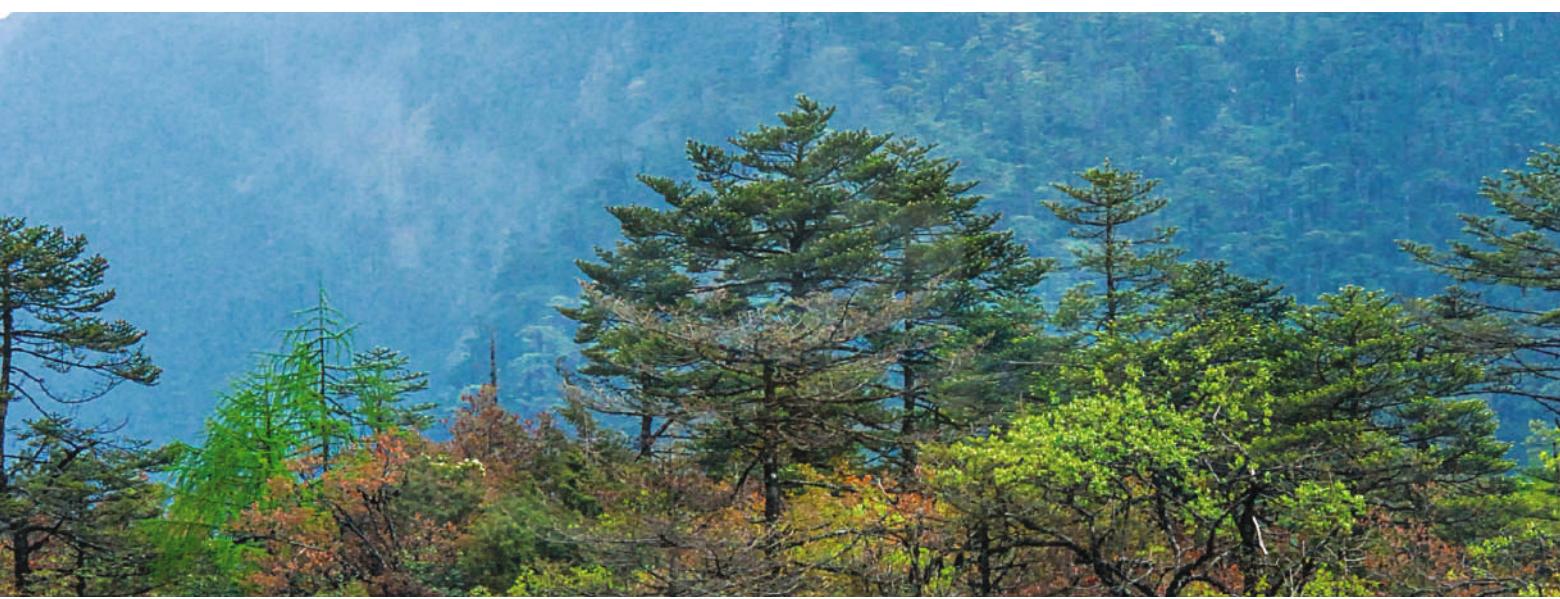




MANAGEMENT  
EFFECTIVENESS  
EVALUATION OF  
**NATIONAL  
PARKS AND  
WILDLIFE  
SANCTUARIES  
IN INDIA**

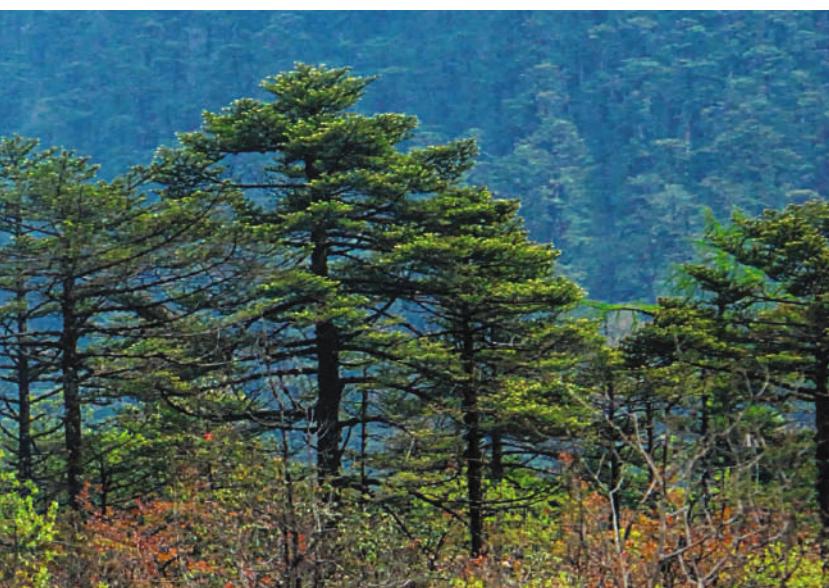




भारतीय वन्यजीव संस्थान  
Wildlife Institute of India

Ministry of Environment,  
Forest & Climate Change

# PROCESS AND OUTCOMES 2015-2017



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MANAGEMENT  
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**NATIONAL  
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Mathur, V.B. and Ansari N.A.  
2017. *Management Effectiveness  
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in India. Process and Outcomes,  
2015-17.* Wildlife Institute of  
India, Dehradun, p 198.



I am pleased to note that the Management Effectiveness Evaluation (MEE) process has gained further momentum and India has now completed the second cycle of MEE for another 80 National Parks and Wildlife Sanctuaries during 2015 to 2017. This is a much-needed and valuable addition to the previous MEE conducted during 2006-2014 for 125 National Parks and Wildlife Sanctuaries. The MEE process has also been successfully applied in evaluating the Tiger Reserves in the country in three cycles, 2006, 2010, 2014 and is now being taken up for the fourth cycle.

It is commendable that India is amongst the few countries globally that have institutionalized the MEE process. This has provided important information regarding strengths and weaknesses of the evaluated National Parks, Wildlife Sanctuaries and Tiger Reserves and also given insights for enhancing and undertaking specific actions to further improve management and governance. There is a need to fast-track MEE uptake for the remaining Protected Areas so that these may also be benefitted from the evaluation process and outcomes. I encourage our field managers to actively participate in this process which has been adapted and customized according to the needs and practicalities of Protected Area management and conservation in India.

I congratulate the Wildlife Division of our Ministry, Chief Wildlife Wardens of the States and the Protected Area managers and frontline staff for their participation and inputs. I compliment the Director, Wildlife Institute of India and his team for technical backstopping and guidance in the MEE process.

A handwritten signature in black ink that reads "Harsh".

**(Dr. Harsh Vardhan)**  
Minister of Environment,  
Forest and Climate Change,  
Government of India

## MESSAGE



Management Effectiveness Evaluation (MEE) was initiated as a formal process in India in 2004 with the evaluation of 28 Tiger Reserves and then further taken up from 2006 onwards in Protected Areas (National Parks and Wildlife Sanctuaries) with a view to improving Protected Area management and governance. Information generated from the evaluation process has been found to be very useful in understanding the status of PAs, the threats they face as well as the opportunities for adapting and making management more effective.

Over the past years, the outcomes of the MEE process have demonstrated that despite all odds our PA management is successful in many aspects in meeting conservation goals. The MEE process followed in India uses the global framework comprising six elements viz. the context of PA status and threats faced, planning, inputs or allocation of resources, the process of management, outputs, and the resulting impacts or outcomes. Of these six elements in MEE framework, the element 'planning' was evaluated as best while 'output' and 'outcomes' received the lower ratings. The six elements also include 30 headline indicators in the MEE process. Of these indicators, 'zonation of the site' got the best rating while 'NGO support' has received the lowest rating.

The mean MEE score of 80 PAs evaluated during 2015-17 is 62% (range 27.50% to 88.79%), which is higher than the global mean. There has been an improvement of 2% in the overall MEE score from the previous MEE of PAs (2006-14). 19% of the evaluated PAs have been placed in 'Very Good' category, 36% in 'Good', 41% in 'Fair' and only 4% in 'Poor' category. PAs falling in the southern region of India have performed better while PAs of north-eastern region need more attention to strengthen efforts for enhancing their management effectiveness.

## MESSAGE

I would like to express my appreciation of our managers and field staff for their sustained efforts in protection and management of PAs. At the same time, I urge them to seek ways and take up actions to plug gaps and improve and

adapt management strategies and actions according to evolving needs and challenges. I thank Director, Wildlife Institute of India and his team for guiding and providing technical support as well as all the independent evaluators who have contributed in making the MEE process successful. I call upon all relevant stakeholders to lend their continued support to conservation of our PAs as vital biological repositories.



**Siddhanta Das**

Director General of Forest &  
Special Secretary to the  
Government of India



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We would like to thank a large number of officers and managers across the country for providing support for the evaluation of 80 National Parks and Wildlife Sanctuaries during 2015-17.

We are grateful to the officials and staff of the Wildlife Division of the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India for providing technical guidance and financial assistance to accomplish this exercise.

We would like to specially thank to Chief Wildlife Wardens of all 31 States & Union Territories and all the park managers and frontline staff of 80 protected areas for their valuable contribution in carrying forward the Management Effectiveness Evaluation (MEE) process.

## ACKNOWLEDGEMENTS

We express our sincere appreciation for the professional support and untiring efforts of the Independent teams (Chairman's and members) constituted by the MoEFCC for the five regions- Northern, Southern, Eastern, Western & North-eastern for the evaluation of national parks and wildlife sanctuaries (2015 to 2017).

We are especially indebted to the faculties and staff of the Wildlife Institute of India for their valuable support in accomplishing the task.

*The Team*

# CONTENTS

## CHAPTER ONE

<b>01</b>	<b>Process of Management Effectiveness Evaluation (MEE) of National Parks and Wildlife Sanctuaries in India</b>
04	1.1 Introduction
04	1.2 What is Management Effectiveness Evaluation (MEE)?
05	1.3 Why do we need evaluation or/ and assessment?
06	1.4 The WCPA Framework for Assessing Management Effectiveness
08	1.5 Management Effectiveness Evaluation (MEE) across the world and India
08	1.6 Assessment Process for National Parks and Wildlife Sanctuaries in India
10	1.7 Assessment Criteria for National Parks and Wildlife Sanctuaries in India
22	1.8 MEE Score Card
23	1.9 References

## CHAPTER TWO

<b>27</b>	<b>Management Effectiveness Evaluation (MEE) of National Parks and Wildlife Sanctuaries in India. Results: at a glance 2015-2017</b>
28	2.1 Overview of MEE of National Parks and Wildlife Sanctuaries, 2015 - 2017
28	2.2 Region-wise performance of National Parks and Wildlife Sanctuaries
34	2.3 Element-wise performance
36	2.4 Performance of Headline Indicators
37	2.5 Comparison of current MEE Results with previous MEE Exercise

## CHAPTER THREE

<b>41</b>	<b>Management Strengths, Weaknesses and Immediate Actionable Points</b>
<b>42</b>	<b>3.1 Northern Region</b>
44	1. Sukhna Wildlife Sanctuary
46	2. Chhilchhila Wildlife Sanctuary
47	3. Khol Hi Raitan Wildlife Sanctuary
49	4. Manali Wildlife Sanctuary
52	5. Pong Dam Wildlife Sanctuary
53	6. Rupi Bhaba Wildlife Sanctuary
55	7. Shimla Water Catchment Wildlife Sanctuary
56	8. Gulmarg Wildlife Sanctuary
59	9. Karakoram Wildlife Sanctuary
61	10. Bir Bhadson Wildlife Sanctuary

---

62	11. Harike Wildlife Sanctuary
64	12. Chandraprabha Wildlife Sanctuary
66	13. Hastinapur Wildlife Sanctuary
67	14. Okhla Bird Sanctuary
70	15. Soor Sarovar Bird Sanctuary
72	16. Askot Musk Deer Wildlife Sanctuary
73	17. Binsar Wildlife Sanctuary

### **80      3.2 Southern Region**

82	1. Lohabarrack Wildlife Sanctuary
83	2. Mount Harriet National Park
84	3. Rani Jhansi Marine National Park
86	4. Sri Penusila Narasimha Wildlife Sanctuary
87	5. Cotigaon Wildlife Sanctuary
89	6. Bannerghatta National Park
90	7. Bhimgad Wildlife Sanctuary
91	8. Cauvery Wildlife Sanctuary
93	9. Gudavi Bird Sanctuary
94	10. Idukki Wildlife Sanctuary
95	11. Mathikettan Shola National Park
96	12. Kanyakumari Wildlife Sanctuary
98	13. Pulicat Lake Bird Sanctuary
99	14. Mahavir Harina Vanasthali National Park
101	15. Manjeera Wildlife Sanctuary
102	16. Pakhal Wildlife Sanctuary

### **108      3.3 Eastern Region**

110	1. Gautam Buddha Wildlife Sanctuary
112	2. Kusheshwar Asthan Bird Sanctuary
113	3. Badalkhol Wildlife Sanctuary
116	4. Bhairamgarh Wildlife Sanctuary
117	5. Bhoramdev Wildlife Sanctuary
118	6. Tamor Pingla Wildlife Sanctuary
121	7. Palkot Wildlife Sanctuary
122	8. Udhwa Lake Bird Sanctuary
123	9. Debrigarh Wildlife Sanctuary
125	10. Kapilash Wildlife Sanctuary
127	11. Kotagarh Wildlife Sanctuary
129	12. Lakhari Valley Wildlife Sanctuary
132	13. Ballavpur Wildlife Sanctuary
133	14. Lothian Island Wildlife Sanctuary
135	15. Ramnabagan Wildlife Sanctuary
136	16. Senchal Wildlife Sanctuary

### **142      3.4 Western Region**

144	1. Dadra and Nagar Haveli Wildlife Sanctuary
145	2. Balaram Ambaji Wildlife Sanctuary
147	3. Girnar Wildlife Sanctuary
148	4. Khijadiya Bird Sanctuary
149	5. Nal Sarovar Bird Sanctuary
151	6. Vansda National Park
152	7. Bagdara Wildlife Sanctuary

---

- 153 8. Ghatigaon Hukna Wildlife Sanctuary
- 155 9. Ken Gharial Wildlife Sanctuary
- 156 10. Phen Wildlife Sanctuary
- 156 11. Dnyanganga Wildlife Sanctuary
- 158 12. Phansad Wildlife Sanctuary
- 159 13. Radhanagri Wildlife Sanctuary
- 160 14. Tansa Wildlife Sanctuary
- 162 15. Bhainsrodgarh Wildlife Sanctuary

**168 3.5 North-eastern Region**

- 170 1. Kamlang Wildlife Sanctuary
- 171 2. Kane Wildlife Sanctuary
- 172 3. Amchang Wildlife Sanctuary
- 173 4. Borail Wildlife Sanctuary
- 174 5. Deepor Beel Wildlife Sanctuary
- 176 6. Dehing Patkai Wildlife Sanctuary
- 178 7. Sonai Rupai Wildlife Sanctuary
- 179 8. Yangoupokpi Lokchao Wildlife Sanctuary
- 180 9. Siju Wildlife Sanctuary
- 181 10. Lengteng Wildlife Sanctuary
- 182 11. Tawi Wildlife Sanctuary
- 183 12. Tokalo Wildlife Sanctuary
- 184 13. Puliebadze Wildlife Sanctuary
- 185 14. Kyongnosa Alpine Sanctuary
- 187 15. Maenam Wildlife Sanctuary
- 188 16. Rowa Wildlife Sanctuary

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## CHAPTER FOUR

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**193 The Way Forward**

- 195 **CD:**  
Filled in questionnaires in respect of all 80 Protected Areas evaluated between 2015 to 2017.

**Annexures**

- 196 **Annexure I:**  
Landscape regions, sites, teams for MEE of Protected Areas (NP+WLS) in India, 2015-17
- 198 **Annexure II:**  
Assessment Criteria for Addressing Issues Relating to Climate Change and Carbon Capture in the PAs

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	Member	Dr. Justus Joshua Director - research Green Future Foundation, Rajasthan	Dr. Justus Joshua Director - Research Green Future Foundation, Rajasthan
	Member	Dr. R.K. Singh Wildlife Conservation Trust, Mumbai	Dr. R.K. Singh Wildlife Conservation Trust, Mumbai
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01

**PROCESS OF MANAGEMENT  
EFFECTIVENESS  
EVALUATION OF NATIONAL  
PARKS AND WILDLIFE  
SANCTUARIES IN INDIA**



1.1

## Introduction

Protected areas (PAs) are the basis of most conservation strategies. They protect biodiversity, safeguard ecosystem health and provide an array of ecosystem services such as food, clean water supply, medicines, livelihood, protection from the impacts of natural disasters and mitigating climate change (Hockings 2003). Protected areas are critical for maintaining a healthy environment for people and nature. They are essential for biodiversity conservation and vital to the cultures and livelihoods of indigenous peoples and local communities. They also deliver clean air and water, bring benefits to millions of people through tourism, and provide protection from climate change and natural disasters (UNEP-WCMC and IUCN 2016).

Over the past 20 years, there has been a dramatic increase in the number and extent of protected areas established globally, representing a growing recognition of the value of protection as a way to safeguard natural and cultural resources and mitigate human impacts on biodiversity. There are 202,467 terrestrial and inland water protected areas recorded in the World Database on Protected Areas (WDPA), covering 14.7% (19.8 million km<sup>2</sup>) of the world's land area and 3.4% of the global ocean area (excluding Antarctica) (UNEP-WCMC and IUCN 2016). They store 15% of the global terrestrial carbon stock, help in reducing deforestation, managing habitat and preventing species loss, and support the livelihoods of over one billion people. The areas of designated protected areas rose between 1990 and 2014 from 13.4 million km<sup>2</sup> to 32 million km<sup>2</sup>.

1.2

## What is Management Effectiveness Evaluation (MEE)?

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:

**a.**

Design issues relating to both individual sites and PA systems

**b.**

The adequacy and appropriateness of management systems and processes

**c.**

Delivery of the objectives of PAs, including conservation of values.

## Why do we need evaluation or/ and assessment?

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 will 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).

Assessments should not primarily be about reporting on or judging the managers and/or frontline staff, but it should primarily be used to assist managers to work as effectively as possible (Mathur et al. 2011). 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).

1.4

## The WCPA Framework for Assessing Management Effectiveness

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 Area (WCPA) i.e. Framework for Assessing the Management Effectiveness of Protected Areas (Figure 1.1 and Table 1.1), 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.

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.

Figure 1.1  
The WCPA  
Framework for  
Assessing  
Management  
Effectiveness  
(Source  
Hockings et al.  
2006).

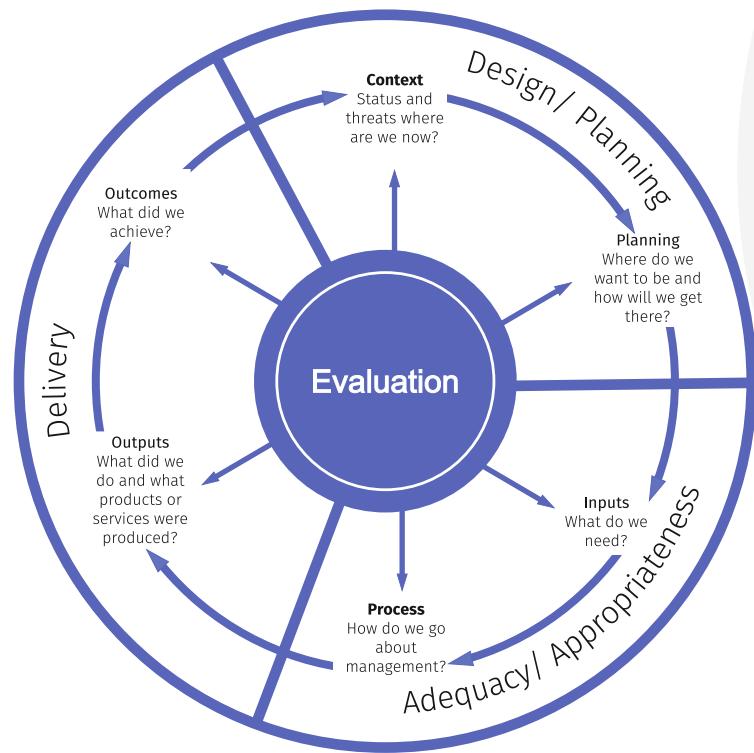


Table 1.1  
Summary of the  
WCPA  
Framework  
(Source: Stolton  
et al. 2007)

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 - policy environment - Partners	- Status - National context
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
Inputs	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

Of these elements, the outcomes most clearly indicate whether the site is maintaining its core values, but the outcomes can also be the most difficult element to measure accurately. However, the other elements of the framework are all also important for helping in identification of particular areas where management might need to be adapted or improved.

Over the past 10 years, numerous assessment systems have been developed, most based at least to some extent on the WCPA Framework. 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).

1.5

## Management Effectiveness Evaluation (MEE) across the world and India

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). In response to these initiatives, work on management effectiveness assessment has become an increasingly common component of PA management worldwide.

According to the global database of Protected Area Management Effectiveness (PAME) of the CBD Programme of Work on Protected Areas, evaluations have now been undertaken in over 9037 PAs around the World (UNEP-WCMC and IUCN 2016). The result indicated that only 17.5% of the countries have achieved the 60% score of management effectiveness (Code et al. 2015).

