacant for a long time and this has affected the management of the TR.
2. There are vacancies to an extent of 79% of the sanctioned strength of the staff of the TR. The posts of the ACF and two Forest Rangers are vacant. Similarly, the posts of nine out of 10 Foresters, 10 out of 15 forest guards and all 10 forest constables are vacant. The protection of the forest and wildlife has been affected.
3. Due to the acute shortage of staff, the management has relied heavily on 170 Temporary Wildlife Guards deployed on daily wages for the protection of the TR. Such temporary guards may not be fully capable of dealing with enforcement duties.
4. The Research activities have been described in the TCP, but there is lack of any initiative as the position of Research Officer has not been filled.
5. Meetings of the Steering Committee for Tiger Conservation as well as the Tiger Foundation have not been conducted regularly.
6. Jhum cultivation is prevalent in the buffer areas of the TR. There is indiscriminate felling of trees and bamboo followed by burning so as to prepare areas on steep slopes for cultivation.
7. The presence of 15 villages in the buffer is a threat to the TR.



Immediate Actionable Points

1. Large number of vacancies in the sanctioned posts has affected the protection, patrolling and monitoring work in the TR. The State should follow a policy of recruiting against all levels of vacancies on a regular basis.
2. APOs should be prepared based on budget proposals in the TCP, and the State should submit it in a timely manner to the NTCA for the sanction and release of funds. There should be sufficient time for implementation of planned activities in field.
3. The security of the TR needs to be improved by establishing more number of anti poaching camps in vulnerable areas with basic facility of potable water, sanitary facilities and solar lights. Further, temporary and semi-permanent camps should be upgraded and made permanent so that the protection staff can stay there at night. The protection of the TR is of paramount importance and should be addressed urgently.
4. The population estimation of Tiger, predators and prey should be carried as per the protocol of the NTCA within the prescribed time line.
5. The NTCA should coordinate and monitor the progress of the All India Tiger Estimation exercise in the TR as it has a low density of Tigers and needs continuous monitoring. It is suggested that NGOs may be involved in this exercise.
6. There is need for active coordination between BSF deployed at the international border with Bangladesh, for exchange of information and enhancing protection.
7. The erection of fences in the border area should be reviewed and discouraged as they prevent movement of animals in these vital corridors.

Shantanu Sharma



BUXA TIGER RESERVE, WEST BENGAL

Evaluation Period
August, 2017

09

Management Strengths

1. Buxa TR lies at the confluence of three Biogeographic Zones and is endowed with rich faunal and floral biodiversity. It forms part of a large ecological landscape with Phipsu Wildlife Sanctuary of Bhutan in the North, Jaldapara National Park, Gorumara National Park, Chhaparamari Sanctuary, Neora Valley National Park, in the West and Assam forests in the East. These contiguous forests allow movement of Wildlife and ensure gene flow.
2. The TR is traversed by rivers and rivulets which bring alluvial silt and rejuvenates the reserve forming foraging habitats for wild animals. The forests of the reserve conserve water and help stabilise the flow in rivers. But, for these forests, the river courses would change much more rapidly, bringing human misery during floods.
3. The TR has dense forests and large area under grassland which is maintained as a prime foraging habitat for ungulates. The management of grassland is an important habitat amelioration work.
4. The TR has both natural and artificial water holes providing water to the animals. Some of the water holes are made of concrete and designed as saucer shaped structures holding rain water and during summer are filled by water tankers thereby ensuring water during the pinch period.

Management Weaknesses

1. The forests in this landscape are interspersed with numerous villages with a fairly large human population, tea estates and exert biotic pressure on the resource of the TR. The communities residing in these villages are dependent on the Forest for their needs. Tribals working in tea estates also exert pressure on the forests. Some of these families are involved in smuggling of timber. On an average, 1800 cubic meter of timber has been seized annually during the last 3 years. The seizure was more than 4200 cubic meter in one of the earlier years.
2. Ungulate sightings was found to be low during the field visit. A marginal decline in the elephant population of north Bengal was found in a recently concluded census.
3. The guidelines for tourism were formulated by the NTCA in October 2012, based on the directions of the Supreme Court. These guidelines State that visits are allowed only in the designated tourism zone and that a maximum of 20% of the core/critical tiger habitat usage (not exceeding the present usage) for regulated, low-impact tourist visitation may be permitted. The guidelines prohibit the construction of any tourist infrastructure in the core area. In spite of this, West Bengal Tourism Development Corporation has constructed tourists' lodges at Jayanti, within the core area.
4. There are vacancies in the frontline staff, especially at the forest guard level which has severely affected the protection of forest and wildlife.
5. The railway line between Alipurduar and Siliguri through Rajabhatkhawa has caused mortality of several wild elephants over the years and safety measures are not in place.
6. The forests are interspersed with tea gardens, and the movement of wild animals in the corridors through these gardens lead to conflicts. Often tribals working in the tea garden are victims.