India has also made a beginning in evaluating the management effectiveness of its national parks, wildlife sanctuaries, tiger reserves (TRs) and world heritage sites (Mathur 2008). The MEE of national parks and wildlife sanctuaries was initiated in 2006 and till 2014, 125 sites have been evaluated ([http://www.wii.gov.in/images//images/documents/mee\\_report\\_2006\\_14.pdf](http://www.wii.gov.in/images//images/documents/mee_report_2006_14.pdf)). Three Natural World Heritage sites in South Asia, namely Keoladeo National Park, Rajasthan ([https://cmsdata.iucn.org/ downloads/keoladeo\\_eoh\\_second\\_assessment\\_oct07.pdf](https://cmsdata.iucn.org/ downloads/keoladeo_eoh_second_assessment_oct07.pdf)), Kaziranga National Park, Assam ([https://cmsdata.iucn.org/downloads/kaziranga\\_second\\_eoh\\_assessment\\_nov07.pdf](https://cmsdata.iucn.org/downloads/kaziranga_second_eoh_assessment_nov07.pdf)) and Chitwan National Park, Nepal ([https://cmsdata.iucn.org/downloads/chitwan\\_eoh\\_second\\_assessment\\_oct07.pdf](https://cmsdata.iucn.org/downloads/chitwan_eoh_second_assessment_oct07.pdf)) were evaluated in 2002-2007. Under India's Project Tiger, management effectiveness assessment of 28 TRs in 2006, 39 TRs in 2010 ([http://www.wii.gov.in/protected\\_download/publications/researchreports/2011/tiger/mee\\_tiger\\_2011](http://www.wii.gov.in/protected_download/publications/researchreports/2011/tiger/mee_tiger_2011)) and 43 TRs in 2014 ([http://www.wii.gov.in/ release\\_mee\\_tiger\\_report\\_2014](http://www.wii.gov.in/ release_mee_tiger_report_2014)) was carried out.

1.6

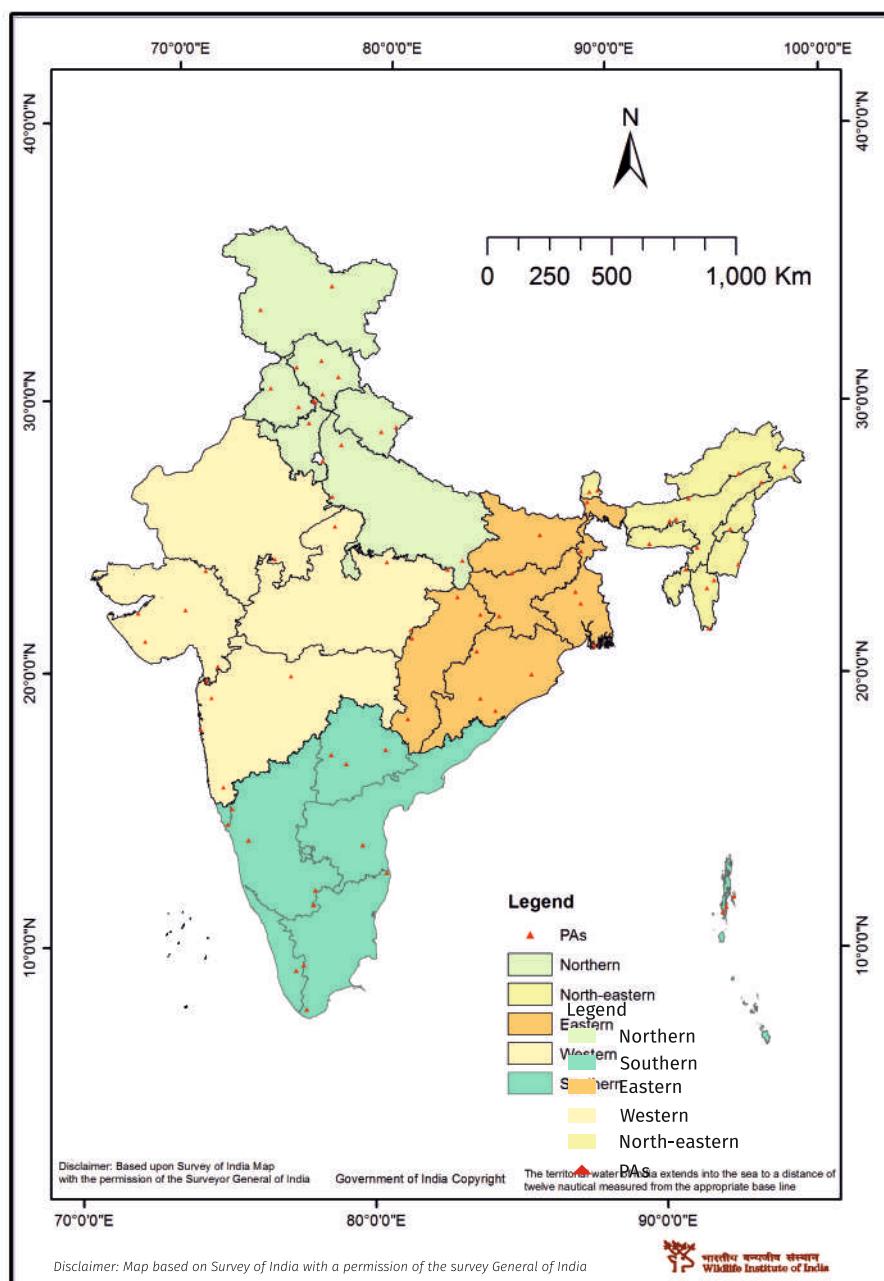
## Assessment Process for National Parks and Wildlife Sanctuaries in India

The evaluation of 80 National Parks and Wildlife Sanctuaries (Figure 1.2) was done in two phases from 2015 to 2017 i.e. 40 PAs in each year, 2015-16 and 2016-17. In order to ensure credibility of the assessment process each phase has 5 independent regional committees in 5 regions of the India (Northern, Southern, Eastern, Western and North-eastern). Wildlife Institute of India (WII) team provided the technical backstopping to the MEE process to these committees. Considering the

growing importance of addressing issues relating to Climate Change, Carbon Capture, Preventing Carbon Loss and Encouraging further Carbon Capture in PAs, two additional criteria have been developed. These criteria were not included in the formal MEE process but the information gathered helped to sensitize the conservation community about the significance of these issues and to plan next steps for addressing them. A Technical Manual 'Management Effectiveness Evaluation (MEE) of National Parks and Wildlife Sanctuaries in India' was prepared by Wildlife Institute of India to guide the MEE process ([http://www.wiienvis.nic.in/userlogin.aspx?Page=MEE\\_PA\\_Technical%20Manual30%20August2016.pdf&file=pdf](http://www.wiienvis.nic.in/userlogin.aspx?Page=MEE_PA_Technical%20Manual30%20August2016.pdf&file=pdf)).

The Independent REC of MEE visited these National Parks/ Wildlife Sanctuaries for conducting MEE as per the prescribed assessment criteria and completing the MEE Score Card. In addition to the specially customised 30 'Headline Indicators' for India, the MEE teams have also assessed the Management Strengths, the Management Weaknesses and the Immediate Actionable Points in respect of each PA and these are presented in Chapter 3 of this report. The attached CD contains the actual filled in questionnaires of all 80 PAs included in evaluation from 2015 to 2017.

**Figure 1.2**  
 Map showing 80 PAs across 5 regions in India taken under MEE assessment



## 1.7

## Assessment Criteria for National Parks and Wildlife Sanctuaries in India

For assessment of each of the six elements of the MEE Framework, the following criteria have been developed for MEE process. Explanatory notes, wherever needed, are provided to guide the assessment process. The scores by themselves will not help in providing the complete picture unless supported by considered observations (remarks) that qualify such scores.

## 1

### Context

## 1.1

#### Assessment criteria\*

Are the values of the site well documented, assessed and monitored?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Values not systematically documented, assessed or 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 and faunal and floral species.

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 1.2

#### Assessment criteria\*

Are the threats to site well documented and assessed?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Threats 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. Threats within and outside PA should both be considered. Impacts, if any on the population abundance of key species may be indicated in the remarks.

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 1.3

**Assessment criteria\***

Is the site free from human and biotic interference?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
The site has extensive human and biotic interference.	Poor			
The site has some human and biotic interference.	Fair			
The site has little human and biotic interference.	Good			
The site has no human and biotic interference.	Very good			

*\*This assessment should be based on existence of human settlements/ villages; livestock grazing, cultivation, encroachments etc, resource extraction/ livelihood dependence of local communities and should reflect the overall interference due to all the above factors. Number and size of human settlements/ enclaved villages and their impacts on the site may be indicated in the Remarks.*

*<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

## 2

**Planning**

## 2.1

**Assessment criteria\***

Is the site properly identified (NP/WLS) and categorized (in terms of zonation) to achieve the objectives?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Site not identified correctly or categorized.	Poor			
Site identified correctly but not categorized.	Fair			
Site identified correctly but not systematically categorized.	Good			
Site identified correctly and systematically categorized with proper zonation plans.	Very good			

*\*Management prescriptions for various zones (Core, Buffer, Tourism etc) may be carefully assessed.*

*<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

## 2.2

Does the site have a comprehensive Management Plan?

**Assessment criteria\***

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
No relevant Management Plan in place.	Poor			
Management Plan exist but not comprehensive.	Fair			
Site has a comprehensive Management Plan.	Good			
Site has a comprehensive, science based Management Plan prepared through a participatory process.	Very good			

\*Is the Management Plan consistent with WII Guidelines or not? The extent to which the concerns of the stakeholders, if any have been incorporated in the Management Plan may be commented upon.

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 2.3

Is the Management Plan routinely and systematically updated?

**Assessment criteria**

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
No process in place for systematic review and update of Management Plan.	Poor			
Management Plan sometimes updated in adhoc manner.	Fair			
Management Plan routinely and systematically updated.	Good			
Management Plan routinely, systematically and scientifically updated through a participatory process.	Very good			

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 2.4

Does the site safeguards the threatened biodiversity values?

**Assessment criteria\***

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Sites does not safeguard the threatened biodiversity values.	Poor			
Sites safeguards a few threatened biodiversity values.	Fair			
Sites safeguards a large number of threatened biodiversity values.	Good			
Sites 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

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 2.5

Are stakeholders given an opportunity to participate in planning?

Condition	Category <sup>+</sup>	(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. Further, is there a system/scope of putting the draft Management Plan in Public Domain in place?*

*<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

## 2.6

Are habitat restoration programmes systematically planned and monitored?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Habitat restoration programmes are entirely adhoc.	Poor			
Limited planning and monitoring programmes are in place for habitat restoration.	Fair			
Habitat restoration programmes are generally well planned and monitored.	Good			
Habitat restoration programmes are thoroughly planned and monitored.	Very good			

*\* 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 there a planning process in place? What is the extent of 'invasive species in the Site? Are there any measures to reduce/ remove them? Have these been successful?*

*<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

## 2.7

Does the site has an effective protection strategy?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Site has no protection strategy.	Poor			
Site has an adhoc protection strategy.	Fair			
Site has a comprehensive protection strategy but is not very effective.	Good			
Site has a comprehensive and very effective protection strategy.	Very good			

*\* 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. Is there any coordination with other wings of the Forest Department/ Police/ Customs etc? Are these effective?*

*<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10*

## 2.8

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

**Assessment criteria\***

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Human-wildlife conflicts are rampant.	Poor			
Site has been able to mitigate few human-wildlife conflicts.	Fair			
Site has been able to mitigate many human-wildlife conflicts.	Good			
Site has been able effective in mitigating all human-wildlife conflicts.	Very good			

\* Judgment needs to consider staff training, capabilities, equipment, logistics, local attitude and politics (negatively aided and/or abetted), assistance of relevant agencies (e.g. police, Local administration, Local people themselves) PR, follow-up actions and monitoring. Details of compensation paid for human injury/death and property damage in the last 3 years may be collected.

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 2.9

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

**Assessment criteria\***

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

\* 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? What kind of relationship exists with the District Administration and other Line Departments? Does the Site get any funds from these agencies?

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## Inputs

### 3.1

#### Assessment criteria\*

Are personnel adequate, well organised and deployed with access to adequate resources in the site?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Few, if any, personnel explicitly allocated for PA management.	Poor			
Some personnel explicitly allocated for PA management but not systematically linked to management objectives.	Fair			
Some personnel explicitly allocated towards achievement of specific management objectives.	Good			
Adequate personnel explicitly allocated towards achievement of specific management objectives.	Very good			

\* This assessment should inter-alia be based on number of personnel allocated for attainment of PA 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)

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

### 3.2

#### Assessment criteria\*

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

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

\* 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.

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 3.3

**Assessment criteria\***

Are resources (human and financial) linked to priority actions and are funds released timely?

Condition	Category <sup>+</sup>	(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			

\*Obtain details of funds released by MoEF and their utilization by site in the last 3 years and indicate them under 'Remarks'. Also comment on the problems associated with funds and their mitigation.

<sup>1</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 3.4

**Assessment criteria\***

What level of resources is provided by NGOs?

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

\*Details of contributions (cash/ kind) made by the NGOs in the last 3 years may be collected.

<sup>1</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 3.5

Does PA manager considers resources (human and financial) to be sufficient?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Resources insufficient for most tasks.	Poor			
Resources sufficient for some tasks.	Fair			
Resources sufficient for most tasks.	Good			
Resources are in excess for most tasks.	Very good			

<sup>\*</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 4

## Process

## 4.1

Does the site have trained manpower resources for effective PA management?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Very few trained officers and frontline staff in the site.	Poor			
Few trained officers and frontline staff, who are posted in the site.	Fair			
A large number of trained officers and frontline staff are posted in the site.	Good			
All trained managers and frontline staff posted in the site.	Very good			

<sup>\*</sup>Indicate % of trained staff in various categories. i.e. Higher Management: ACF/DCF/CF/CCF; Frontline Staff: Range Officer; Beat Officer; Forest Guard; Casual Daily Labour (CDL); Others.

<sup>\*</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 4.2

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

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

<sup>\*</sup>Has the PA staff received award/ appreciation from any agency in the last 3 years?

<sup>\*</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 4.3

Is there effective public participation in PA management?

**Assessment criteria\***

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Little or no public participation in PA management.	Poor			
Opportunistic public participation in some aspects of PA management.	Fair			
Systematic public participation in most aspects of PA management.	Good			
Comprehensive and systematic public participation in all important aspects of PA management.	Very good			

\* Participation would include Conservation & awareness programmes, Census operations, Intelligence gathering, Forest fire control etc.

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 4.4

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

**Assessment criteria\***

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
No systematic approach to handling complaints.	Poor			
Complaints handling system operational but not responsive to individual issues and limited follow up provided.	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			

\* Number of queries made and response thereof under the Right to Information (RTI) Act in the last 3 years may be compiled.

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 4.5

Does PA management addresses the livelihood issues of resource dependent communities especially of women?

**Assessment criteria**

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

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## Output

### 5.1

Is adequate information on PA management publicly available?

<i>Assessment criteria*</i>				
<i>Condition</i>	<i>Category<sup>+</sup></i>	<i>(Tick ✓)</i>	<i>Reference document(s)</i>	<i>Remarks</i>
Little or no information on PA 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 for most PAs or groups of PAs.	Good			
Comprehensive reports are routinely provided on management and condition of public assets in all PAs or groups of PAs.	Very good			

\* Does the Site has a website? If yes, is it comprehensive, well-managed and periodically updated?

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

### 5.2

Are visitor services (tourism and interpretation) and facilities appropriate for the relevant protected area category?

<i>Assessment criteria*</i>				
<i>Condition</i>	<i>Category<sup>+</sup></i>	<i>(Tick ✓)</i>	<i>Reference document(s)</i>	<i>Remarks</i>
Visitor services and facilities are at odds with relevant PA category and/or threaten PA values.	Poor			
Visitor services and facilities generally accord with relevant PA category and don't threaten PA values.	Fair			
All visitor services and facilities accord with relevant PA category and most enhance PA values.	Good			
All visitor services and facilities accord with relevant PA category and enhance PA values.	Very good			

\* Include the existence and quality of visitor and interpretation centers, including skills and capabilities of personnel manning these, site related publications, films, videos; arrangements of stay (including places serving refreshments and food owned and managed by site), 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. Details of numbers of visitors/ tourists (both domestic and overseas) coming in the last 3 years and the revenue earned may be compiled.

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 5.3

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

**Assessment criteria\***

Condition	Category <sup>+</sup>	(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 and routine reporting of management related trends undertaken.	Good			
Systematic evaluation and comprehensive reporting of trends undertaken and attempts made at course corrections as relevant.	Very good			

\* Not all sites attract projects and researchers and with exceptions, little research takes place on the site 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. Details of number of research projects in the last 3 years, institutions involved, salient outcomes may be collected and used in awarding scores.

<sup>1</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 5.4

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

**Assessment criteria**

Condition	Category <sup>+</sup>	(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 inadequately made available.	Good			
Systematic inventory provides the basis for maintenance schedule and adequate funds are made available.	Very good			

<sup>1</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## Outcomes

### 6.1

#### Assessment criteria\*

Are populations of threatened species especially key faunal species declining, stable or increasing?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Threatened/ endangered species populations declining.	Poor			
Some threatened/ endangered species populations increasing, most others stable.	Fair			
Most threatened/ endangered species populations increasing, most others stable.	Good			
All threatened/ endangered species populations either increasing or stable.	Very good			

\* 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. Comments on the population trends may be made under Remarks.

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

### 6.2

#### Assessment criteria

Have the threats to the site being reduced/ minimized or is there an increase?

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

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

### 6.3

#### Assessment criteria\*

Are the expectations of visitors generally met or exceeded?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Expectations of visitors generally not met.	Poor			
Expectations of many visitors are met.	Fair			
Expectations of most visitors are met.	Good			
Good expectations of most visitors are met.	Very good			

\* Is there any system of receiving/ analyzing visitor feedback?

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 6.4

**Assessment criteria\***

Are local communities supportive of PA management?

Condition	Category <sup>+</sup>	(Tick ✓)	Reference document(s)	Remarks
Local communities are hostile.	Poor			
Some are supportive.	Fair			
Most locals are supportive of PA management.	Good			
All local communities supportive of PA 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 dis-affection 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.

<sup>+</sup>Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

## 1.8

**MEE Score Card**

Framework Element Number	Framework Element Name	Number of Questions (a)	Maximum Mark per question (b)	Total (axb)	Marks obtained for the Element	Overall score %
1.	Context	03	10	30		
2.	Planning	09	10	90		
3.	Inputs	05	10	50		
4.	Process	05	10	50		
5.	Outputs	04	10	40		
6.	Outcomes	04	10	40		
<b>Total</b>		<b>30</b>		<b>300</b>		

\*Rating in %: Poor – Upto 40; Fair – 41 to 59; Good – 60 to 74; Very Good – 75 and above

1.9

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02

**MANAGEMENT  
EFFECTIVENESS  
EVALUATION OF NATIONAL  
PARKS AND WILDLIFE  
SANCTUARIES IN INDIA**

**Results: At A Glance 2015-2017**



## 2.1

## Overview of MEE of National Parks and Wildlife Sanctuaries, 2015 - 2017

A total of 80 Protected Areas (PAs) including 6 National Parks, 65 Wildlife Sanctuaries, 8 Bird Sanctuaries and one Alpine Sanctuary from 32 Indian States and Union Territories were subjected to evaluation under MEE process during 2015 to 2017. These 80 Protected Areas have been grouped in five regions viz. Northern, Southern, Eastern, Western and North-eastern regions. The Northern region includes 17 PAs from 7 States+UT, Southern region includes 16 PAs from 7 States, Eastern region includes 16 PAs from 5 States, Western region includes 15 PAs from 5 States+UT and North-eastern region includes 16 PAs from 8 States.

The overall mean MEE score is 62% with a range from 27.50% to 88.79%. The Southern region recorded highest mean MEE Score i.e. 73.89% with a range of 57.50 to 88.79%, followed by Western region 66.17% with a range of 47.50% to 82.50% and the lowest was in North-eastern region 52.25% with a range of 31.73% to 62.50% (Table 2.1).

Table 2.1

Region-wise number of PAs evaluated, mean MEE Score and range

Region Name	States	No. of States/ Uts	No. of PAs	Mean MEE Score %	MEE Score Range %
Northern	Chandigarh, Haryana, Himachal Pradesh, J & K, Punjab, Uttar Pradesh and Uttarakhand	7	17	57.92	45.69-80.00
Southern	A & N Islands, Andhra Pradesh, Goa, Karnataka, Kerala, Tamil Nadu and Telangana	7	16	73.89	57.50-88.79
Eastern	Bihar, Chhattisgarh, Jharkhand, Odisha and West Bengal	5	16	59.58	27.50-77.50
Western	Dadra and Nagar Haveli, Gujarat, Madhya Pradesh, Maharashtra and Rajasthan,	5	15	66.17	47.50-82.50
North-eastern	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim & Tripura	8	16	52.25	31.73-62.50
Total	32 States/Union Territories	80 (6 NP+ 74 WLS)	62.00	27.50-88.79	

## 2.2

## Region-wise performance of National Parks and Wildlife Sanctuaries

Region-wise MEE ratings of PAs have also been calculated. Overall 19% PAs (15 Nos.) are in 'Very Good' category, 36% PAs (29 Nos.) are in 'Good' category, 41% PAs (33 Nos.) in 'Fair' category and only 4% (3 Nos.) PAs are under 'Poor' category. Southern region recorded maximum PAs in 'Very Good' (7 Nos.) and 'Good' category (8 Nos.), North-eastern region recorded maximum PAs in 'Fair' category (13 Nos.) and Eastern region recorded 2 PAs in 'Poor' category (Table 2.2).

**Table 2.2**

 Region-wise  
 MEE ratings of  
 PAs

Regions	Total no. of PAs evaluated	Ratings*			
		Very Good	Good	Fair	Poor
Northern	17	1	6	10	0
Southern	16	7	8	1	0
Eastern	16	3	7	4	2
Western	15	4	6	5	0
North-eastern	16	0	2	13	1
Total	80	15	29	33	3
Percentage	19	36	41	4	

\*Rating in %: Poor – Upto 40; Fair - 41 to 59; Good - 60 to 74; Very Good - 75 and above

Individual scores of each and every National Park and Wildlife Sanctuary were calculated by the Regional Expert Committees (REC). Region-wise performance and best scored PAs and least scored PAs are discussed below.

A total of 17 PAs were evaluated in Northern region. They achieved an overall score of 171.18 out of 295.29 (57.92%), including 01 PA in 'Very Good' category, 06 PAs in 'Good' category, 10 PAs in 'Fair' category and no PA in 'Poor' category (Table 2.3). Sukhna WLS (Chandigarh) has the highest MEE score (80%-Very Good) while Hastinapur WLS (Uttar Pradesh) has the lowest MEE score (45.69%-Fair).

In Southern region, a total of 16 PAs were evaluated by REC, achieved mean score of 219.84 out of 297.50 (73.89%) including 07 PAs in 'Very Good' category, 08 PAs in 'Good' category, 01 PA in 'Fair' category and no PA in 'Poor' category (Table 2.4). Mahavir Harina Vanasthali NP (Telangana) has the highest MEE score (88.79%-Very Good) while Sri Penusila Narasimha WLS (Andhra Pradesh) has the lowest MEE score (57.50%-Fair).

A total of 16 PAs were evaluated in the Eastern region with mean MEE score of 59.58% (178.75 out of 300) including 03 PAs in 'Very Good' category, 07 PAs in 'Good' category, 04 PAs in 'Fair' category and 02 PAs in 'Poor' category (Table 2.5). Lothian Island WLS (West Bengal) has the highest MEE score (77.50%-Very Good) while Kusheshwar Asthan Bird Sanctuary (Bihar) has the lowest MEE score (27.50%-Poor).

A total of 15 PAs were evaluated in the Western region with mean MEE score of 66.17% (198.50 out of 300) including 04 PAs in 'Very Good' category, 06 PAs in 'Good' category, 05 PAs in 'Fair' category and no PA in 'Poor' category (Table 2.6). Phen Wildlife Sanctuary (Madhya Pradesh) has the highest MEE score (82.50%-Very Good) while Bagdara Wildlife Sanctuary (Madhya Pradesh) has the lowest MEE score (47.50%-Fair).

In North-eastern region, a total of 16 PAs were evaluated with mean MEE score of 171.09 out of 269.38 (52.25%) including no PA in 'Very Good' category, 02 PAs in 'Good' category, 13 PAs in 'Fair' category and only one PA in 'Poor' category (Table 2.7). Deepor Beel Wildlife Sanctuary (Assam) has the highest MEE score (62.50%- Good) while Borail Wildlife Sanctuary (Assam) has the lowest MEE score (31.73%-Poor).

**Table 2.3**

Individual ratings of National Parks and Wildlife Sanctuaries in Northern region

Region	State	PA	MEE Score	Maximum Marks	Percentage	MEE Rank/Category
NORTHERN REGION	Chandigarh	Sukhna Wildlife Sanctuary	240.00	300	80.00	Very Good
	Haryana	Chhilchhila Wildlife Sanctuary	185.00	300	61.67	Good
	Haryana	Khol Hi Raitan Wildlife Sanctuary	160.00	280	57.14	Fair
	Himachal Pradesh	Manali Wildlife Sanctuary	160.00	300	53.33	Fair
	Himachal Pradesh	Pong Dam Wildlife Sanctuary	195.00	300	65.00	Good
	Himachal Pradesh	Rupi Bhaba Wildlife Sanctuary	192.50	300	64.17	Good
	Himachal Pradesh	Shimla Water Catchment Wildlife Sanctuary	182.50	290	62.93	Good
	Jammu & Kashmir	Gulmarg Wildlife Sanctuary	155.00	300	51.67	Fair
	Jammu & Kashmir	Karakoram Wildlife Sanctuary	182.50	300	60.83	Good
	Punjab	Bir Bhadson Wildlife Sanctuary	172.50	280	61.61	Good
	Punjab	Harike Wildlife Sanctuary	165.00	300	55.00	Fair
	Uttar Pradesh	Chandraprabha Wildlife Sanctuary	172.50	300	57.50	Fair
	Uttar Pradesh	Hastinapur Wildlife Sanctuary	132.50	290	45.69	Fair
	Uttar Pradesh	Okhla Bird Sanctuary	165.00	300	55.00	Fair
	Uttar Pradesh	Soor Sarovar Bird Sanctuary	162.50	300	54.17	Fair
	Uttarakhand	Askot Musk Deer Wildlife Sanctuary	132.50	280	47.32	Fair
	Uttarakhand	Binsar Wildlife Sanctuary	155.00	300	51.67	Fair
<b>Mean Score</b>		<b>171.18</b>		<b>57.92</b>		

**Table 2.4**

Individual ratings of National Parks and Wildlife Sanctuaries in Southern region

Region	State	PA	MEE Score	Maximum Marks	Percentage	MEE Rank/Category
SOUTHERN REGION	Andaman & Nicobar Islands	Lohabarrack Wildlife Sanctuary	202.50	290	69.83	Good
	Andaman & Nicobar Islands	Mount Harriet National Park	212.50	300	70.83	Good
	Andaman & Nicobar Islands	Rani Jhansi Marine National Park	185.00	290	63.79	Good
	Andhra Pradesh	Sri Penusila Narasimha Wildlife Sanctuary	172.50	300	57.50	Fair
	Goa	Cotigaon Wildlife Sanctuary	212.50	300	70.83	Good
	Karnataka	Bannerghatta National Park	217.50	300	72.50	Good
	Karnataka	Bhimgad Wildlife Sanctuary	240.00	300	80.00	Very Good
	Karnataka	Cauvery Wildlife Sanctuary	237.50	300	79.17	Very Good
	Karnataka	Gudavi Bird Sanctuary	210.00	300	70.00	Good
	Kerala	Idukki Wildlife Sanctuary	242.50	300	80.83	Very Good
	Kerala	Mathikettan Shola National Park	245.00	300	81.67	Very Good
	Tamil Nadu	Kanyakumari Wildlife Sanctuary	232.50	300	77.50	Very Good
	Tamil Nadu	Pulicat Lake Bird Sanctuary	235.00	300	78.33	Very Good
	Telangana	Mahavir Harina Vanasthali National Park	257.50	290	88.79	Very Good
	Telangana	Manjeera Wildlife Sanctuary	217.50	300	72.50	Good
	Telangana	Pakhal Wildlife Sanctuary	197.50	290	68.10	Good
<b>Mean Score</b>		<b>219.84</b>			<b>73.89</b>	

Table 2.5

Individual ratings of National Parks and Wildlife Sanctuaries in Eastern region

Region	State	PA	MEE Score	Maximum Marks	Percentage	MEE Rank/Category
EASTERN REGION	Bihar	Gautam Buddha Wildlife Sanctuary	105.00	300	35.00	Poor
	Bihar	Kusheshwar Asthan Bird Sanctuary	82.50	300	27.50	Poor
	Chhattisgarh	Badalkhol Wildlife Sanctuary	180.00	300	60.00	Good
	Chhattisgarh	Bhairamgarh Wildlife Sanctuary	160.00	300	53.33	Fair
	Chhattisgarh	Bhoramdev Wildlife Sanctuary	205.00	300	68.33	Good
	Chhattisgarh	Tamor Pingla Wildlife Sanctuary	177.50	300	59.17	Fair
	Jharkhand	Palkot Wildlife Sanctuary	187.50	300	62.50	Good
	Jharkhand	Udhwa Lake Bird Sanctuary	180.00	300	60.00	Good
	Odisha	Debrigarh Wildlife Sanctuary	225.00	300	75.00	Very Good
	Odisha	Kapilash Wildlife Sanctuary	187.50	300	62.50	Good
	Odisha	Kotagarh Wildlife Sanctuary	205.00	300	68.33	Good
	Odisha	Lakhari Valley Wildlife Sanctuary	167.50	300	55.83	Fair
	West Bengal	Ballavpur WLS	182.50	300	60.83	Good
	West Bengal	Lothian Island WLS	232.50	300	77.50	Very Good
	West Bengal	Ramnabagan WLS	155.00	300	51.67	Fair
	West Bengal	Senchal WLS	227.50	300	75.83	Very Good
		<b>Mean Score</b>	<b>178.75</b>		<b>59.58</b>	

Table 2.6		Region	State	PA	MEE Score	Maximum Marks	Percentage	MEE Rank/Category
Individual ratings of National Parks and Wildlife Sanctuaries in Western region	WESTERN REGION	Gujarat	Dadra & Nagar Haveli	Dadra and Nagar Haveli Wildlife Sanctuary	172.50	300	57.50	Fair
			Gujarat	Balaram Ambaji Wildlife Sanctuary	180.00	300	60.00	Good
			Gujarat	Girnar Wildlife Sanctuary	235.00	300	78.33	Very Good
			Gujarat	Khijadiya Bird Sanctuary	190.00	300	63.33	Good
			Gujarat	Nal Sarovar Bird Sanctuary	225.00	300	75.00	Very Good
		Gujarat	Gujarat	Vansda National Park	227.50	300	75.83	Very Good
			Madhya Pradesh	Bagdara Wildlife Sanctuary	142.50	300	47.50	Fair
			Madhya Pradesh	Ghatigaon Hukna Wildlife Sanctuary	155.00	300	51.67	Fair
			Madhya Pradesh	Ken Gharial Wildlife Sanctuary	207.50	300	69.17	Good
		Madhya Pradesh	Madhya Pradesh	Phen Wildlife Sanctuary	247.50	300	82.50	Very Good
			Maharashtra	Dnyanganga Wildlife Sanctuary	222.50	300	74.17	Good
			Maharashtra	Phansad Wildlife Sanctuary	212.50	300	70.83	Good
		Maharashtra	Maharashtra	Radhanagri Wildlife Sanctuary	217.50	300	72.50	Good
			Maharashtra	Tansa Wildlife Sanctuary	175.00	300	58.33	Fair
		Rajasthan	Rajasthan	Bhainsrodgarh Wildlife Sanctuary	167.50	300	55.83	Fair
				<b>Mean Score</b>	<b>198.50</b>		<b>66.17</b>	

Table 2.7

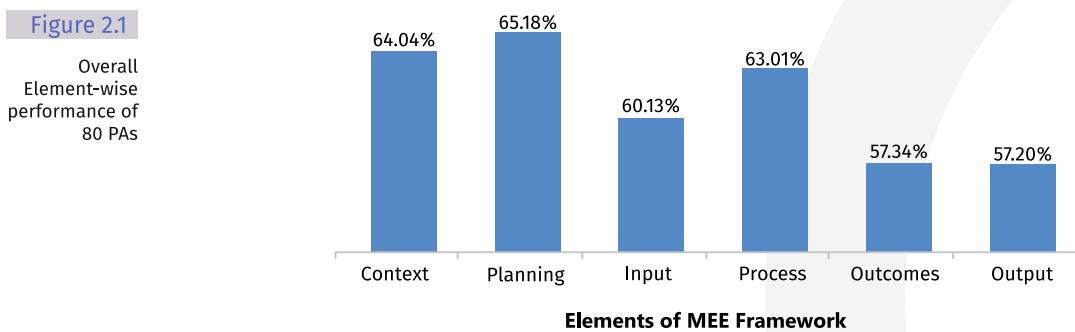
Individual ratings of National Parks and Wildlife Sanctuaries in North-eastern region

Region	State	PA	MEE Score	Maximum Marks	Percentage	MEE Rank/Category
NORTH-EASTERN REGION	Arunachal Pradesh	Kamlang Wildlife Sanctuary	117.50	230	51.09	Fair
	Arunachal Pradesh	Kane Wildlife Sanctuary	130.00	260	50.00	Fair
	Assam	Amchang Wildlife Sanctuary	127.50	260	49.04	Fair
	Assam	Borail Wildlife Sanctuary	82.50	260	31.73	Poor
	Assam	Deepor Beel Wildlife Sanctuary	175.00	280	62.50	Good
	Assam	Dehing Patkai Wildlife Sanctuary	137.50	290	47.41	Fair
	Assam	Sonai Rupai Wildlife Sanctuary	135.00	270	50.00	Fair
	Manipur	Yangoupokpi Lokchao Wildlife Sanctuary	142.50	280	50.89	Fair
	Meghalaya	Siju Wildlife Sanctuary	150.00	300	50.00	Fair
	Mizoram	Lengteng Wildlife Sanctuary	155.00	270	57.41	Fair
	Mizoram	Tawi Wildlife Sanctuary	150.00	270	55.56	Fair
	Mizoram	Tokalo Wildlife Sanctuary	135.00	250	54.00	Fair
	Nagaland	Puliebadze Wildlife Sanctuary	102.50	190	53.95	Fair
	Sikkim	Kyongnosla Alpine Sanctuary	165.00	300	55.00	Fair
	Sikkim	Maenam Wildlife Sanctuary	182.50	300	60.83	Good
	Tripura	Rowa Wildlife Sanctuary	170.00	300	56.67	Fair
<b>Mean Score</b>		<b>141.09</b>			<b>52.25</b>	

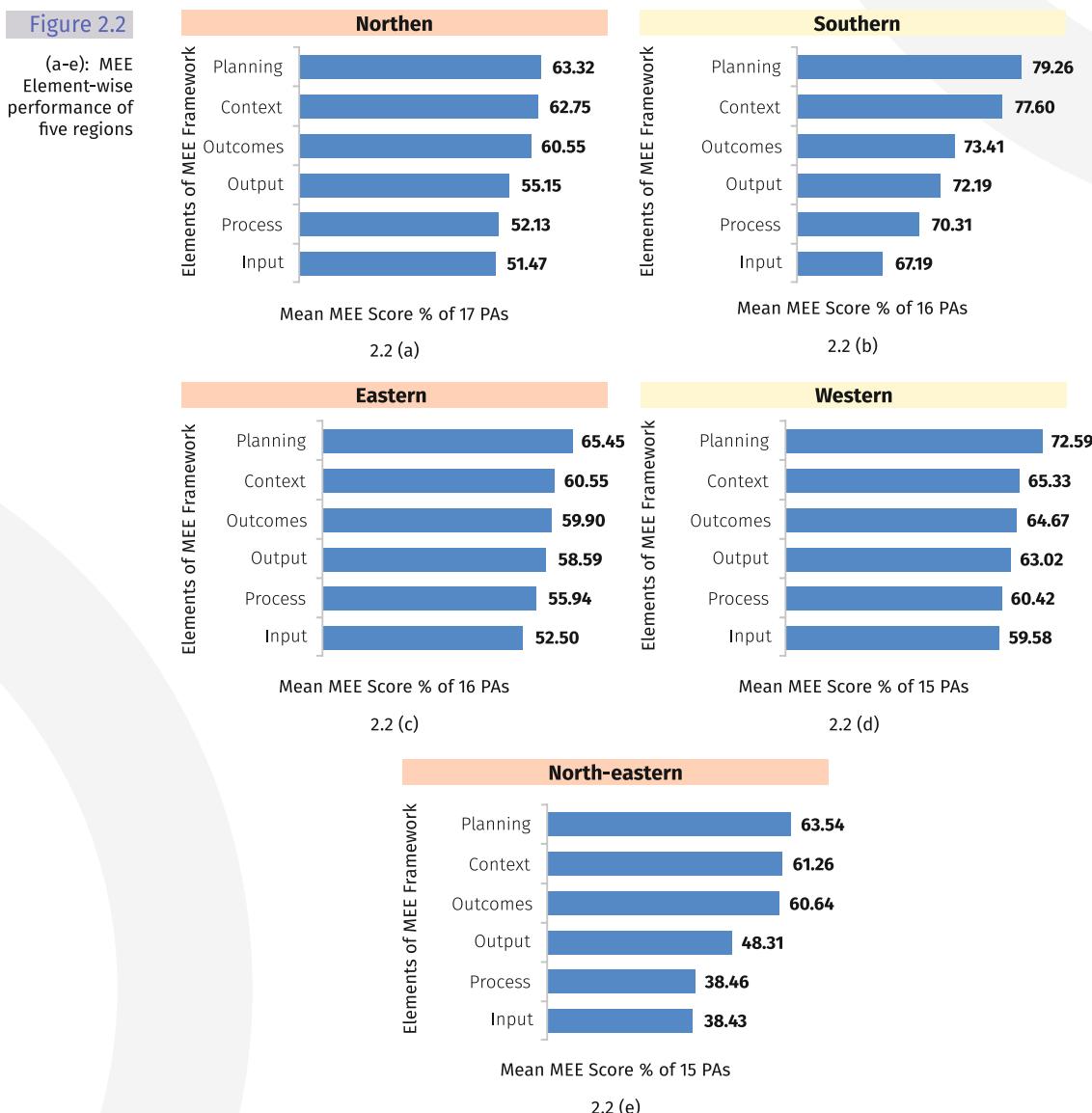
2.3

## Element-wise performance

There are thirty 'headline indicators in MEE process. These 30 headline indicators have been divided into six elements of MEE Framework, i.e. Context, Planning, Input, Process, Output and Outcomes. All the 80 PAs have been analysed on the basis of these 30 headline indicators and 6 elements of MEE process. Planning has the highest MEE score 65.18% followed by Context 64.04% while Output has the lowest MEE score 57.20% followed by Outcomes 57.34% (Figure 2.1).



Region-wise variations in 6 elements of MEE process have also been analysed. In Northern region, the element 'Planning' has the highest score 63.32% while 'Input' has the lowest score 51.47%. (Figure 2.2-a). In Southern region, 'Process' has the highest score 79.26% while 'Output' has the lowest score 67.10% (Figure 2.2-b). In Eastern region, 'Context' has the highest score 65.45% while 'Outcomes' has the lowest score 52.50% (Figure 2.2-c). In Western region, 'Planning' has the highest score 72.59% while 'Process' has the lowest score 59.58% (Figure 2.2-d). In North-eastern region, 'Process' has the highest score 63.54% while 'Output' has the lowest score 38.43% (Figure 2.2-e).



2.4

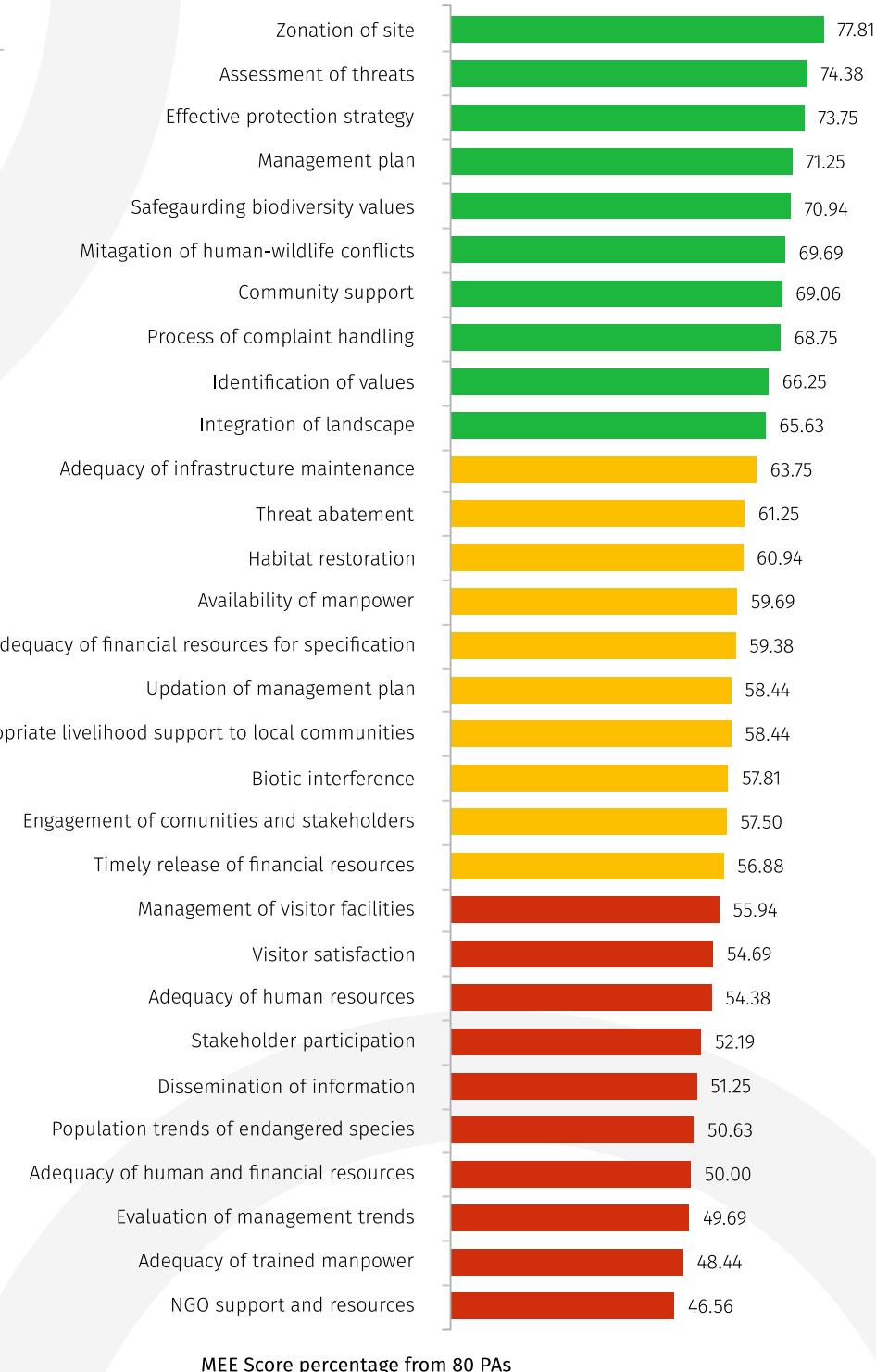
## Performance of Headline Indicators

The relative performance of 30 headline indicators based on MEE of 80 PAs is shown in Figure 2.3. 'Zonation of the site' followed by 'Assessment of threats' had the best rating, while NGO support and resources' followed by 'Adequacy of trained manpower' had the lowest ratings across all the 80 National Parks and Wildlife Sanctuaries.