Immediate Actionable Points

1. Four villages (Bhutia Basti, 28th mile village, 29th mile village and Jayanti) have been identified for relocation. The TR management is holding consultations with the communities, and no concrete proposal has been brought out so far. There is an urgent need to work out a relocation package.
2. The foot paths used for patrolling should be cleared of undergrowth and weeds to enable quick patrolling.
3. The State Government should take up recruitment and training of frontline staff personnel, especially forest guards. The forest patrolling must be stepped up to ensure that the timber smuggling is controlled.
4. The management keeps track of the movements of elephants and has a warning system by which information about the movements of elephants on the rail track is passed on to railways. The railway personnel then make arrangements to slow down trains. The Forest patrolling staff monitoring movement of elephants near Railway track should verify the information before conveying to the Railways to prevent false alarm.
5. Old orange orchards on encroached forest land in the hilly tracts should be evicted through negotiation and consultation.
6. The proposed Tala Rydak road, which leads to Pepping in Bhutan, traverses through natural hill and foothill forests of Bhutanghat. Another alignment should be found for the road that bypasses the TR to avoid the disturbance to the area.
7. The warning system for the movement of elephants should be used to inform tea gardens so that the conflicts with tribals working there can be prevented.
8. The prey base in the TR should be assessed before reintroduction of Tiger is carried out.
9. The management should initiate mitigation measures in consultation with the Railways to prevent mortality of Elephants on the broad gauge Railway line between Alipurduar and Siliguri.
10. The vacancies in front line staff should be filled urgently to enhance protection of the Reserve.
11. There is a need to carry out regular monitoring of population of Tigers, co-predators and prey as there is low density of Tigers in this TR.
12. Constructions of any tourism facility should be prohibited in the core area as it violates rules and guidelines and will be detrimental to reintroduction of Tigers in this Reserve.



SUNDARBANS TIGER RESERVE, WEST BENGAL

Evaluation Period
February, 2018

10

Management Strengths

1. The TR is free of human settlements in the core and buffer of the TR.
2. The TR is part of Sundarban Biosphere Reserve and is a World Natural Heritage Site of UNESCO. Adequate funds are allocated to this Reserve by Central and State Governments for infrastructure support and management.
3. There is strong coordination between the Border Security Force and the anti poaching staff of Khatwajhuri camp of Baseerhat Range for joint patrolling at the international border. Further there is a mobile BSF check post near the Burir Dhupri anti-poaching camp. At the Jhila and Bagna anti-poaching camps, the anti-poaching personnel of the Forest Department jointly patrol the forest along with the police force stationed there.
4. The tourism is well managed and is permitted in the buffer Zone except for Nethi Dhupani Island located in West Range where regulated tourism is permitted. (thirteen tourist boats per day). The entire TR has been declared as no plastic zone.
5. The TR carries out smart surveillance and monitoring of the mangrove areas using two drones which are stationed, one each at Basheerhat and Sajnekhali, which can be pressed into service in any emergency
6. The large contiguous patch of mangroves is well protected over the years as there is a general ban on the felling of mangrove trees in all reserve forests since 1990. In fact, there was felling of trees in Sajnekhali Wildlife sanctuary since 1976 and that in Sundarban National Park since, its notification in 1984.
7. Creation of Nylon fencing along the forest village interface in stretch of 96 kmts is a good management practice, which has assisted in mitigation of human wildlife conflict.



Dipanjan Naha

Management Weaknesses

1. There is a shortage of frontline staff, more than 50% of the sanctioned staff posts, especially at the forest guard level are vacant
2. A sufficient number of anti poaching camps have been established on the northern islands, but some more camps need to be established on the southern islands.
3. Collection of Honey in the summer months by villagers residing in the border areas of Bangladesh and local Indian villages is a serious threat.
4. More research needs to be conducted in the landscape, especially on subjects such as climate change and carbon sequestration.
5. Incidences of illegal use of drones have been noticed and they were intercepted and seized.