Figure 2.3

Performance of headline indicators

30 'Headline Indicators'



MEE Score percentage from 80 PAs

2.5

## Comparison of current MEE Results with previous MEE Exercises

A comparison of current MEE exercise has been done with previous MEE exercise of PAs. There is an increase of 2% in overall MEE score from previous MEE exercise of National Parks and Wildlife Sanctuaries 2006-14. Region-wise, Northern, Southern and Western regions have recorded an increase in mean MEE score, whereas Eastern and North-eastern region have recorded a decrease in mean MEE score (Table 2.8).

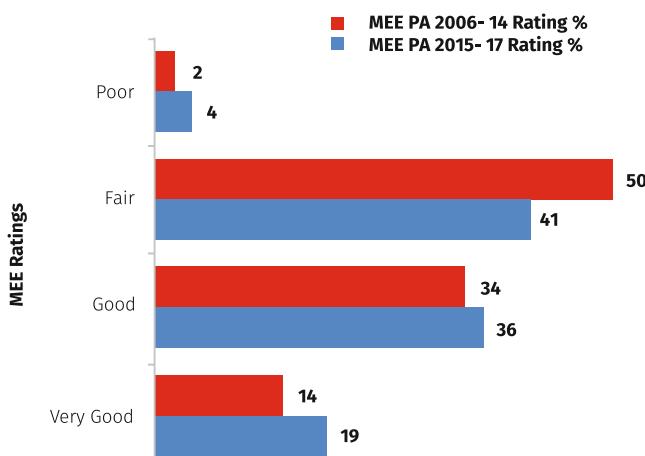
By comparing the ratings of current MEE exercise with previous MEE ratings of National Parks and Wildlife Sanctuaries 2006-14, an increase of 5% in 'Very Good' category, 2% increase in 'Good' category, 9% decrease in 'Fair' category and 2% increase in 'Poor' category is observed (Figure 2.4).

**Table 2.8**  
 Comparison of current mean MEE PA Score with previous MEE PA results

Regions	Mean MEE Score % in MEE PA 2006-14	Mean MEE Score % in current MEE PA 2015-17	Status
Northern	55.30	57.92	▲
Southern	65.10	73.89	▲
Eastern	60.80	59.58	▼
Western	58.90	66.17	▲
North-eastern	63.90	52.25	▼
Total	60.80	62.00	▲

**Figure 2.4**

Figure 2.4  
 Comparison of current MEE PA (2015-17) ratings with previous MEE PA (2006-14) ratings







03

**MANAGEMENT  
STRENGTHS,  
WEAKNESSES AND  
IMMEDIATE  
ACTIONABLE POINTS**

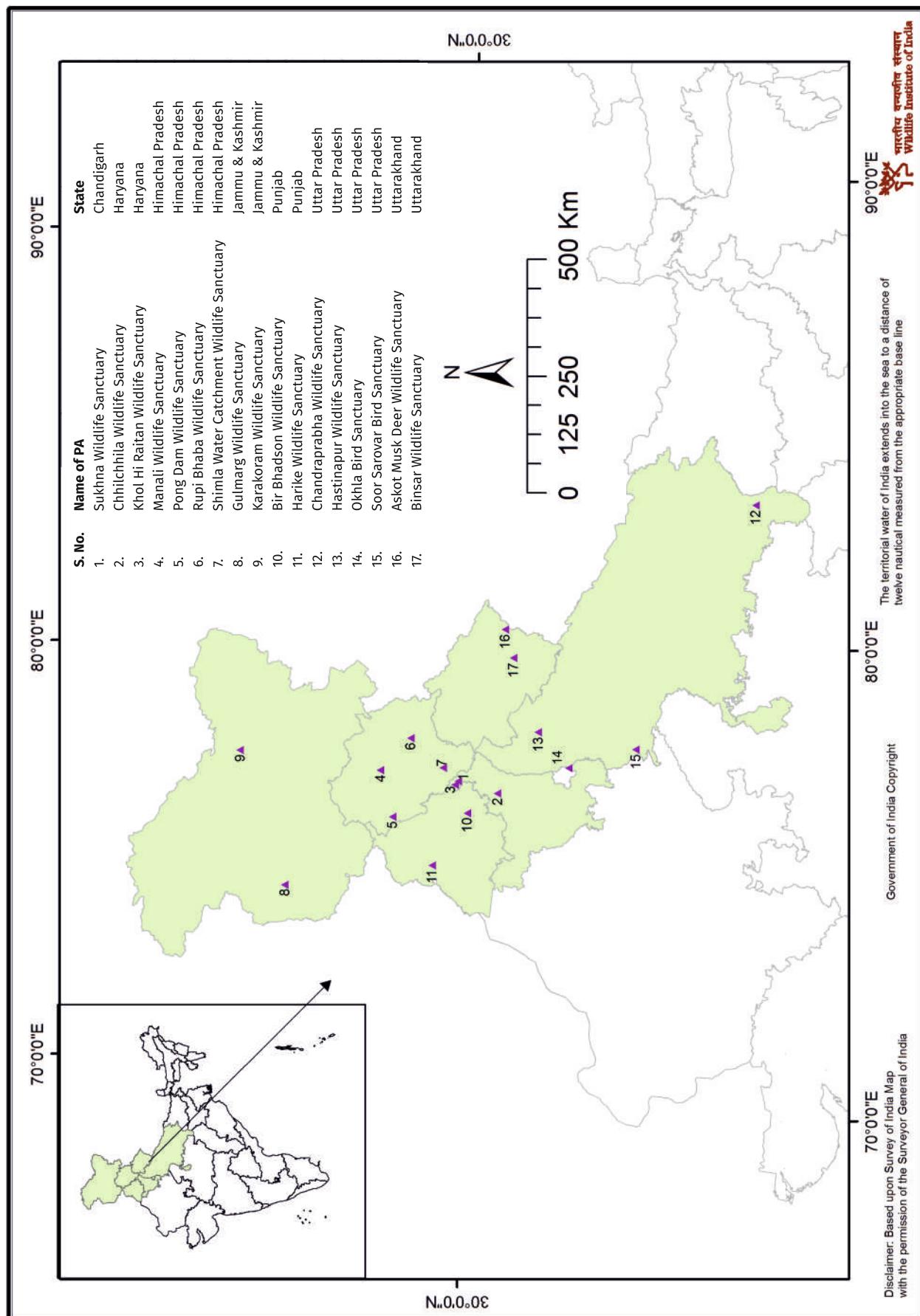
**NORTHERN REGION**



## 3.1

## NORTHERN REGION

S. No.	State	Protected Area
1.	Chandigarh	Sukhna Wildlife Sanctuary
2.	Haryana	Chhilchhila Wildlife Sanctuary
3.	Haryana	Khol Hi Raitan Wildlife Sanctuary
4.	Himachal Pradesh	Manali Wildlife Sanctuary
5.	Himachal Pradesh	Pong Dam Wildlife Sanctuary
6.	Himachal Pradesh	Rupi Bhaba Wildlife Sanctuary
7.	Himachal Pradesh	Shimla Water Catchment Wildlife Sanctuary
8.	Jammu & Kashmir	Gulmarg Wildlife Sanctuary
9.	Jammu & Kashmir	Karakoram Wildlife Sanctuary
10.	Punjab	Bir Bhadson Wildlife Sanctuary
11.	Punjab	Harike Wildlife Sanctuary
12.	Uttar Pradesh	Chandraprabha Wildlife Sanctuary
13.	Uttar Pradesh	Hastinapur Wildlife Sanctuary
14.	Uttar Pradesh	Okhla Bird Sanctuary
15.	Uttar Pradesh	Soor Sarovar Bird Sanctuary
16.	Uttarakhand	Askot Musk Deer Wildlife Sanctuary
17.	Uttarakhand	Binsar Wildlife Sanctuary



## Sukhna Wildlife Sanctuary, Chandigarh

### A. Management Strengths

1. This protected area (PA) has an approved management plan (2007–2017) that is being implemented well.
2. The PA is mostly free from encroachment.
3. There are no villages inside the PA, and only five villages are present in the fringe.
4. There is no dependence on the PA as the local villagers are employed elsewhere and are well off. Most people are reported to have good relations with the management of the PA owing to a few benefits that the PA brings to them (some employment, water security, etc.).
5. The biodiversity is representative of the lower Shiwalik sub-tropical forests.
6. The groundwater regime is supported by the healthy lake.
7. A large number of soil and moisture conservation works, as suggested in the approved management plan, have been sanctioned and successfully carried out in the PA. More than 180 soil conservation structures have been erected in the PA.
8. Vulnerable areas along habitations, especially along the southern border of the PA, have been fenced.
9. The number of visitors is large, but the tourism is regulated and is mainly along the bund and about six specifically marked trekking routes. There are only two well-maintained entry points.
10. No forest/wildlife offence cases have been reported in the last 5–6 years.
11. There is an interpretation centre, and this is visited by large numbers of tourists every year.
12. Timely and adequate release of funds is a practice in the state, and the PA benefits from this in the planning and completion of works.

### B. Management Weaknesses

1. No major top carnivores have been identified. There may however be smaller felids such as the fishing cat and caracal and canids such as the jackal. Leopards have sometimes been reported, these may be seasonal visitors.
2. There are 200–300 feral cows, which can damage the vegetation, especially in the absence of a large carnivore.
3. There is a lack of staff members trained in wildlife management. Although some officers have been trained in wildlife management, most of the frontline staff has not been trained in wildlife management.
4. No wildlife census has been conducted after 2010, when one was conducted with the assistance of WII. The PA is a small area, and close monitoring and censuses may be carried out with a trained staff, volunteers and scientists.
5. A dog problem has been emerging over the past few years. This can be aggravated when prey is available in the form of feral cows, water birds, etc.

6. Adhatoda vasica, even though it is a native species, is often considered a weed as it is not palatable and can spread far, masking any other palatable ground vegetation. It does have some untapped medicinal value (<http://nif.org.in/ADHATODA-VASICA-L>) and is important as cover for wildlife.

### C. Immediate Actionable Points

1. The relevant zones in the sanctuary should be declared according to the management plan's prescription (page 45 of management plan).
2. Wildlife training is to be provided to the staff so that they can effectively monitor all wildlife taxa. With the PA being small and compact, it is possible for the staff to learn specific skills (arachnids, insects, birds, photography, etc.), which can ultimately help make the monitoring of the PA effective and continuous. The number of staff members in this small state on the whole is sufficient, but we recommend that an RFO and a few guards be posted exclusively for the PA.
3. Local people and the wildlife staff members can also be trained as nature guides to enhance the visitor experience.
4. A comprehensive large-mammal wildlife census should be carried out as soon as possible. The assistance of organizations such as WII may be sought again till local capacity is built.
5. We found Eucalyptus covering a large proportion of the PA, thus masking much of the representative plant species that the area can conserve. We thus suggest that Eucalyptus be removed in a phased manner. The removal of Eucalyptus can be included in the management plan to be prepared and implemented from 2017. Lantana can also be removed simultaneously and the typical sub-tropical Shiwalik forest type restored using native tree, shrub and herb species. The removal of any trees, shrubs, etc. should be done keeping in view the various orders and guidelines issued by different courts, the MoEFCC, etc.
6. The Eco-Sensitive Zone (ESZ) should be made large enough to maintain the essential features of the wildlife sanctuary (WLS).
7. Sukhna WLS should be transferred from Punjab to the Union Territory of Chandigarh according to the provisions of the Punjab Reorganization Act 1966 for optimal management.
8. A total area of 450 acres is to be acquired for establishing a 2 km long corridor between Sukhna lake and the WLS. An extent of 75 acres has been acquired. The acquisition of land can be expedited so that the PA is expanded to a more ecologically meaningful unit. This can also reduce to some extent the threat of encroachment from the southern borders and provide access to the lake for wildlife.
9. In the absence of large carnivores, the feral cattle, already numbering around 300 in just 26 km<sup>2</sup>, can potentially degrade the forests and compete with wild herbivores. It is important to institute a management strategy for them, including mass sterilizations, stopping any further release by villagers and translocation into gaushalaas wherever possible. This strategy should in compliance with the existing animal welfare laws of the country.
10. Similarly, there is an unknown population of free-ranging dogs in the PA. As has been seen in different parts of the country and the world, such dogs can seriously deplete local wildlife, from birds to mammals. They may be sustained by nearby garbage sites and hunt animals whenever they get a chance. A management strategy should be developed for tackling this issue in compliance with the existing animal welfare laws of the country.
11. Part of the revenues from rentals, etc. of the gymkhana, club and car park near Sukhna Lake could be ploughed back into the funds of the WLS.

## Chhilchhilla Wildlife Sanctuary, Haryana

### A. Management Strengths

1. As a result of the easy accessibility of the WLS, the staff and the manager of PA visit it frequently, and so the management of the PA improves continuously.
2. The PA is rich in historical values.
3. The PA has good potential as a wetland ecosystem and can be developed into a good bird sanctuary.
4. The PA provides a good wintering/breeding ground for many migratory and resident birds.
5. The public support for the PA is adequate.
6. Adequate funds are released in a timely manner. This the staff ample time to carry out the necessary protection and development works.
7. Trained human resources (DFO, Inspector (RO) and well-trained field staff) are available in the PA for handling various issues such as human-animal conflicts and census operations.
8. Motorcycles and other equipment are available in the PA.
9. The adjacent landscape is conducive for resident and migratory bird species, and there are no major threats to the WLS.
10. No major wildlife and forest offence cases have been reported during the last few years.
11. It is a potential ecotourism site that, if developed and maintained as a good bird sanctuary, may attract many tourists and nature lovers.
12. There is no habitation inside the WLS except a temple on its boundary.

### B. Management Weaknesses

1. The WLS, being a small and isolated area surrounded by agricultural and other land use, is difficult to manage.
2. Because of intensive paddy/wheat cropping, pesticide and fertiliser runoff enters the sanctuary.
3. The area, being dependent on rainwater, faces a lot of uncertainty regarding the availability of water.
4. There is a shortage of dedicated staff in the sanctuary.
5. There is no fencing on the boundary of the PA.
6. There is a wide opening in the embankment, because of which water drains away from the sanctuary.
7. There are no proper mounds for birds to nest on within the WLS.
8. Many eucalyptus trees that were planted long back in the area still exist. They are not conducive for birds.
9. The existence of the temple may cause disturbances in the sanctuary.
10. There is no proper approach road to the sanctuary.
11. The PA does not have any interpretation centre.
12. There is a lack of publicity for the PA. It does not have good or adequate publicity material.

### C. Immediate Actionable Points

1. Adequate field-level staff, including one sub-inspector, two forest guards and two watchers should be deployed in the WLS.
2. A pucca wall and entry gate should be constructed.
3. The broken portion of the bund on the eastern side should be repaired to maintain the minimum level of water inside the PA.
4. A spillway should be provided for safe drainage of wastewater.
5. Five or six earthen mounds of irregular shape should be made at different places inside the water body, and planting of *Acacia nilotica* should be done on the mounds.
6. It should be ensured that no construction or extension of buildings is taken up in the temple in the WLS.
7. A pucca approach road should be constructed so that the staff can move easily.
8. The required action may be taken up against the nearby polluting industry, which is causing adverse impacts on the flora and fauna of the WLS.
9. One interpretation centre having signage that highlights the historical and biodiversity values should be set up near the entry gate.
10. The WLS should be publicized extensively through the print and electronic media.
11. Crop diversification in the immediate vicinity of the sanctuary should be encouraged to reduce the pesticide and fertilizer runoff in the WLS.
12. Ecodevelopment committees (EDCs) should be constituted at the earliest.
13. An awareness programme for encouraging the use of organic farming should be taken up.
14. Sections on monitoring and evaluation, updating the plan and prescriptions need to be incorporated in the management plan.
15. A section on human-wildlife conflicts should be incorporated in the management plan. Conflicts should be addressed on a priority basis.
16. Benchmark studies of the area should be carried out involving university scholars or institutions such as WII and BNHS, and periodical studies undertaken at intervals of 5 years or so.
17. Censuses should be carried out regularly to discern the trends of populations of various species.

## Khol Hi Raitan (Morni Hills) Wildlife Sanctuary, Haryana

### A. Management Strengths

1. The final notification of Khol Hi Raitan Wildlife Sanctuary (WLS) has been issued.
2. An ecosensitive zone with width varying between 0 and 925 m was notified on 3 June 2009.
3. The forest cover is good, and there are only a few degraded areas within the WLS.
4. There is strict protection in the WLS, and no poaching activities have been reported.

5. The water regime is good. There are both natural and artificial tanks (10 open tanks and one guzzler, with two more guzzlers under construction). Most of these water bodies have water throughout the year. Only the guzzler requires replenishment during the pinch period (March-June).
6. The number of vehicles (one Bolero for the DFO, one motorcycle for the guards) available to the staff of the WLS is sufficient.
7. The funds are adequate (totalling about Rs.50 lakhs) and are released in a timely manner (30% in Quarter 1, 25% in Quarter 2, 20% in Quarter 3 and 25% in the last quarter). The funds are utilized fully.
8. The people are generally supportive of the WLS. They cooperate with the staff/management of the WLS and provide information.
9. A secret fund has been available since last year, for better gathering of information.
10. The territorial staffs are bound by duty to engage in fire extinguishing tasks in the WLS.
11. A bird safari and a trail within this safari have been created for visitors.
12. There is no encroachment in the WLS.
13. There are no habitations inside the WLS.
14. Around 80% of the boundary pillars have been constructed/ repaired.
15. The prey base (Goral, Barking Deer, Wild Pig, Rhesus Macaque, Blue Bull and Sambar) available for the flagship species, the Leopard, is good.
16. With the proximity to Chandigarh and the ease of approach by road, there is potentially a very large number of visitors.
17. The staffs are trained in wildlife management. The DFO has attended a 3 month certificate course at WII, and the FG has undergone a 6 month wildlife training programme at Bandhavgarh as well as attended refresher courses.
18. The infrastructure available for the management of the WLS is adequate.
19. The office of the RFO is equipped with computer and landline broadband facilities.

## B. Management Weaknesses

1. Zonation has not been carried out for management of the WLS.
2. There are very few staff members to manage the WLS (one Inspector, one WLG and one daily wage labourer).
3. Plantation work is undertaken by the territorial wing according to their requirements and not according to the needs of the wildlife.
4. The wireless sets have become old and non-functional and have not been replaced.
5. The staff members are not reimbursed for calls made using their mobile phones.
6. Grazing is prevalent in some areas of the WLS.
7. There is dual administrative control of the WLS (wildlife offence cases are dealt with by the wildlife staff, whereas forest offence cases inside the WLS are being dealt with by the territorial staff).
8. The area has been declared a WLS, but the corresponding territorial staff have not been transferred to the Wildlife Wing.
9. There is no promotional avenue for state wildlife service officers.

### C. Immediate Actionable Points

1. The management plan needs to be improved upon and approval obtained subsequently at the earliest.
2. The information gathering system should be strengthened.
3. An interpretation centre should be established at Berwala, which is a strategic location.
4. After the WLS was declared, only the area was transferred to the Wildlife Wing but not the staff. The corresponding staff need be transferred to the Wildlife Wing now so that the protection and development works are improved.
5. The work of fixing boundary pillars (new and repairs) needs to be completed at the earliest.
6. Staff members can be reimbursed for mobile phone charges (up to a certain limit).
7. Plantation work has to be carried inside the WLS in consultation with the Wildlife Wing or by the Wildlife Wing itself.
8. Promotional avenues need to be created/ revived for Divisional Wildlife Wardens and Class II Divisional Wildlife Officers to motivate them.
9. Ecodevelopment committees need to be established so that the interface between the WLS and the human populations on the fringes is improved.
10. One check post needs to be established at Mandhana.
11. Nature trails with vantage viewing points should be created within the WLS.
12. Brochures providing information about the salient features and attributes of the WLS need to be made available to the public.
13. Entry fees can be charged at Berwala and Mandhana.
14. Considering the practical difficulties in the field (searching and frisking), lady forest guards can be deployed at the WLS.

4

## Manali Wildlife Sanctuary, Himachal Pradesh

### A. Management Strengths

1. The WLS has no network of roads and is therefore relatively free of vehicular disturbances and offenders.
2. Many areas have a mobile network, which facilitates quick communication related to fire and general protection work. As such, the fire hazard is reported to be of a limited nature.
3. There is adequate rainfall in this belt, and so the regeneration of trees of most species is quite good.
4. There is no mining inside the WLS or nearby.
5. The legal notification of the WLS was issued in 2013, and there are no habitations in the PA at present. The dependence on the PA for its resources by the local people is low.
6. The PA has rich biodiversity and scenic value representative of a 'transition zone' of sorts between the Greater and Trans Himalayan zones.

7. The PA is perceived to be a good, perennial water source due to its glacial streams.
8. The proximity to Manali Town presents an excellent opportunity for creating awareness among the many visitors this town receives. The potential for utilizing the PA for ecotourism models that can raise substantial revenue for its conservation is high.
9. The contiguous wilderness on all sides except the east affords possibilities of conservation of a larger landscape.

## B. Management Weaknesses

1. There is no management plan (the management plan expired in 2014). A new management plan has been prepared, but it has not been approved. As pointed out in the evaluation document, there are some areas where more work is required (values of PA, stakeholder participation, monitoring protocols, zonation, etc.) before the draft management plan can be approved.
2. Inadequacy and late release of funds for development and management of the WLS is a persistent issue.
3. There is no system of regular monitoring of the flora and fauna of the WLS. As a result, the biodiversity values and the status of some of the key species are not understood well. Defining some target priority species, such as the musk deer, goral, snow leopard and pheasants, can be helpful. No proper benchmark data on wildlife are available.
4. There is a shortage of staff members. There are only one Deputy Range Officer and two forest guards in the PA (one post of forest guard is vacant).
5. There is no vehicle for dedicated use in the WLS, which makes the movement of the staff and protection of the sanctuary difficult.
6. None of the PA staff members is trained in wildlife management; however, the division has just one forest guard who has undergone training at the Sai Ropa training facility in Great Himalayan National Park.
7. The PA faces non-availability of labour due to the proximity of the tourist town of Manali. This often impedes works even when funding is available.
8. The communication network in the sanctuary is poor (there is no proper wireless network inside).
9. The boundary along the south of the PA, in areas adjacent to Manali Town, is porous. Some encroachment has been reported.
10. Around 2000-3000 sheep and goats of migratory herders on their way to Bara Bangal and Lahaul pass through the sanctuary (they go in April-May and come back in September-October) and possibly deplete the forage available for wild ungulates. This is especially so when they pass through the area at the end of the growing season in autumn.

## C. Immediate Actionable Points

1. The staff needs to be increased—at least six forest guards and one Deputy Range Officer must be posted in the sanctuary as according to the estimates of the managers of the PA.
2. One multi-utility vehicle will be used in moving material and labourers to areas near working sites and in patrolling.

3. The timely release of funds needs to be ensured so that the managers can carry out the necessary works under the management plan in the relatively short working season between May and October.
4. Research projects needed by the WLS must be taken up in collaboration with WII, BSI, ZSI, technical NGOs, universities, etc. The potential for conducting useful ecological studies, especially those dealing with bird and ungulate communities, impacts of grazing, etc., in the area is great. Many of these studies can be conducted through student and intern projects of state-level universities with the co-guidance of scientists from institutes of repute in the field. The use of camera trapping studies for general biodiversity assessment is an important option for better exploration of the PA's wildlife values.
5. On a similar note, a baseline survey must also be carried out using the services of research scholars and trained volunteers as per species-specific monitoring protocols. This can fulfil the important need of carrying out periodic censuses/monitoring of target species. It may be noted that many conservation areas in the country have taken advantage of such trained manpower for getting reliable information about wildlife and fulfilling the goals of awareness generation and outreach at the same time.
6. The new management should be finalized and approval obtained at the earliest. Careful articulation of the values, management objectives, zonation, monitoring protocols and periodic appraisals should also be included.
7. Some contiguous forests (around 50 km<sup>2</sup>) should be included in the WLS or its administrative control given to the DFO Wildlife. Similarly, the area around Hanuman Tibba (the highest point in the north-west of this range), which has ibex and musk deer habitats and is potentially snow leopard habitat, should be included in the PA for integrated management of the whole catchment area. This area could be managed using a landscape approach even if it is not added to the WLS.
8. The interpretation centre should be enriched with enhanced content relating to Manali WLS. As noted earlier, Manali Town has more than a few lakh visitors every year, but only a very small proportion of these visit the interpretation centre. The centre is located at possibly the most easily accessible place in town and should be used to spread conservation messages and provide correct information about the PA, the values of the Middle and Greater Himalaya and regulated treks and outings into a clearly designated tourism zone in the PA.
9. As mentioned previously, it will be advisable to designate a tourism zone with trekking trails, huts, etc. In this region it will also be useful to have aesthetically placed signage informing visitors about wildlife and cultural values, good vantage points, camping sites and huts, and do's and don'ts.
10. Around 2000-3000 sheep and goats pass through the WLS. They are taken by seven or eight herder groups to Bada Bangal and Lahaul. It is important to understand their use of the area better and regulate it so that they either find an alternative route or spend minimal time in the PA.

## Pong Dam Lake Wildlife Sanctuary, Himachal Pradesh

### A. Management Strengths

1. This is the largest man-made wetland of India (307 km<sup>2</sup>), 160 km<sup>2</sup> of which is in the WLS and was declared a Ramsar Site in 2002.
2. More than 50,000 Barheaded Geese visit Pong Lake every year during winter.
3. The largest number of bird species (425) to be found in any PA of western India, and 35% of all the bird species of India, is found in the WLS.
4. The Greater Whitefronted Goose, Lesser Whitefronted Goose, Little Gull, Blackbellied Tern, Whiterumped Vulture are some of the rare species found in the WLS.
5. There are 280 nests of the Whiterumped Vulture at 43 sites and three vulture feeding stations in and around the WLS.
6. The WLS has good habitats for ground-nesting birds such as terns, the Skimmer, the Sarus and plovers.
7. A total of 250 plant species, 18 species of snake, 95 species of butterfly and 24 species of mammal are found in the WLS.
8. Research and monitoring (bird ringing station) are conducted regularly.
9. The potential for wildlife tourism in and around the WLS is vast.
10. The management plan has been approved and is currently operational (2014-2015 to 2023-2024).
11. The staff strength of the WLS (one ACF, two Range Officers, four Foresters, 20 FGs, four boatmen, 20 anti-poaching staff on work charge basis, two MPWs, and two peons) is adequate.
12. One Gypsy, two motor cycles and three departmental boats are available for the WLS.
13. The budgetary allocation for the WLS (CAMPA, Rs. 3.16 crore; CSS, Rs. 14 lakh; State Plan, Rs. 26 lakh) are adequate but are not released on time.

### B. Management Weaknesses

1. The land is owned by the Bhakra Beas Management Board, and an NOC is required for creating any infrastructure.
2. The boundary has not been demarcated and is porous.
3. Permits for fishing in the lake are being given to about 1500 fishermen.
4. A cattle grazing is a problem, especially in summer, when the island of Rensar becomes accessible as the water level goes down.
5. Agriculture is practised in the drawdown areas of Pong Lake that lie within the notified boundary of the WLS. The use of fertilizers and pesticides is prevalent in the catchment areas and may harm the aquatic ecosystem.
6. The Beas and other three river catchments upstream are prone to erosion, leading to silting up of the lake.

7. The delayed release of CSS funds hinders the WLS management.
8. The staff and officers are not trained in wildlife management.

### C. Immediate Actionable Points

1. Boundary survey, and demarcation and fencing of vulnerable areas of the WLS are to be done at the earliest.
2. The stakeholders of the WLS should be involved in various management issues through the Pong Conservation Society.
3. An entry gate and ticketing and visitor facilities should be created at a location like Nagrota for ecotourism.
4. Illegal sowing must be discouraged by creating alternative ecotourism-related livelihoods.
5. In-Principle NOC from BBMB can be obtained for creating infrastructure in consonance with Wildlife Protection Act and Forest Conservation Act.
6. The staff must be trained in wildlife management (especially aquatic habitat-related training).
7. The locals and visitors have to be sensitized to the significance of the WLS and the issues being faced by Pong Dam WLS.
8. Creation of alternative livelihoods for the fishermen, cattle graziers and those practising cultivation in the drawdown areas should be given adequate attention and resources.
9. Phased creation of swamps/marshes in the drawdown areas could be taken up.
10. The contract/permission for fishing and the order under which compensation claims are being given by the Forest Department to the Fisheries Department for the fish consumed by wild birds in Pond Dam Lake WLS need to be reviewed in the light of the provisions of the WLP Act and the various orders of the Hon'ble Supreme Court issued in this regard.

6

## Rupi Bhaba Wildlife Sanctuary, Himachal Pradesh

### A. Management Strengths

1. The site is appropriate as the region has an interesting mosaic of habitats and caters to the needs of major key faunal species, which require large habitats for local migration. A number of small-/medium-sized protected areas (PAs) in close proximity will provide much needed continuity if care is taken to protect corridors between them. Rupi Bhawa Wildlife Sanctuary (WLS), along with a network of other PAs, is a part of an important network of habitats straddling different administrative units and even state boundaries.
2. As traditional nomads graze their livestock over a large landscape (even defying political boundaries), the needs of domestic and wild herbivores have to be harmonized in a judicious and ecologically sustainable manner, and the mosaic of sites including Rupi Bhawa WLS meets this requirement.
3. This high-altitude Himalayan region is part of a major river catchment and thus needs

vegetative cover for soil and moisture conservation as well. Against the backdrop of impending climate change, with its resultant impacts *inter alia* on biodiversity, close monitoring of climatic factors and floral and faunal attributes will provide clues for the mitigation measures that are required, if any.

## B. Management Weaknesses

1. The boundaries of the PA need to be rationalized.
2. Presently easy access is limited to only one valley and thus needs to be extended to other valleys too; but keeping in view the fact that accessibility is a double-edged sword, a cautious approach is recommended. The recent opening up of approach roads has introduced an open market economy, a shift to intensive horticulture practices, etc. and may have impacts on traditional eco-friendly livelihood practices and the rural economy. Steps need to be taken to ensure that the traditional way of living, which is dependent on natural resources, e.g. using water mills, is not disturbed.
3. The movement of four-wheel vehicular traffic needs to be regulated. Caution is necessary in taking decisions to lay motorable all-weather roads, which may usher in eco-tourism.
4. The number of staff members managing the PA is meager. The staff are not trained to meet the challenges of the difficult terrain and the available resources are inadequate for working under the very adverse conditions that prevail at this site.

## C. Immediate Actionable Points

1. It has been reported that in response to a need that has been felt to accommodate destitute cattle, a cattle camp (panjarpol) has been established next to the PA boundary. This (ill maintained) cattle camp is not only a serious drain on the fodder and forage resources of the PA-cattle carcasses that remain on the scene for long (due to the low temperatures) pose a danger of communicable diseases to the local cattle as well as wild herbivores.
2. Rationalization of the PA boundaries and installation of a fully manned gate to regulate traffic on all-weather roads are needed. Additional field-level posts need to be created, and winter patrolling by teams supported by camping facilities/logistics needs to be introduced.
3. Measures such as the formation of a PA advisory committee and appointment of Honorary Wardens, which are statutory requirements, need to be implemented for enhancement of local participation in planning and implementation of works, as well as for transparency.
4. The local populations of the surrounding villages as well as the field staff need to be oriented for introduction of adventure tourism that is dovetailed with conservation education.

## Shimla Water Catchment Wildlife Sanctuary, Himachal Pradesh

### A. Management Strengths

1. The sanctuary has a compact area free of human habitations (around 80% of the vulnerable areas along NH22 are fenced).
2. The sanctuary was finally notified on 23 October 1999.
3. The provisioning of water to Shimla over the last 100 years has established the utility of the sanctuary.
4. There is a rich Himalayan biodiversity assemblage (including Deodar and its associates, three types of Oak and six types of conifer) in the wildlife sanctuary.
5. This sanctuary has the highest density of the Koklass Pheasants among all the PAs of Himachal Pradesh. It also supports more than 150 species of bird and a good population of the Goral.
6. The proximity of the sanctuary to Shimla offers tourists and nature lovers an opportunity to view wildlife.
7. Visitors can enjoy the scenic landscapes of the sanctuary.
8. There is potential for conducting scientific research on biodiversity in the sanctuary.
9. Conflicts with the local human populations are minimal as the people are not dependent on the wildlife sanctuary for their fuel or fodder needs.
10. Human-animal conflict is relatively low.
11. The sanctuary is easily approachable by road.
12. The staff available for managing the wildlife sanctuary is adequate (one RO, two Foresters, four FGs, five IV<sup>th</sup> Class employees).
13. An ecotourism society has been formed to manage the sanctuary. The CCF is the President, and the SDM is a member. Entry fees, etc. are ploughed back for the PA.
14. Brochures, signage, benches, cycles and eco-toilets are available for tourists visiting the sanctuary.

### B. Management Weaknesses

1. The wildlife sanctuary is small in size (only around 10 km<sup>2</sup>), and it is an isolated forest.
2. A stretch of around 4 km of NH 22 passes through the sanctuary. Garbage is dumped along this stretch by tourists.
3. The number of vehicles required for the park management is not adequate (one vehicle for the DFO and one motorcycle for the staff).
4. The tourism at Kufri exerts a pressure in the form of horses left to graze inside the sanctuary and garbage left behind by tourists, especially in summer.
5. The sanctuary has no dedicated website or interpretation centre.

### C. Immediate Actionable Points

1. It has been reported that in response to a need that has been felt to accommodate destitute cattle, a cattle camp (panjarpol) has been established next to the PA boundary. This (ill maintained) cattle camp is not only a serious drain on the fodder and forage resources of the PA-cattle carcasses that remain on the scene for long (due to the low temperatures) pose a danger of communicable diseases to the local cattle as well as wild herbivores.
2. Rationalization of the PA boundaries and installation of a fully manned gate to regulate traffic on all-weather roads are needed. Additional field-level posts need to be created, and winter patrolling by teams supported by camping facilities/logistics needs to be introduced.
3. Measures such as the formation of a PA advisory committee and appointment of Honorary Wardens, which are statutory requirements, need to be implemented for enhancement of local participation in planning and implementation of works, as well as for transparency.
4. The local populations of the surrounding villages as well as the field staff need to be oriented for introduction of adventure tourism that is dovetailed with conservation education.

## Gulmarg Wildlife Sanctuary, Jammu & Kashmir

### A. Management Strengths

1. The WLS has very high potential for all-season tourism that can be used to spread conservation awareness among the lakhs of existing visitors from India and abroad. It also has great potential for getting some of the revenue from tourism, which at present goes solely to the Gulmarg Development Authority (GDA), Tourism Department and private enterprises. There are greatly revered shrines such as the Baba Rishi, which also attract additional pilgrims.
2. In summer the glaciers of the WLS melt and are a source of drinking water to downstream areas such as Srinagar, Badgaon, Baramulla and Sopore.
3. There are no permanent habitations inside the WLS, and some seasonal hamlets are occupied during June-September. Compartments 50-58 are reported to be less disturbed by human use.
4. Musk deer, goral and brown bear are reportedly found in good numbers in the WLS.
5. The WLS provides a good habitat for the revival/recovery of the markhor. This is an endangered species that possibly went locally extinct four or five decades ago and can be helped to recover. Markhor are known to occur in nearby catchments in the Boniyar and Poonch regions.
6. The staff is well versed in handling human-animal conflicts and has the necessary equipment. There is however a dearth of staff members, which can make handling cases difficult at times.
7. The occurrence of fires is rare. Fires are controlled in time.

## B. Management Weaknesses

1. The periphery, including the vulnerable areas, does not have fencing and is quite porous, permitting grazing and some illegal extraction from parts of the PA.
2. The ground -level staff has very few members. Only one Range Officer, two Foresters and two watchers have been posted in an area of 120 sq km<sup>2</sup> in mountainous terrain where the weather is harsh.
3. Blocks 31-40 are under the control of the Territorial DFO, and only Blocks 41 and 50-58 are with the Wildlife Wing. Blocks 37 and 38 are with the GDA.
4. A considerable number of sheep, goats and domestic cattle graze in some blocks during the only growing season, from July to mid-September, which can deplete the forage for the wild herbivores. This as-yet undetermined number of livestock, belonging to the Bakarwals, Gujjars and other communities, apparently uses the area for 15-20 days during spring (going to summer pastures) and autumn (returning to winter pastures). It is however felt that large numbers, especially during the autumn, when plant growth ceases, can deplete forage resources for the critical winter period.
5. A lack of winter gear such as snow scooters and vehicles makes patrolling the WLS difficult during harsh winters, leaving wildlife such as musk deer vulnerable to poaching.
6. The lack of communication facilities is also a hindrance to efficient monitoring and patrolling in the PA.
7. The PA is provided with grossly inadequate funds, and these funds are not released in a timely manner too.

## C. Immediate Actionable Points

1. The area controlled by the Territorial Wing should be transferred to the Wildlife Wing along with the staff posted there at the earliest so that uniform management may be carried out by the mandated agency, i.e., the Wildlife Department.
2. Specific prescriptions regarding activities to be taken up, their prioritization and annual physical and financial targets should be incorporated in the management plan.
3. Adequate funds need to be released in a timely manner for the PA to function efficiently. It is critical that the state ensure this.
4. There should be a provision for systematic updating of the management plan on the basis of lessons learnt from periodic monitoring and evaluation, and census operations should be included in the management plan.
5. The stakeholders (villagers, pastoralists, armed forces, GDA, Tourism Department, etc.) should be identified clearly, and provisions for regular meetings with them should be incorporated in the management plan.
6. EDCs should be constituted for each village at the earliest so that there is a greater involvement of the people in the management of the PA and there are activities that serve as positive incentives to them to conserve the PA.
7. Provisions for systematic maintenance of assets should be incorporated in the management plan.
8. Demarcation of the WLS should be done on priority basis so that all the stakeholders are clear about the boundaries and the legal aspects of any violations.

9. Awards and rewards should be given to deserving staff members to boost their morale.
10. Establishment of an interpretation centre near Kongdoori to educate the Gondola visitors is highly desirable, and this should be included in the Gulmarg Development Authority Master Plan. Exhibits from the existing one at Tangmarg can be moved to this one, which is likely to have much more visitors.
11. Signage showing the biodiversity values and do's and don'ts should be placed at vantage points in and around the WLS, especially along the Gondola and other paths frequented by tourists.
12. Publicity material in the form of brochures about the WLS, a short film on the wildlife of the sanctuary and a website should be prepared at the earliest and made available at the interpretation centre as well as tourist establishments.
13. There should be adequate arrangements for receiving visitor feedback, which can be used by the management to make the facilities more conducive for them and provide better material for developing awareness among them. Here too, the proposed interpretation centre or other points along the Gondola route can be of great use.
14. Cases of man-animal conflict outside the WLS should be dealt with by the concerned territorial staff. Alternately, adequate staff members should be made available to the Wildlife DFO to manage these incidents, which can often become very volatile.
15. Some percentage (possibly 10%) of the revenue earned from the Gondola tourists should be allocated for the development of the WLS. This may need political will, and the appropriate authority in the Wildlife Department should prepare a suitable case for this.
16. Revival/restoration plans should be prepared and implemented for threatened and representative species such as the markhor, brown bear and musk deer.
17. Census operations should be carried out regularly (at least once in 3 years) and according to protocols. These protocols are now available from institutions such as WII and NCF.
18. A camera trap-based method should be adopted for ascertaining the occurrence and populations of mammals and pheasants. It needs to be noted that with proper training by scientists, the departmental staff can design and implement such research initiatives that help assess the populations of target species, and also assessment of biodiversity values, especially the more cryptic species such as nocturnal mammals and birds or small cats.
19. With a large part of the PA being located in high altitudes, including areas under permafrost and with the relatively high livestock grazing pressures, the PA faces unknown threats due to climate change. Brainstorming sessions in which scientists and researchers from local universities, national institutions and local villagers participate need to be facilitated by the Wildlife Department.
20. It is a known fact that timely promotions motivate officers to give their best. In Jammu & Kashmir, the prospects of promotion of Wildlife Wardens appear to be quite bleak or limited. The Service Rules may be amended so as to give the Wildlife Wardens equal opportunities for promotion. This is a general recommendation for the state, but clearly it affects the PA under consideration too as it is a part of the same system.