Immediate Actionable Points

1. There is a bilateral protocol for discussing all border issues between - the BSF and their counterparts in Bangladesh. The NTCA has moved the Ministry of Home Affairs to make arrangement for consultation between the respective Forest Departments of the two countries on matters relating to conservation and wildlife trade which should be followed up.
2. Some more anti-poaching camps should be established on the southern islands.
3. Recruitment of staff members is important for protection. More than 50% of the staff positions, especially at the forest guard levels are vacant. The average age of 60% of the staff is more than 50 years; vacant staff position should be filled without further delay. The Police Recruitment Board has been entrusted with the task of recruitment of forest guards. They should expedite the process.
4. The long porous international border with Bangladesh requires strengthening of patrolling and acquisition of high speed boats for quick deployment of staff. Incidences of illicit felling of trees, poaching, illegal fishing, crab collection and honey collection- requires immediate attention.
5. The strong enforcement measures across the border by the Bangladesh Forest Department against poachers have been an effective deterrence and anti-poaching operations should be continued without any complacency.





Bilal Habib

CONCLUSIONS AND WAY FORWARD

5.1 Best practices in current MEE TR Cycle, 2018

5.2 Key outcomes of MEE of Tiger Reserves in India



5.3 Lessons Learnt in MEE of Tiger Reserves in India

5.4 Way Forward

05



BEST PRACTICES IN CURRENT MEE TR CYCLE, 2018

5.1

The Tiger Reserves in India are excellent examples of adaptive management approaches. There are various innovative strategies adopted by various Tiger Reserves in the country for management of its natural resources and conservation of biodiversity. Some key examples of best practices adopted by various Tiger Reserves are given as under:

E-Eye Surveillance System in Corbett for fire management, grazing control and other threat abatement; dovetailing of traditional protection practices with modern tools and techniques. Tiger Cell, with a GIS unit, dedicated to providing research inputs for management purposes, monitoring of M-STrIPES-based patrolling.

Unmanned Aerial Vehicle (UAV) to monitor graziers in Melghat; WhatsApp and SMS group for better communication amongst stakeholders in Melghat; the TCP of Melghat translated into Marathi and provided to the staff up to the Beat level for better management approach

Village relocation planning at Tadoba-Andhari TR, Satkosia TR

Involvement of women in management of Tiger Reserves of Maharashtra

Habitat management activities at Kanha Tiger Reserve

Mitigation of human wildlife conflicts in Tiger Reserves of South India

Community involvement in TR management at Periyar Tiger Reserve

- Tourism management at Amrabad Tiger Reserve, Sathyamangalam Tiger Reserve, Nawegaon-Nagzira Tiger Reserve, Corbett TR etc.
- Innovative patrolling and protection measures at Nawegaon-Nagzira Tiger Reserve, Corbett Tiger Reserve etc.

KEY OUTCOMES OF MEE OF TIGER RESERVES IN INDIA

5.2

The overall assessment of Tiger Reserves indicates that, management strengths such as adequacy of Central and State funding; compliance of statutory requirements; NGO support; effective protection strategies, etc are performing better in TR management. Whereas, some aspects of TR management need greater attention, such as visitor satisfaction; habitat restoration; adequacy of infrastructure maintenance; village relocation planning; research & monitoring; TCP preparation & approvals. Also there are some aspects, where TR management needs further attention such as livelihood support to locals; effectiveness of public participation; adequacy of manpower deployment; dissemination of information to public; population trends of endangered species and landscape connectivity. Further there are emerging concerns in TR management which need a more adaptive approach such as climate change issues, developments in the surrounds of TRs, human-wildlife conflicts, strengthening and diversification of TCFs and management of invasive species.

LESSONS LEARNT IN MEE OF TIGER RESERVES IN INDIA

5.3

The Indian MEE process is scientific, participatory, independent, rapid and considers the process as important as the product. The SWOT analysis in terms of management strengths, management weaknesses and immediate actionable points of each Tiger Reserve as part of the MEE process has proved to be very useful in improving the management and governance and provides a much better analytical and action framework. The evaluation based on a mix of 'qualitative' as well as 'quantitative' headline indicators has provided good insights into functioning of Tiger Reserves in the country. Indian MEE is being further integrated with the M-STrIPES platform for better use of qualitative as well as quantitative parameters, for effective monitoring and management. MEE process now forms an integral part of the capacity building of TR Managers and Frontline Staff.