## Karakoram Wildlife Sanctuary, Jammu & Kashmir

### A. Management Strengths

1. A beautiful landscape with diverse ecosystems such as the extensive Sea Buckthorn forests and sand dunes (around 11,000 ha) makes this sanctuary an attractive area for visitors.
2. The Snow Leopard is the flagship species of the wildlife sanctuary (WLS).
3. The Lynx *Lynx lynx* population is significant.
4. This is the only area in India where the Chiru *Panthalops hodgsoni* is found.
5. The Ladakh Urial *Ovis vignei* is also found in the WLS.
6. The human population density is low. Only the valleys are inhabited.
7. The terrain is highly undulating, and hence the level of poaching is low despite the extremely small strength of the staff protecting the PA.
8. The wildlife owes its existence to the cooperation of the local people. Villagers inform the authorities about wildlife crime, and wildlife conservation is aided greatly by them.
9. Ecotourism initiatives have been implemented (furnishing houses and providing training for hosting home stays, training nature guides, etc.).
10. Nature camps are organized twice a year for school students.
11. Pastoralism is on the decline.
12. Snow Leopard sightings have improved, and there is a demand among tourists to see the animal.
13. Large numbers of wild medicinal plants are found in the area, in Nubra Valley.
14. There is a high level of endemism among the butterfly species in Nubra Valley.
15. Tourists are distributed across the large area, and thus the adverse impacts on the PA are limited.
16. The coordination with the district authorities is quite good.
17. Law enforcement is quite strict even with the small staff strength.

### B. Management Weaknesses

1. There is a severe shortage of staff in the PA, where a large and remote area has to be looked after.
2. The staff of the PA does not have adequate equipment (night vision binoculars, infrared cameras, etc.).
3. There is no wireless network inside the WLS.
4. The management plan has not been approved by the CWLW (it has been sent for approval).
5. Only the intention to declare the area a WLS is in place; the final notification has not been issued yet.
6. A total of 66 villages are present within the WLS, causing biotic interference.
7. The extensive army presence throughout the area may be detrimental to wildlife conservation.

8. There are Advanced Landing Grounds at Thoise and DBO (for aircraft), within the WLS.
9. The funds available for maintenance and development of the WLS are insufficient. The funds are released very late (as late as March).
10. Wildlife censuses are not conducted at regular intervals.
11. There is no interpretation centre.

### C. Immediate Actionable Points

1. The final notification of the WLS has been issued.
2. The WLS has been fenced all around with 8-foot-high chain link fencing and to an additional height of 4 feet with barbed wire (total height 12 feet).
3. Adequate water is available (seven water holes are being replenished by three tube wells, and the Amloh Minor canal passes through the WLS).
4. There is no encroachment or human habitation inside the WLS.
5. The WLS is approachable from all sides through motorable roads, which also serve as fire lines.
6. The strength of the staff is sufficient for the size of the WLS (one Range Officer, one Forester, two Forest Guards, 20 daily wagers on work charge basis and one Multipurpose Worker).
7. The area is compact and connected with the Bhorey Aghoul Reserve Forest on the western side.
8. A Bolero Camper and a tractor are available for the use of the WLS.
9. Mobile bills are being reimbursed up to Rs 500 per month for A and B level officers and Rs 250 for C and D level staff members.
10. Infrastructure is available in the form of a Range Office and a watchtower.
11. Fire lines with a total length of 48 km within the sanctuary and 17 km along the periphery are being maintained.
12. There have been no instances of fire in the last 4 years.
13. There are almost no poaching cases in the WLS.
14. The dependence of the local population on the WLS is negligible.
15. The Government of Punjab formed an advisory committee for the WLS on 10 April 2015.
16. The Eco-sensitive Zone, with a width of 100 m, along the 17 km periphery, was notified on 21 January 2016.
17. Village Development Committees (VDCs) have been formed in the villages around the WLS.
18. A tranquilizing kit with a rescue-and-trap cage is available with the WLS staff.

## Bir Bhadson Wildlife Sanctuary, Punjab

### A. Management Strengths

1. The final notification of the WLS has been issued.
2. The WLS has been fenced all around with 8-foot-high chain link fencing and to an additional height of 4 feet with barbed wire (total height 12 feet).
3. Adequate water is available (seven water holes are being replenished by three tube wells, and the Amloh Minor canal passes through the WLS).
4. There is no encroachment or human habitation inside the WLS.
5. The WLS is approachable from all sides through motorable roads, which also serve as fire lines.
6. The strength of the staff is sufficient for the size of the WLS (one Range Officer, one Forester, two Forest Guards, 20 daily wagers on work charge basis and one Multipurpose Worker).
7. The area is compact and connected with the Bhorey Aghoul Reserve Forest on the western side.
8. A Bolero Camper and a tractor are available for the use of the WLS.
9. Mobile bills are being reimbursed up to Rs 500 per month for A and B level officers and Rs 250 for C and D level staff members.
10. Infrastructure is available in the form of a Range Office and a watchtower.
11. Fire lines with a total length of 48 km within the sanctuary and 17 km along the periphery are being maintained.
12. There have been no instances of fire in the last 4 years.
13. There are almost no poaching cases in the WLS.
14. The dependence of the local population on the WLS is negligible.
15. The Government of Punjab formed an advisory committee for the WLS on 10 April 2015.
16. The Eco-sensitive Zone, with a width of 100 m, along the 17 km periphery, was notified on 21 January 2016.
17. Village Development Committees (VDCs) have been formed in the villages around the WLS.
18. A tranquilizing kit with a rescue-and-trap cage is available with the WLS staff.

### B. Management Weaknesses

1. The entire WLS is infested with Prosopis juliflora and Eucalyptus.
2. Around 1000 feral cattle are living in the WLS.
3. There is a dearth of food plant species for Macaques and Sambar in the WLS.
4. Polythene litter is found along public access roads within the WLS.
5. The budget of the WLS is not released on time.
6. The DFO and staff are not trained in wildlife management.

7. Modern equipment such as camera traps; night vision binoculars and GPS are not available for the staff.
8. The soil is saline in places in the WLS.

### C. Immediate Actionable Points

1. The advisory committee should meet regularly.
2. Phased removal of invasive species and replanting with indigenous plants and grasses is required.
3. The feral cattle need to be restricted to a smaller area within the WLS, and if no areas are available, they need to be moved out of the WLS.
4. Signage should be put up at appropriate vantage points in the WLS on the do's and don'ts.
5. The polythene bags, plastic, etc. scattered inside the WLS need to be removed as soon as possible.
6. Adequate food plant species should be made available for macaques within the WLS so that they are not attracted to other sources of food, resulting in human-wildlife conflicts.
7. The new management plan has to be drawn up as soon as possible (considering the guidelines of WII, in consultation with local stakeholders, with a provision for a mid-term review, and considering the adverse impacts of climate change).
8. Providing collars on the top of the chain link fence is desirable for increasing its longevity.
9. Area-specific and need-based research should be taken up in collaboration with local universities and colleges for management-related issues.
10. CSS funds were delayed and have not been released for the last 4 years. Efforts should be made to obtain CSS funds.
11. Brochures need to be made and placed at strategic locations to attract visitors to the WLS.

11

## Harike Wildlife Sanctuary, Punjab

### A. Management Strengths

1. Harike WLS was declared a Ramsar Site in 1990 because of its rich biodiversity value.
2. The area is very compact and easily accessible, which is helpful in management.
3. There is no shortage of water in the wetland as the WLS receives an assured supply of water from two rivers, the Sutlej and Beas.
4. The avifauna of the WLS is very rich (>80 bird species have been recorded). During winter counts of the birds, the numbers cross 1,00,000.
5. Seven or eight Indus river dolphins live in the WLS according to WWF reports.
6. There is no shortage of funds, and funds are released in a timely manner from the state as well as the centre.
7. The strength of the field-level staff is adequate as all eight posts of guards have been filled up.

8. An ecotourism plan is in place, with support from the Tourism Department and the ADB. Infrastructure such as a boardwalk at the confluence of the two rivers, trails and an interpretation centre will be created soon.
9. The infrastructure appears to be adequate (except for a need for boats):
10. There are six check posts and two tented protection huts in the PA.
11. There are six vehicles (one Gypsy, two Bolero Campers, one Tatamobile, one Swaraj Mazda, one Swaraj tractor).
12. There are two boats (only one is operational).

## B. Management Weaknesses

1. The WLS has a long boundary (54 km) that is porous and does not have any fencing at present.
2. Large patches inside the WLS have been encroached. There are also some fields and tubewell huts in it. Roughly 850 acres of land has been encroached by over 30 encroachers. Most of these encroachments have taken place very long ago.
3. A few groups of domestic cattle graze in the area.
4. The water from the Sutlej is much polluted. It has a bluish colour and a stench. Thus it may be affecting birds.
5. There is silt deposition near the Harike barrage. This may cause a loss of habitat for water birds in a few years.
6. The shortage of boats is affecting patrolling and management adversely.
7. Water hyacinth covers possibly 5% of the water body, restricting the area available for birds and the aquatic fauna.
8. Two more foresters (posts sanctioned but not filled) are needed for the management of the WLS. A Deputy Ranger is working on the post of Forest Ranger.
9. There is almost no participation of the local villagers in the management of the PA.

## C. Immediate Actionable Points

1. The vacancies in the staff (Forester and Forest Ranger) need to be filled up immediately.
2. The management plan prepared by Mr. Gurmit Singh (2004-2014), the term of which has expired, needs to be revised and updated in consultation with the various stakeholders at the earliest as per the WII guidelines. A provision should be made for a mid-term review and modification of the management plan (adaptive management). If possible, help may also be sought from WII in preparing the plan.
3. There are only two boats, of which only one is functional. Two additional new boats need to be procured, and the one that is out of order should be repaired at the earliest.
4. EDCs should be constituted in the peripheral villages to seek the villagers' cooperation with various management activities.
5. A benchmark study should be carried out to establish the pollution level and the water quality. This should be followed by monitoring at monthly intervals.
6. Updating of checklists, monitoring and organizing awareness camps must be carried out in coordination with organizations such as WII, WWF and local universities.
7. Two or three new check posts should be established soon at vulnerable points.

8. The DFO's headquarters are located at Ferozepur, which is c. 60 km from Harike WLS. There is another WLS (Abohar Blackbuck Sanctuary) under the control of the DFO. It is desirable to have two posts of ACFs sanctioned, one each for Harike and Abohar, with their headquarters at the respective places.
9. At present there is no system of charging tourists entry fees (only a permit is issued). The CWLW may, if it is found to be administratively feasible, start charging entry fees at Harike and the other sanctuaries.
10. Water hyacinth should be removed from time to time.
11. De-siltation may be carried out in consultation with the Irrigation Department.
12. It should be made mandatory for water treatment plants to be set up at all nearby polluting industries upstream of the WLS (at Ludhiana in particular).
13. Modern equipment such as spotting scopes and digital cameras should be made available to the staff for monitoring.
14. The staff need to be trained for wildlife monitoring.
15. With increasing tourism, it is important to train the staff and local youth as nature guides and to carry out rescues from water when necessary.
16. All encroachments need to be removed from the PA and illegal grazing stopped at the earliest. Help may be obtained from the district administration and the police.
17. The feral cattle in the PA should be removed.
18. A comprehensive plan should be drawn up for constructing a boundary wall/fencing around the PA. All resources such as state, central and NREGA funds must be tapped.
19. The period of the management plan drawn up by Basanta Raj Kumar (2008–2009 to 2017–2018) is also coming to an end, and it is desirable for it to be reviewed and modified or a new one prepared in consultation with WII.

12

## Chandraprabha Wildlife Sanctuary, Uttar Pradesh

### A. Management Strengths

1. The sanctuary has a good scenic natural habitat. It is well connected with all-weather roads.
2. The sanctuary is the only site for wildlife and nature tourism near the city of Varanasi.
3. A management plan is in place for a term from 2010-2011 to 2019-2020.
4. The Sloth Bear is the flagship species of the sanctuary, and there is a good population of bears in the sanctuary. The last government census was conducted in 2016, and the estimate was 357.
5. The sanctuary has historical value as it was the hunting reserve of the King of Kashi.
6. The Chandraprabha River, which is the main river, is perennial in nature, and so adequate water is available within the sanctuary.
7. The diversity of medicinal plants in the sanctuary is high.
8. The sanctuary is known to have a population of endangered species of vulture.
9. There are no villages inside the wildlife sanctuary, but there are 53 villages on the periphery.
10. There are 30 EDCs in the buffer zone of the park. Each EDC has two self-help groups (SHG). There are about 61 SHGs around the park.

## B. Management Weaknesses

1. The management plan has not been approved by the CWLW.
2. The boundary is porous, and grazing of livestock is prevalent.
3. There are many vacant posts among the staff. There are two positions for Foresters, and two have been posted. Out of the two positions for Wildlife Guards, only one has been posted. Out of the seven Forest Guard positions, only three have currently been filled up.
4. The DFO, ACF, RFO and the staff are not trained in wildlife management.
5. The funds are insufficient and are not released on time.
6. The sanctuary has been affected by Naxalism. As a result, there is no night patrolling. One Range Officer was attacked and one Ranger injured in 2004. One police van was destroyed by a landmine, and seven people died in 2004.
7. The guards lack equipment such as binoculars and GPS.
8. There are 53 villages on the periphery, which adds biotic pressure, such as firewood collection and livestock grazing.

## C. Immediate Actionable Points

1. The interpretation centre at Rajdari is not operational, and it should be revived. The brochure of the sanctuary should be updated.
2. The vacant staff positions need be filled up as soon as possible.
3. Newly recruited staff members should be given induction training.
4. Funding should be made available on time.
5. The management plan needs to be considered for approval as soon as possible.
6. Motor cycles need be made available for field guards.
7. Modern firefighting equipment should be made available.
8. The cell phone bills of Forest Guards should be reimbursed up to a certain limit.
9. The signage in the sanctuary could be improved.
10. The railing at the Rajdari waterfall needs to be improved for the safety of tourists.
11. A water storage facility needs to be provided at the guest house at Rajdari, in the sanctuary. The solar power system at the guest house could be of higher capacity.
12. A website should be created for the sanctuary.
13. The entry fees must be ploughed back into the management of the park. Currently it is going to the government.

## Hastinapur Wildlife Sanctuary, Uttar Pradesh

### A. Management Strengths

1. The River Ganga Ecosystem (including the Budi Ganga, the palaeochannel of the Ganga) is an ideal wetland-and-marsh habitat of the Swamp Deer (the flagship species of the wildlife sanctuary (WLS)).
2. Leopard, Jungle Cat and Fishing Cat are present in the WLS.
3. It is an important conservation area of significant size in the National Capital Region.
4. Its flora and fauna are rich. The WLS is rich in medicinal plants.
5. The religious values attached to the River Ganga and numerous sacred places (Brijghat being the most notable) are applicable to the entire area.
6. The Gangetic Dolphin is present in the WLS up to Bijnore Barrage.
7. Different wildlife NGOs are contributing to conservation (turtle and Gharial releases and Sarus conservation) with the involvement of the stakeholders and the local population.
8. The WLS is the only stretch of khola-khaddar with an agricultural landscape configuration that has a protected status along the Ganges.
9. Annual monitoring of certain species is being carried out.

### B. Management Weaknesses

1. The 26A notification has not been carried out to date.
2. The budget is very meagre considering the size of the WLS.
3. The management plan of the WLS expired in 2012.
4. The WLS is managed by five DFOs with none of the positions fully dedicated to the management of the WLS.
5. The dedicated wildlife staff (one SDO ACF rank, one Forester, one FG) is not adequate for managing the WLS.
6. No special wildlife training has been given to the staff.
7. Demarcation of the WLS on the ground has not been done. Encroachment, especially in the drawdown areas, is a problem for effective habitat-level interventions.
8. The proposal for notification of an ecosensitive zone has not yet been accepted by the GoI.
9. There are about 610 villages inside the WLS.
10. Ecodevelopment committees have not been constituted to date.

### C. Immediate Actionable Points

1. A unified command for landscape-level management of the WLS (one Senior DCF and five ACFs for each district) is required for effective administration.
2. The management plan need to be prepared (as per the WII guidelines) and approval

obtained (with provisions for stakeholder participation, a mid-term review, climate change, etc.) at the earliest.

3. Zonation could be developed for management purposes.
4. Monitoring the parameters of wetland health needs to be done.
5. Model(s) for grassland, shrubland and woodland management should be established in place of the existing target-based plantation work.
6. The habitat management should be in line with the landscape-level management.
7. Better and sustained training needs to be provided to the staff for wildlife management.
8. A rescue van may be provided at the earliest.
9. Visitor services such as signage, brochures, entry points and gates, and an interpretation centre need to be developed to encourage wider appreciation of the attributes of the WLS.
10. Inventorization and enumeration of the floral and faunal attributes of the WLS through systematic studies are to be incorporated in the management plan. Research topics should also be incorporated.
11. CAMPA funds can be tapped for taking up research projects.
12. Removal of Water Hyacinth from water bodies should be taken up for maintaining the health of the wetlands.
13. Ecodevelopment committees need to be formed, and their activities should be started at the earliest.
14. The eco sensitive zone should be notified at the earliest.
15. One patrolling motor boat need to be provided for each district.
16. Ex gratia grants are to be paid promptly.

14

## Okhla Bird Sanctuary, Uttar Pradesh

### A. Management Strengths

1. Okhla WLS is very close to Delhi and Noida and very easily accessible to the people of these places. It can attract a lot of tourists.
2. Over 320 bird species visit the WLS, some of which are endangered. This WLS is valued as one of the 466 Important Bird Areas (IBAs) in India.
3. There is no habitation inside the WLS, and disturbance from outside is also minimal.
4. The people living on the periphery of the WLS are mostly prosperous. Therefore they depend very little on the sanctuary. Also, they are by and large supportive of the WLS.
5. The area is compact (400 ha), and it is easy to manage.
6. The periphery is clearly demarcated and fenced. About 800 m (on the northern side) of the 10 km periphery is not fenced at present.
7. Okhla Bird Sanctuary (OBS) is not a Ramsar Site at present; however, it fulfils five of the eight criteria for becoming a Ramsar Site.
8. Sufficient funds are being made available and released in a timely manner from the NOIDA authority for the development of the WLS according to Appendix II, Section 5(4) of the

judgment of the Honourable Supreme Court's order (dated 3 December 2010, issued in reference to I.A. No. 2609-2610 of 2009, in Writ Petition (Civil) no. 202 of 1995), whereby 5% of the total cost of the project (construction of a park (Dalit Prerna Sthal)) has been deposited with the Forest Department of Uttar Pradesh for improved management of the WLS.

## B. Management Weaknesses

1. A high tension transmission line passes through much of the WLS, posing a severe threat to both humans and birds.
2. Given the duties of patrolling and visitor management, the staff strength is insufficient (one RFO and 3 guards), and they are not trained in wildlife-related issues.
3. The infrastructure such as chowkis, staff quarters and vehicles in the field is inadequate for managing the PA efficiently.
4. The management of OBS is being looked after by the DFO, Social Forestry Division, Gautam Budh Nagar, and there is no dedicated wildlife DFO for the sanctuary at present, which is adversely affecting the management.
5. The water body receives sewage from over 20 drains in the Delhi–Ghaziabad region itself, thus causing tremendous pollution and raising a stench.
6. A lot of construction activity is going on near the WLS, causing considerable pollution and disturbance in the WLS.
7. At present OBS is situated in Gautam Budh Nagar, which was carved out from Ghaziabad District, Uttar Pradesh. OBS was notified in 1990 through a Uttar Pradesh Government notification (577/14-3-82/89, dated 8 May 1990) that shows the Right Marginal Bund as the western boundary of OBS. This area, however, is a part of Delhi State but is under the control of the Irrigation Department of Uttar Pradesh. About one-fourth of the area of OBS thus falls in Delhi State. Legal complications may arise in case any wildlife offence takes place in that zone.

## C. Immediate Actionable Points

1. Four or five viewing platforms may be constructed on the left afflux bund between Gate 1 and Gate 2 to improve the viewing experience of tourists.
2. Some more watchtowers (three to five) need to be constructed on the left afflux bund and near the nature trails for regular monitoring and for panoramic views of the sanctuary.
3. Some temporary hides (three to five) may also be created along the nature trails to facilitate observation of birds and their behaviour by the staff as well as researchers.
4. The earlier practice of maintaining floating platforms or floating islands (five to seven platforms, made of bamboo, 10 m × 15 m) may be revived to facilitate perching and nesting of birds towards the deeper parts of the WLS.
5. Irregular shaped mounds (three to five mounds, c. 10–15 m diameter) may be created, and suitable native trees such as babool and fruit-bearing trees may be planted on these mounds for birds to perch and nest on, towards the shallow parts of the water body in the WLS.
6. About 1.6 km of the existing nature trails may be maintained for reaching the two watch towers, and an additional nature trail of about 1 km may be added at a suitable place.

7. Block plantation of indigenous species in 15–20 ha may be taken up towards the northern side of the WLS, in the ESZ to provide fruiting, perching and nesting habitats and to reduce the hazard of pollution.
8. Plantation of a green belt of indigenous species may also be taken up along the Right Marginal Bund to arrest pollution, especially noise pollution, and provide fruiting, perching and nesting habitats.
9. Parking space and visitor facilities may be created at Gate 1 and Gate 2.
10. A well-equipped interpretation centre may be created at a suitable place near Gate 2. The centre should have modern AV gadgets (such as TVs, DVD players and exhibits) to highlight the values of the wetland and its biodiversity.
11. Local unemployed youth can be trained as nature guides to facilitate better interpretation of the area and provide some employment.
12. A library stocked with books related to bird identification, forests and wildlife may be established for the staff and visitors.
13. Modern equipment used for monitoring wildlife such as binoculars, GPS and cameras may be procured for the staff, and a computer and photo printer may be procured for the office.
14. Tourist facilities such as the following may be created:
  - a. Signage and banners
  - b. Souvenir shop
  - c. Brochures/pamphlets and booklets
  - d. Battery-operated vehicles (golf carts and rickshaws, for example) and bicycles
  - e. Benches and viewing platforms along the road
  - f. A small canteen at Gate 2 and clean drinking water at two or three places
  - g. Toilets at two or three suitable places
  - h. Regulated boat rides into the sanctuary
  - i. Safety equipment for boats and visitors
15. The high tension power line poses a serious threat to both humans and birds in the WLS, and it may be shifted outside the WLS or moved underground.
16. A proposal to plough back at least 10% of the revenue received from the entry fees, etc., from the WLS may be sent to the government for approval.
17. A benchmark study may be conducted to determine the water pollution level in the wetland. Monthly monitoring may be carried out subsequently to ascertain that the level of pollution is within reasonable limits and not detrimental to the birds, aquatic life and ecosystem.
18. A quantitative study and analysis of the bird diversity, duration of stay and abundance should be carried out by an ecologist and the report made available to the Forest Department for incorporation in the management plan.
19. The CWLWs/state governments of Uttar Pradesh and Delhi need to sort out the issue raised in point no. 7 in 'Weaknesses' in the foregoing.

## Soor Sarovar Bird Sanctuary, Uttar Pradesh

### A. Management Strengths

1. It is a compact area that is easy to manage.
2. It is easily approachable from Agra by NH 2.
3. The assured availability of adequate water throughout the year helps maintain the water level in the lake.
4. Tourists visit throughout the year, although there are more visitors in winter.
5. The well-managed and publicized Bear Rescue Centre attracts large numbers of tourists.
6. The flora and fauna are very rich. The flora is representative of jheel vegetation and supports a large number of water birds.
7. Soor Kutir is also a religious attraction.
8. There are adequate infrastructure and visitor facilities such as the boating facility, children's park and interpretation centre, and these attract many tourists.
9. The local communities depend relatively little on the PA.
10. There is mobile connectivity throughout the PA. Thus the staff can communicate effectively.

### B. Management Weaknesses

1. The staff strength is insufficient, and the staff members are not trained in wildlife management (especially monitoring birds and taking care of visitors).
2. The funds are inadequate and released late. This hampers effective planning and other development activities.
3. The porous boundary and the habitations, roads and other institutions all around this small PA make it vulnerable to encroachment and persistent disturbance.
4. Equipment, especially night vision devices, binoculars, GPS and safety equipment (life jackets, etc.), is either not available or is insufficient.
5. Only an extent of 4.03 km<sup>2</sup> out of the total area of 7.97 km<sup>2</sup> area was notified as a sanctuary under WLPA 1972 in 2003. The rests of the area also needs to be notified as a sanctuary at the earliest.

### C. Immediate Actionable Points

1. The construction of the boundary wall needs to be taken up with NHAI, TTZ and Mathura Refinery at the earliest.
2. The final notification of the entire area as a sanctuary needs to be issued as soon as possible.
3. Threats such as grazing need to be assessed in greater spatial and temporal detail so that corrective action and suitable ecodevelopment work can be carried out.

4. Review and updating of the current management plan may be taken up by inserting the requisite addendums, especially a provision for periodic review and adaptive management.
5. The services of nature guides must be made available after proper training and assessment. This can be an effective ecodevelopment work too.
6. Ploughing back some percentage of the revenue from the gate receipts should be done after obtaining approval from the Uttar Pradesh Government. At present close to Rs.40 lakhs is being generated annually, and even part of it can provide the managers suitable opportunities to take up various ecodevelopment works for the community to gain their goodwill.
7. Wider publicity regarding Soor Sarovar Bird Sanctuary in Agra at vantage points, hotels, etc. can help create awareness about this beautiful site among tourists and local inhabitants alike.
8. Distribution of the available publicity material at hotels and other places frequented by tourists also needs to be taken up.
9. Training pertaining to wildlife management must be given to all staff members so that they can monitor and analyse the wildlife of the area. Training in participatory planning and protection can also be of help in improving the efficiency of the staff.
10. EDCs should be constituted. Meetings of the committees should be organized regularly, and activities must be taken up at the earliest.
11. Life jackets must be made available in all boats according to their respective capacities.
12. Hydrological studies must be undertaken to monitor the health of the wetland. Ideally both long-term and short-term studies should be conducted with collaborators such as Mathura Refinery, TERI and universities.
13. The current monitoring methods must be reviewed and the existing bird abundance data analysed with help from technical organizations such as BNHS.
14. A systematic census plan that effectively utilizes volunteers such as students must be instituted. A concerted effort of 3-4 days each winter (in the second week of January) can be planned. The census can be used to determine trends over years.
15. Feedback needs to be obtained from visitors on a regular basis. The feedback can help improve the facilities and identify remedial measures regarding various management issues.
16. A common user group must be formed or mobile bills of staff members reimbursed up to a specified amount for better communication.
17. Prosopis juliflora must be eradicated as provided for in the management plan.
18. Suitable nesting trees can be planted on the artificial islands on an experimental basis.
19. Any recommendation that is in contradiction of the various orders of the Honourable Supreme Court and the guidelines of the CEC and TTZ may be treated as null and void.

## Askot Wildlife Sanctuary, Uttarakhand

### A. Management Strengths

1. The great altitudinal gradient of the wildlife sanctuary (WLS) has led to a diverse floral and faunal assemblage.
2. Oak, Fir, Spruce, Blue Pine, Bhoj Patra, etc. are found along the altitudinal gradient.
3. The water regime of the WLS is adequate on account of the Kali, Gori and Dhauli Ganga and more than 50 nala.
4. The Musk Deer (state animal of Uttarakhand) and Snow Leopard are the flagship species of Askot WLS.
5. Plants such as *Tsuga dumosa*, *Macaranga pustulata* and *Trachycarpus takil* and rare plants such as *Osmanthus fragrans* and *Cyathea spinulosa* are present in the WLS.
6. A total of 109 species of orchid have been recorded from the WLS and surrounding areas.
7. Askot WLS has been finally notified (intention declared in 1986 and final notification issued in 2013).
8. Areas within the WLS are not easily approachable on account of the difficult terrain, which acts as a deterrent to poachers and offenders.
9. Van Panchayat Prabandhan Committees are active. This helps the protection of the sanctuary, and management is carried out with a positive approach.
10. Three base stations and 10 handsets constitute the wireless network of the WLS.
11. Firearms are available for the WLS, and poaching cases are not common.
12. Around 20 GPS sets have been provided to the staff.
13. The local communities are supportive of the park management (60 SHGs have been formed), and awareness campaigns are being taken up in the villages.
14. Landscape level projects such as BCRLIP and Kailash Sacred Landscape have significantly contributed to the people's participation in the area.

### B. Management Weaknesses

1. There is a Deputy Director's post, but it has not been filled yet, and the WLS is being managed by the territorial DFO.
2. No dedicated vehicles are available for the WLS.
3. There is no comprehensive management plan in place.
4. There is no interpretation centre at the WLS.
5. The infrastructure (chowkies, checkposts, staff quarters and modern equipment) is insufficient. There are no roads within the WLS, and maintenance of the patrolling paths and inspection roads in the WLS is not carried out.
6. An acute shortage of funds and late release of funds are the norm although some funds are available from CAMPA.
7. Motorcycles are not available for the staff, and they are not reimbursed mobile bills.

8. Technical expertise with respect to wildlife management is lacking among the staff.
9. A total of 111 villages (85 km<sup>2</sup>) are within or on the fringes of the WLS, leading to anthropogenic pressures on the Sanctuary.

### C. Immediate Actionable Points

1. The management plan s to be made in accordance with the WII guidelines and approval obtained at the earliest.
2. Appointment of a dedicated staff for the WLS including a Deputy Director should be taken up on priority.
3. Strengthening of forest roads and construction of fair weather roads/inspection paths will help the protection significantly.
4. Development of an interpretation centre and placement of signage at strategic locations should be done. Trekking paths may be identified and developed within the WLS.
5. Demarcation of beats with areas exclusively within the WLS isto be done for management purposes.
6. Buildings need to be built/ renovated for staff members posted within the WLS.
7. Motorcycles need to be given to the staff.
8. Funds need to be made available on time for works to be undertaken.
9. Wildlife censuses are to be conducted at regular intervals with scientific inputs.
10. Development of tourism infrastructure in the WLS may be taken up.
11. A dedicated website should be developed to create awareness about the WLS.
12. The financial powers of the DFO need to be increased so that execution of development works is not delayed and contingencies are handled adequately.

17

## Binsar Wildlife Sanctuary, Uttarakhand

### A. Management Strengths

1. The only road that exists in the PA is approximately 10 km long. It runs from the main gate to the KMVN Estate and the 'Jhandi Dhar', traversing the southern side of the PA. The rest of the WLS does not have any roads, as a result of which it is relatively free of vehicular disturbance and offenders. There are however two roads along the southern (Dhaulchina) and the western (Taluka) boundaries, which provide access for protection work.
2. The number of buildings and chowkis in each beat is adequate.
3. There is an operational wireless network, which allows quick communication related to fire and general protection work.
4. There is adequate rainfall in this belt, which makes the regeneration of trees of most species quite good.
5. There is no mining inside the WLS.

6. The annual revenue from the entry fees is good (Rs.35 lakhs) due to the large number of tourists/visitors.
7. Fires have been more or less under control over the past few years. This is because of vigilance and supports from a section of the local community that benefit from tourism (especially people from chaks and estates who live within the park boundaries).
8. The intelligence network appears to be moderately good. The occurrence of forest offences in the PA is negligible.
9. The WLS is well known globally among nature lovers.

## B. Management Weaknesses

1. The WLS is perforated with 12 chaks (having >1000 humans and a considerable livestock population) and six estates running homesteads and tourism activity. This has some positive implications too, such as assistance wth fire protection, but the chaks and estates may also be a cause of disturbance.
2. There is a shortage of departmental vehicles, which is hampering the mobility and affecting protection and other development works.
3. The average age of the staff members is 55 years. This is causing some limitations to the field work that requires strenuous activities.
4. There are no office staff members in the range. As a result, paper work is piling up and disposal of even urgent matters may be getting delayed.
5. The notification of an additional area of 147.6 ha as a sanctuary is still pending.
6. There is a lack of facilities including lighting/solar panels in the remote chowkis. This is causing severe hardships to the staff.
7. The boundary of the WLS is porous, giving the people and livestock from about the 80 villages that dot the periphery free access.
8. There is a lack of convergence of the various development schemes in the WLS. Convergence is particularly important to leverage livelihood and welfare support from the district authorities for the people residing inside the WLS and along the periphery, and these people often become victims of wildlife-related conflicts.
9. There are delays in making payments towards compensation for human and livestock losses. This increases animosity towards the Forest Department and conservation programmes in general.
10. There is no scheme for crop damage compensation, which again appears to be one of the main points of resentment among the local communities. They claim that due to the problem of crop damage, mainly by wild pigs and macaques, they have stopped cultivating crops completely.
11. A modern fire alarm system is lacking.
12. The funds for development and management of the WLS are inadequate and are released late.
13. There is no management plan (its period expired in 2010). Many of the works, being carried out on the basis of the expired management plan, may not be required now.
14. Regular meetings/dialogues with the public to reduce their resentment are lacking, and a system for addressing their genuine problems with respect to wildlife and conservation-related matters is absent.

### C. Immediate Actionable Points

1. A proposal should be prepared immediately for ploughing back the entry fees into the development of the WLS, especially ecodevelopment works and approval obtained from the government at the earliest. This can include several entry point activities to gain the trust and support of the community and meeting their genuine demands and resolving conflicts.
2. Two vehicles should be provided to the WLS (one for the RO and one utility vehicle). This will enhance greatly the effectiveness of the staff in meeting the expectations of protection, ecodevelopment and fire control activities as well as other management initiatives.
3. A socioeconomic survey of the 12 chaks, six Estates and 80-odd peripheral villages, which have large populations of people and livestock, must be carried out. The Forest Department did not seem to have some authentic basic data on the human and livestock populations residing within the boundaries of the PA. Understanding this and the forms of dependence is crucial and will provide the necessary input for better management of the PA.
4. It should be ensured that funds are released to the WLS in a timely manner.
5. The management plan expired in 2010. The new management plan has to be prepared and approval obtained at the earliest. Care should be taken to ensure that it is in the latest format prescribed by WII/MoEFCC.
6. Regular consultations must be had with the stakeholders, such as villagers, estate owners and NGOs, to strengthen the coexistence agenda under the ecodevelopment plans. With the area of the PA being small, and with the PA being encircled by numerous villages and riddled with more habitations, the park management needs to maintain continuous and constructive contacts with the local community. Effective ecodevelopment programmes may hold the key to successful management.
7. Training in wildlife management must be provided to the guards and RFO. This may include the latest wildlife management techniques, intelligence gathering, wildlife monitoring, etc.
8. The wildlife populations must be monitored regularly according to the established census protocols. The representative taxa of the PA, including the leopard, goral and musk deer, must be covered. Modern techniques such as the camera trap method (for carnivores) and transect counts (for ungulates and pheasants) should be adopted. The Uttarakhand Wildlife Wing has already embarked on systematic surveys in its PAs, and covering Binsar WLS on priority basis is recommended.
9. GPS equipment should be provided to each member of the field staff.
10. All members of the field staff must be reimbursed for the use of mobile phones up to a certain amount (say Rs.300–400 per month) for better communication.
11. Creating awareness about the Middle Himalayan wildlife values and recreation are the goals of the PA according to the existing management plan. These are sound goals for this PA; however the park management needs to implement measures to ensure that these aspects of interpretation happen effectively in the PA.
12. A suggestion/complaints register is available, and some good suggestions have been made over many years, including some by government officials such as High Court Judges. These should be scrutinized by the DFO, and useful suggestions must be implemented promptly.
13. The existing interpretation centre is a little far from the gate, and there appears to be

little incentive for visitors to go here. Further, the information available here is limited in nature and scope and needs considerable improvement.

14. Relevant signage regarding the flora and fauna (representing the Middle Himalaya) needs to be provided at strategic locations along the main road to Jhandi Dhar, which is frequented by tourists. The Forest Department may take professional assistance from agencies such as CEE and WII for these tasks.
15. Sufficient numbers of brochures, audio-visual material and exercise-based educational pamphlets in Hindi, English and the local language must be prepared. These should include a detailed map of the PA showing areas that can be visited and other attributes.
16. NREGA works must be taken up for carrying out useful work such as construction of pucca walls on the boundary to exclude the possibility of encroachment.
17. One daily wager may be deployed at each chowki to assist the forest guards with protection/development works.

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3.2

**MANAGEMENT  
STRENGTHS,  
WEAKNESSES AND  
IMMEDIATE  
ACTIONABLE POINTS**

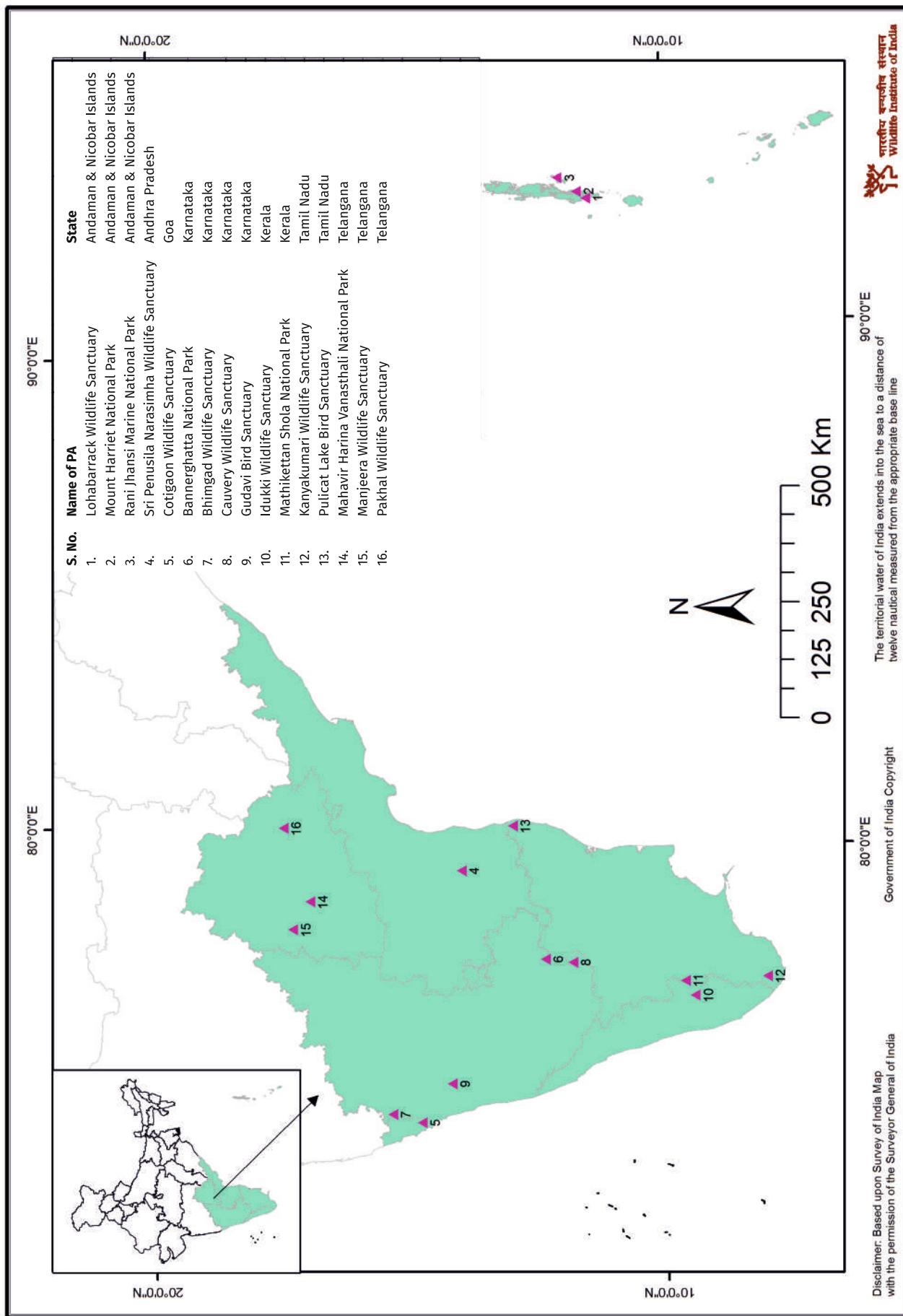
**SOUTHERN REGION**



## 3.2

## SOUTHERN REGION

S. No.	State	Protected Area
1.	Andaman & Nicobar Islands	Lohabarrack Wildlife Sanctuary
2.	Andaman & Nicobar Islands	Mount Harriet National Park
3.	Andaman & Nicobar Islands	Rani Jhansi Marine National Park
4.	Andhra Pradesh	Sri Penusila Narasimha Wildlife Sanctuary
5.	Goa	Cotigaon Wildlife Sanctuary
6.	Karnataka	Bannerghatta National Park
7.	Karnataka	Bhimgad Wildlife Sanctuary
8.	Karnataka	Cauvery Wildlife Sanctuary
9.	Karnataka	Gudavi Bird Sanctuary
10.	Kerala	Idukki Wildlife Sanctuary
11.	Kerala	Mathikettan Shola National Park
12.	Tamil Nadu	Kanyakumari Wildlife Sanctuary
13.	Tamil Nadu	Pulicat Lake Bird Sanctuary
14.	Telangana	Mahavir Harina Vanasthali National Park
15.	Telangana	Manjeera Wildlife Sanctuary
16.	Telangana	Pakhal Wildlife Sanctuary



## Lohabarrack Salt Water Crocodile Sanctuary, Andaman & Nicobar Islands

### A. Management Strengths

1. The sanctuary has a well-drafted management plan.
2. The threats to the biodiversity and area are safeguarded as effectively as possible.
3. There is encouraging participation of stakeholders in planning and management.
4. Human-wildlife conflicts are effectively addressed.
5. There is a good effort towards addressing the livelihood issues of the local communities.
6. Consistent with the progress of ecotourism, the safety of and facilities for visitors at present are adequate.
7. The maintenance schedule is well maintained so enabling follow-up.
8. The support provided by the community to the management of the sanctuary is good.