WAY FORWARD

5.4

India is amongst select countries in world that have institutionalized the process of MEE for assessment of Tiger Reserves in the country. The MEE process has been replicates after every four years for all the existing Tiger Reserves, along with the estimation of Tiger population in the country. The present MEE process has provided valuable insights into the management processes and practices in all Tiger Reserves. The results of current MEE indicates that there has been an overall improvement in the management effectiveness of Tiger Reserves compared to previous assessments made in 2014, 2010 and 2006. From third to current/ fourth cycle of assessment, the overall MEE rating has increased and no Tiger Reserve in the country has been categorised in the poor category. The Tiger Conservation Plan (TCP) and Annual Plan of Operations (APOs) will have to be appropriately aligned to respond to the outcomes of this assessment in order to enhance the management effectiveness of Tiger Reserves in a time bound manner. The APOs will also have to take into account the management strengths, management weaknesses and immediate actionable points as described in this report. With help of the MEE process the participation of a range of relevant stakeholders has to be further enhanced by TR management. The next step of the MEE process is to disseminate the findings of MEE and bring in appropriate changes in policy, governance and management to enhance effectiveness of management of Tiger Reserves. The MEE process needs to be adopted by the Tiger Range countries to secure conservation of the tiger across its entire range.





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FILLED IN QUESTIONNAIRES IN RESPECT OF 50 TIGER RESERVES IN INDIA, EVALUATED IN 2018.

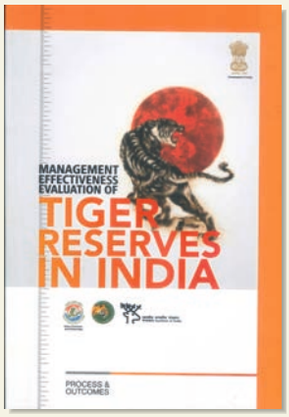


ANNEXURE - I
COMMITTEES AND TIGER RESERVES FOR MEE OF TIGER RESERVES, FOURTH CYCLE 2018

S. No.		Name of Tiger Reserve	State	Chairperson	Member	WII Faculty Member
1.	**Cluster-I** (13 Nos.)	Bor	Maharashtra	Shri Suhas Kumar, IFS, Former PCCF & HoFF, Govt. of Madhya Pradesh	Dr. Samir K. Sinha Coordinator and Regional Head, Wildlife Trust of India, Noida	Dr. A.K. Bhardwaj, IFS, Former PCCF & CWLW Kerala and Senior Professional Fellow WII/ Shri Vinod DK, IFS, Scientist D, on deputation to UNESCO C2C, WII
2.		Melghat	Maharashtra			
3.		Nawegaon-Nagzira (NNTR)	Maharashtra			
4.		Pench	Maharashtra			
5.		Sahyadri	Maharashtra			
6.		Tadoba-Andhari (TATR)	Maharashtra			
7.		Mukundara Hills	Rajasthan			
8.		Ranthambhore	Rajasthan			
9.		Sariska	Rajasthan			
10.		Dudhwa	Uttar Pradesh			
11.		Pilibhit	Uttar Pradesh			
12.		Corbett	Uttarakhand			
13.		Rajaji	Uttarakhand			
14.	**Cluster -II** (9 Nos.)	Achanakmar	Chhattisgarh	Shri Yogesh, IFS, Former PCCF and CWLW Govt. of Arunachal Pradesh	Dr. Dipankar Ghose, Director, Species and Landscapes Division, WWF-India	Shri Ajay Srivastav, IFS, On deputation, Scientist G, WII
15.		Indravati	Chhattisgarh			
16.		Udanti-Sitanadi (USTR)	Chhattisgarh			
17.		Bandhavgarh	Madhya Pradesh			
18.		Kanha	Madhya Pradesh			
19.		Panna	Madhya Pradesh			
20.		Pench	Madhya Pradesh			
21.		Sanjay -Dubri	Madhya Pradesh			
22.		Satpura	Madhya Pradesh			
23.	**Cluster -III** (7 Nos.)	Nagarjunasagar Srisailam (NSTR)	Andhra Pradesh	Shri R.N. Mehrotra, IFS, Former PCCF and HOFF, Government of Rajasthan	Dr. Joseph Vattakaven ConsultantWWF-Tigers Alive Initiative/Shri Prasanjeet Navgire, Law & Enforcement Officer, Wildlife Conservation Trust, Mumbai	Dr. Manoj Nair, IFS, on deputation, Scientist-F, UNESCO C2C, WII/ Dr. Nasim Ahmad Ansari, Project Scientist, WII
24.		Valmiki	Bihar			
25.		Palamau	Jharkhand			
26.		Satkosia	Odisha			
27.		Similipal	Odisha			
28.		Amrabad	Telangana			
29.		Kawal	Telangana			

S. No.		Name of Tiger Reserve	State	Chairperson	Member	WII Faculty Member
30.	**Cluster -IV** (11 Nos.)	Bandipur	Karnataka	Shri B.K. Patnaik, IFS, Former PCCF(WL) and CWLW, Government of Odisha	Dr. Rathin Barman, Deputy Director, Wildlife Trust of India	Dr. Sonali Ghose, IFS, Deputy Director, Ministry of Drinking Water and Sanitation/ Shri Salvador Lyngdoh, Scientist- D, WII
31.		Bhadra	Karnataka			
32.		Biligiri Ranganatha Swamy Temple (BRT)	Karnataka			
33.		Kali (Dandeli-Anshi)	Karnataka			
34.		Nagarhole	Karnataka			
35.		Parambikulam	Kerala			
36.		Periyar	Kerala			
37.		Anamalai	Tamil Nadu			
38.		Kalakad-Mundanthurai (KMTR)	Tamil Nadu			
39.		Mudumalai	Tamil Nadu			
40.		Sathyamangalam	Tamil Nadu			
41.	**Cluster -V** (10 Nos.)	Kamlang	Arunachal Pradesh	Shri B.K. Singh, IFS, Former PCCF and HOFF Government of Karnataka	Dr. Yashveer Bhatnagar, Scientist, Nature Conservation Foundation, Karnataka/ Dr. D.S. Srivastava, Former Professor, Patna University, Patna	Dr. Pratap Singh, IFS, on deputation, Scientist-G, WII
42.		Namdapha	Arunachal Pradesh			
43.		Pakke	Arunachal Pradesh			
44.		Kaziranga	Assam			
45.		Manas	Assam			
46.		Nameri	Assam			
47.		Orang	Assam			
48.		Dampa	Mizoram			
49.		Buxa	West Bengal			
50.		Sundarbans	West Bengal			

PLATE I
OTHER MEE RESOURCES



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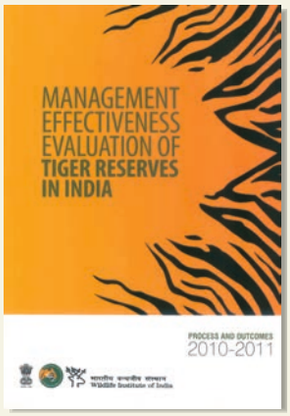

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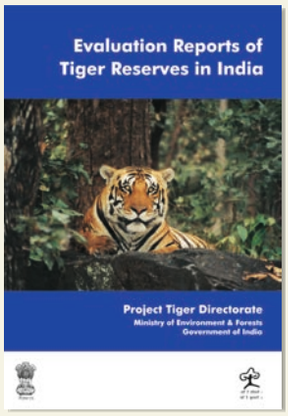

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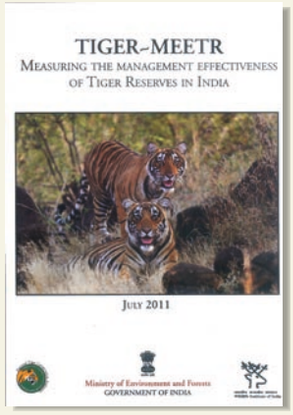

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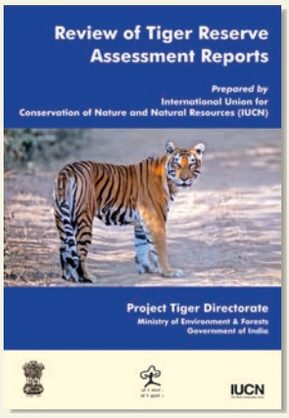

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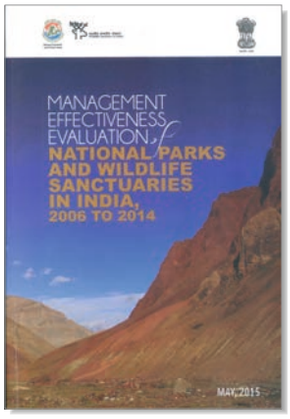

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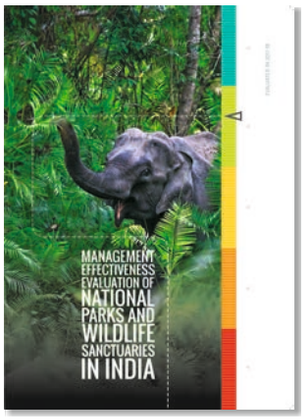

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