### B. Management Weaknesses

1. The management personnel strength is inadequate. The requirement of frontline staff members across ranks is indicated as 54; only 50% of this has been provided. The age profile is unfavourable.
2. The mobility of the staff in the field is quite inadequate. There is no four-wheel vehicle or motor cycle for the RFO or Deputy Ranger. The one dinghy (in addition to the fibreglass boat) provided is not quite suitable for choppy seas/swells.
3. Although the permanent uniformed staffs are trained in forestry with wildlife management being one subject among the many in the curriculum, the personnel need training in the fundamentals of coastal and marine ecosystem conservation. This critical element is absent.
4. Although efforts are on, there is no support from NGOs.
5. Incentives for staff members and risk allowances are not available.
6. The information available to the public about the sanctuary is scanty.
7. Although regular surveys and monitoring have been proposed, little headway can be made for want of adequate funding.
8. The funding is inadequate, and funds are released quite late.

### C. Immediate Actionable Points

1. As observed elsewhere in the country, funding for the forest management sector is minuscule as compared with the need. Whatever funding is provided to the sector, only a small fraction naturally gets allotted for PA management. This funding gets distributed according to the perceived importance of areas, and therefore the smaller PAs, like

Lohabarrack, irrespective of their objectives, keep getting very little funding. Although the management plan is good as in this case, its sanctity is not met. This will have to change and can happen only at the highest level of administration of the Union Territory as well as at the level of the Government of India. The latter comes first. Coastal and marine area conservation is complicated and critically important for combating global warming and the consequent climate change. If PAs are strengthened, the approach has an excellent chance of finding its way into coastal zone management. Further, unless there is adequate funding and wherewithal to conduct periodic surveys, research and monitoring of ecosystems and species, it will not be possible to attain conservation goals.

2. There has to be a realistic staffing norm, especially for the personnel engaged in conservation of coastal and marine ecosystems.
3. The management personnel need specialized training in several aspects. This is not happening in spite of the mandate for conservation of excellent and very valuable coastal and marine areas.
4. The current regulations regarding entitlement to vehicles by rank, especially concerning the front rank personnel, need revisiting. Most coastal and marine PAs have terrestrial components. To manage these precious areas effectively, mobility on land and the quality and safety of the watercraft on the sea—though these are expensive—are critically important. Likewise, support is needed for construction, maintenance and providing facilities for anti-poaching/patrolling camps and staff housing.
5. Unlike many terrestrial ecosystems, the risks of managing coastal and marine ecosystems are high, and the frontline personnel especially need adequate incentives, including risk allowances. Providing comprehensive insurance, with the premium being paid by the government, would be an appropriate arrangement.
6. The information pertaining to the management of the sanctuary has to be detailed, not just catering to visitor interest. These details can be provided in the department's website, or there could be separate websites for convenient clusters of PAs (with a mention in the main website) since there are many small PAs that are in geographic proximity to each other.

2

## Mount Harriet National Park, Andaman & Nicobar Islands

### A. Management Strengths

1. The level of biotic pressure is low.
2. The protection is effective.
3. There is no human-wildlife conflict.
4. The PA is integrated with the South Andaman Division.
5. Although there is no stakeholder participation, the PA enjoys local support.
6. All complaints are regularly handled and addressed on a priority basis.

## B. Management Weaknesses

1. The management plan does not follow the approved format.
2. There is no stakeholder participation in the planning and management.
3. There is no NGO support.
4. Surveys have been conducted, but the reports have not been interpreted to see what is useful.
5. The livelihood issues of the neighboring communities have not been explored.
6. Mobility is poor. There is a fiber glass boat and a dinghy. There are foreshore protection camps that need to be accessed by sea. There is only one 4WD vehicle.

## C. Immediate Actionable Points

1. The approved format needs to be adopted for the next management plan.
2. The communities residing in peripheral areas could be considered stakeholders. For operational purposes as necessary these people need to be considered.
3. NGOs need to be sought out, and as per their agenda the suitable ones need to be encouraged to participate and contribute. This issue is not restricted to this PA alone but is common to others on the islands.
4. The existing survey reports need to be interpreted to consider what is important. There has to be a central think tank to spell out the research and monitoring needs and wherewithal, with specific plans and the mechanisms and modalities for going forward for some PAs. Some population estimates can be made by the PA, but this has not been attempted.
5. This exercise can take place with a community participation process as stated earlier. The PA stands to gain strong local support.
6. The management plan has outlined the operational needs that need to be considered. The light boat and the dinghy are unsuitable and need to be replaced by seaworthy craft. The communication facilities need to be improved. Efforts are being made at the government level to improve the communication facilities. The staff needs to be considered also.

## Rani Jhansi Marine National Park, Andaman & Nicobar Islands

### A. Management Strengths

1. The values are adequately articulated.
2. The PA is free of biotic pressures.
3. There is no human-wildlife conflict.
4. The only livelihood issue that of the fishermen is resolved by granting their boats innocent

passage through the waters of the national park (NP).

5. All complaints are addressed on a priority basis.

## B. Management Weaknesses

1. The management plan does not follow the approved format. It is yet to be approved and lacks sufficient data.
2. There is no stakeholder participation in the planning and management.
3. The personnel are inadequate. There is one RFO, who also has jurisdiction over Havelock Island, one Forester, two forest guards and one boatman. The islands are small and far flung. The DFO and the RFO are stationed at Havelock and do not have even a single vehicle at their disposal.
4. The NGO support is poor.
5. The staffs are trained in forestry but have no training in managing coastal and marine ecosystems.
6. Some floral and faunal surveys have been conducted and some good information generated, but the effort still has a long way to go.

## C. Immediate Actionable Points

1. The approved planning format needs to be used at an opportune time. Efforts need to be made to gather the required data about different components. This can be a continued process. Getting the plan approved needs to be expedited.
2. Fishermen passing through the waters of the NP and the residents of Havelock Island could be considered stakeholders as strategies develop in the future.
3. The required force as described in the plan proposal needs to be recruited. The fibre glass boat is not suitable for use in choppy seas. Dinghies are dangerous and cannot even be registered. At least two all-weather sea-worthy craft are needed. The activities of poachers from Myanmar and Indonesia cannot be discounted. At least one vehicle is needed for the DFO and the RFO.
4. NGOs need to be sought out, and according to their agendas, the suitable ones need to be encouraged to participate and contribute. This issue is not restricted to this PA alone but is common to others on the islands
5. The help of institutions, NGOs and experts needs to be sought urgently to develop training modules. Those institutions that offer training in forest management need to consider the specialized needs of such PAs.
6. The available reports need to be interpreted to identify what is important. There needs to be a central think tank to spell out the research and monitoring needs and wherewithal, with specific plans and the mechanisms and modalities for going forward for some PAs.

## Sri Penusila Narasimha Wildlife Sanctuary, Andhra Pradesh

### A. Management Strengths

1. The threats are well identified, and all efforts are being made to reduce these in spite of the odds.
2. Although there are vacancies in the frontline ranks, the protection strategies are on track, with protection camps located in strategic places, with good support. There is a special task force of personnel from the forest department and police to stamp out the scourge of smuggling of Red Sanders.
3. The present visitor centre at Panchalakona has been planned well and is being developed. The EDC members managing it are well trained. There is an excellent butterfly garden, and a section is devoted to medicinal plants. In time, with the wildlife populations recovering, this facility will potentially support with the required outreach.

### B. Management Weaknesses

1. Smuggling of Red Sanders timber is a particular threat.
2. The sanctuary is under the control of four territorial divisions—Nellore, Rajampet, Kadapa and Proddatur. The core area is in charge of the Kadapa Wildlife Division. As such, there are challenging constraints for planning and implementation of management.
3. The abundance of native animals, including birds, is low, probably because of the disturbed past. Populations are not being monitored.
4. Revision of the management plan is pending since 2015. The preliminary plan lacks details and directions.
5. There is little or no participation of the stakeholders/people in planning and management.
6. The staff vacancy level in the frontline ranks is close to 50%. The staff members are not trained in wildlife management.
7. The staffs are not sufficiently mobile, and their field accoutrements are inadequate.
8. There is little about the sanctuary on the department's website.

### C. Immediate Actionable Points

1. The special task force, made up of forest and police personnel, needs to persevere with its actions against the Red Sanders smugglers as it is doing now. The vacant positions in the frontline ranks (see Management Weaknesses, item 6) need to be filled up on priority to strengthen the protection in the field against all illegal activities.
2. Priority action is needed to make the sanctuary an independent unit under unitary control. The cogent recommendations in the previous management plan need to be revisited and

improved if necessary. The decision obviously would need to be taken at the highest level of administration. However the matter of reorganization needs to be proposed formally at the earliest and pursued.

3. Monitoring the populations of at least the better known vertebrates needs to be undertaken annually. There are now many techniques to choose from. A format for daily observations should be included for use of personnel patrolling their jurisdictions. Help for undertaking wildlife surveys could be sought from institutions with expertise. Stronger strategies for management of habitats can emerge from monitoring/surveys to help population recoveries.
4. Immediate action is needed to revise the management plan. The term of the previous one ended in March 2015.
5. Unless the staff strength is raised to its full capacity and the personnel are provided the necessary mobility and essential field equipment, the matter of enlisting the participation of local communities will be difficult. Hence action needs to be taken on priority to provide the full complement of staff members. People's participation also includes government functionaries of other departments. Programmes need to converge to serve the conservation of forests and other ecosystems in a common frame of reference. This needs to be addressed at appropriately high levels of administration.
6. There is an excellent training centre at Dulapally, in neighbouring Telangana. The training courses in wildlife management, including thematic training modules, offered by the centre could be utilized to train the staff adequately. There needs to be a phased timetable for the purpose. The officers could avail themselves of the training courses offered at WII, Dehradun. Training is never a one-time exercise but a continuous one in consideration of the regular turnover of personnel.
7. The sanctuary and in fact all PAs need to have adequate quality space in the department's website.

5

## Cotigaon Wildlife Sanctuary, Goa

### A. Management Strengths

1. There is effective protection, with four patrolling camps. The vehicle-based and foot patrolling are regular.
2. There is effective handling of human-wildlife conflicts.
3. Funding is received in time.
4. The visitor services, viz. ecotourism centre, canteen, butterfly park, walking paths, visitor safety features and visitor information, are effective.
5. All complaints are properly logged and attended to on a priority basis.
6. The habitat restoration programmes are on track.

## B. Management Weaknesses

1. PA values are not fully explored and articulated. They are scattered across the plan creating confusion. Threats not fully articulated.
2. The zoning of the PA is on hold pending final notification.
3. The entire funding is from the state. No funding is received from the Centre.
4. Stakeholders residing within the PA and outside are not enabled to participate.
5. Integration in a landscape has not been attempted.
6. Although the current staff are working efficiently, the vacancies amount to 33%.
7. NGOs have next to no contribution.
8. Individuals from different institutions have undertaken research, but little effort has been made to interpret and use the relevant knowledge.
9. There are few livelihood-related strategies for the resident population (which is small).

## C. Immediate Actionable Points

1. The management plan needs to follow the recognized framework. The values are to be fully explored and safeguarded. Details of the threats that have been identified are needed and they need to be quantified where necessary.
2. The final notification needs to be expedited. The zones and their constitution need to be worked out in anticipation.
3. Considering the future strategies, adequate funding needs to be sought from the Centre.
4. The participation of stakeholders in planning and management needs to be ensured.
5. The PA has habitat that extends into Karwar Division, Karnataka and Anshi-Dandeli Tiger Reserve. The NTCA concept could be used for enhancing the effectiveness of the management.
6. The staff strength needs to be brought to full working capacity at the earliest.
7. Efforts need to be made to explore NGOs with agendas that would be useful for the PA. These need to be cultivated.
8. This weakness is not restricted to this PA alone. Regular attempts are needed to interpret useful information to strengthen the management.
9. There are plans to train and integrate members in ecotourism activities. These plans for other opportunities need to be followed vigorously.

## Bannerghatta National Park, Karnataka

### A. Management Strengths

1. The values and threats are effectively articulated
2. Habitat-specific restoration strategies are in place.
3. The protection is effective, with 26 anti-poaching camps. Solar fencing and masonry walls have been raised at the identified points of conflict to prevent conflicts between people and elephants and other animals.
4. All complaints and conflicts are addressed expeditiously.
5. Estimates of the populations of wild species are made every 4 years using the NTCA protocol.

### B. Management Weaknesses

1. There are six hamlets within the PA. There are encroachments also. The linear shape of the PA presents bottlenecks.
2. Stakeholders do not participate in the planning and management.
3. The habitat continues into Hosur Division, in Tamil Nadu. But the two parts have not been managed as a part of the landscape.
4. Although the staffs are efficient and knowledgeable, 33% of the posts are vacant.

### C. Immediate Actionable Points

1. Removal of encroachments and efforts to promote voluntary relocation of the hamlets need to be explored.
2. Dialogues with the resident community and people residing along the periphery are necessary.
3. A dialogue with the Hosur Division of the Tamil Nadu Forest Department is needed to synergize the management strategies—protection issues and conservation of wide ranging species, to mention just two important aspects.
4. The need for recruitment requires to be addressed at the state level.
5. While the protocol is excellent, the PA can very conveniently undertake annual estimates, but not doing so, the field staffs face a serious risk of losing the field skills that are associated with the techniques involved, especially with the current rates of staff turnover. There can be significant fluctuations in the some species that have low populations (particularly with the highly linear shape of the PA) over very short intervals. These fluctuations are not captured by the long-term protocol.

## Bhimgad Wildlife Sanctuary, Karnataka

### A. Management Strengths

1. The values and threats have been documented appropriately.
2. The biotic pressure is relatively low.
3. There are excellent opportunities for landscape-based planning and management.
4. A strong protection platform has been created.
5. There is strong support from NGOs.
6. Ecotourism initiatives have had a good start.

### B. Management Weaknesses

1. The zoning of the area is weak and unclear. The proposal for the Eco-sensitive Zone has been hanging fire for quite some time.
2. The sanctuary is currently a part of the Belgaum Territorial Division.
3. The habitat management/restoration initiatives need to be strengthened.
4. Considering the conservation values and the size of the area, the staff strength is not adequate.
5. The participation of the local communities in planning and management is weak, and livelihood issues have been poorly addressed.
6. The information available to the public regarding the sanctuary is inadequate.
7. Very little has been done regarding research and monitoring.

### C. Immediate Actionable Points

1. The Karnataka Forest Department has had a long tradition of excellent wildlife management. It is also a state with extensive forests. Thus it would be appropriate to separate Bhimgad Sanctuary as a unit independent of the Territorial Belgaum Forest Division. This is not to downplay the good work done by the division towards effective management of the area but to stress that as an independent unit managed by a DCF it could do even better in conserving its values. The Belgaum Division is one of the largest among the territorial divisions in Karnataka, and it has to be managed effectively—as it is being now—as a vital portion of the landscape that includes PAs, a tiger reserve and portions of managed forests (RFs) in Karnataka and adjacent Goa. It would thus be fair for the sanctuary and the territorial division if they are managed independent of each other.
2. It follows that to conserve the diverse values of the PA it needs to be zoned according to the principles already laid down, with separate boundaries, area statements, objectives and strategies.
3. An excellent platform has already been established for protection. It needs to be

strengthened by an intelligence-gathering mechanism, informer system and database of offences that complement the efforts of the neighbouring tiger reserve.

4. The strength of the management personnel needs to be realistically reviewed. The size of the PA as an independent range is quite large. It is suggested that two ranges, with one forest guard per 15 km<sup>2</sup> as a standard, be adopted. The Tourism Zone needs a separate Deputy RFO.
5. Since ecotourism has had an excellent beginning, a well-appointed interpretation centre is in order.
6. To ensure that the support and participation of the local people in planning and management are good, efforts need to be made to transcend the current levels through a PRA exercise and by meeting at least the minimum aspirations of the local communities through convergence of inter-agency programmes. The capabilities of the Belgaum Forest Division could stand in good stead in this regard.
7. While what priority research needs to be undertaken—by the PA on its own steam and through collaborative partners—may be filtered through an appropriate process of consultation, some immediate needs of monitoring could be met straightforwardly. For example, the populations of the better-known mammals, particularly all threatened species, could be monitored. Depending on the outcomes, this could materially help strengthen conservation strategies. Open areas as identified are important. A system of permanent plots would help understand change and evolve cogent strategies for management. These are only two examples. The process can be extended to a long list of monitoring considerations with specific techniques.
8. There is an excellent opportunity for bringing about landscape-based planning and management in concert with neighbouring Goa, with the largest areas under the management control of the Karnataka Forest Department.
9. Efforts need to be made to resolve the constitution of the ESZ, but much depends on Goa in this matter.
10. The state may consider appropriately designing content regarding the PA in its website. There are other PR avenues those could be explored. There is excellent support from several NGOs already.
11. The tenure of the current management plan will be completed in March 2018. The new one needs to be for a period of 10 years. This new plan may consider the recommendations made herein.

## Cauvery Wildlife Sanctuary, Karnataka

### A. Management Strengths

1. The values and threats have been defined well.
2. The site has an effective management plan.
3. Although the process of integrating PAs within the large landscape has not yet been formalized in planning and management within the country, the sanctuary is part of a significantly ecologically rich landscape with wide-ranging populations of the Elephant and

Tiger. There are other PAs around Cauvery Wildlife Sanctuary (WLS). The coordination in the context of conservation is taking place via the similar objectives of these areas although this coordination has not been formalized. This is an ideal situation for planning and demonstrating landscape-based planning and management.

4. Given the heavy biotic pressures and conflicts, very good efforts at protection are being made, with 48 anti-poaching/patrolling camps that are excellently equipped and supported.
5. There is good support in the form of resources such as those required for mobility, equipment and buildings.
6. Local communities and stakeholders participate in several aspects of planning and management.
7. The site has the support of the local people.

## B. Management Weaknesses

1. The biotic pressures and human-wild animal conflicts are considerable, which is not surprising because of the 35 enclaved villages and the presence of significant populations of the Elephant, Tiger and other large animals.
2. Several posts among the frontline ranks are vacant.
3. The release of Central Government funding is always delayed.
4. Although efforts are being made to address the livelihoods issues of local communities, much more could be done.
5. Although the Elephant and Tiger populations are periodically monitored, because of the specific nature of the projects, the other species lack such monitoring.
6. The visitor facilities can be better.
7. The information available about the sanctuary in the public domain is sketchy.

## C. Immediate Actionable Points

1. The process of relocation and rehabilitation of villages is in the preliminary stage. According to the relevant guidelines, this needs to be accorded priority; but especially since there are local sensitivities and interference on account of local politics, the process is necessarily slow. Even if some villages agree to be relocated, it would greatly help in reducing the pressure on the PA.
2. Given the conservation importance of the area, to strengthen the management, the quantum of frontline staff positions needs to be realistically worked out, but even before that, all the staff vacancies in the field need to be filled up on priority.
3. The stage is well set to define the limits of the landscape of which the sanctuary is a part and to attempt to prepare an overarching landscape-based management plan integrating the interests of all the PAs and reserved forests.
4. There are procedural requirements that arbiter timely release of central funding. It would be necessary to examine the matter at the level of the state government to resolve the problem concerning late release of these funds. This would benefit all the PAs within the state.
5. There are 17 EDCs functioning within the PA. The state government has issued detailed instructions regarding the constitution and functioning of the EDCs. Besides the EDCs, the

welfare of the resident communities would be better served with an emphasis on women's self-help groups, working for better access to drinking water, health care and programmes for skill development, entrepreneurship and education. The opportunities offered by the provisions under corporate social responsibility could be explored.

6. The populations of species other than the Tiger and Elephant need to be monitored on a regular basis. There are several field-friendly techniques for doing this. This needs to be in addition to the once-in-4-years exercise conducted by NTCA and WII. The results, among others, would help test the extent of success in managing threats and making appropriate corrections.
7. The area could have an independent website to explain its conservation values, management in general and service to society.
8. It is understood that the existing visitor facilities will be upgraded and this will follow the overall sequence of management priorities, which is as it should be. There are also plans to create new facilities. The department has set stellar examples through the performance of Jungle Lodges and Resorts, an independent company. This is only to suggest that such excellence needs to be kept in consideration while planning the facilities.

9

## Gudavi Bird Sanctuary, Karnataka

### A. Management Strengths

1. The biotic pressures are very low.
2. The area is too small to have different zones, but the tourism zone and the rest of the PA are well conceived.
3. The protection is effective—there is a chain link fence, CPT and regular patrolling.
4. The management of the habitat is effective.
5. The visitor services are effective. There are excellent and tasteful visitor paths and other facilities.

### B. Management Weaknesses

1. The values of the PA other than birds have not been explored.
2. The management plan framework used is ad hoc, and thus the related information is scattered.
3. There is hardly any support from NGOs.
4. There is no stakeholder participation in the planning and management.
5. There is considerable scope for research. But there has been no attempt to carry out research. The monitoring of bird populations is quite inadequate.

### C. Immediate Actionable Points

1. Other values, such as natural and economic values, need to be assessed and articulated.
2. The approved format needs to be used for the management plan.
3. Belgaum and Karwar are not far away from the PA. Efforts to join hands with the NGOs there are needed.
4. There are local stakeholders. There is a need to establish contact and a rapport with them.
5. The bird counts are carried out for recording numbers. A design for estimates that would provide insights is needed. Measurements of the water quality are made, but no interpretation has been attempted. The area, being quite small, is naturally fragile. Good monitoring protocols are essential.

10

## Idukki Wildlife Sanctuary, Kerala

### A. Management Strengths

1. The values and threats have been effectively articulated.
2. The boundaries have been demarcated well, and the biotic pressures are low.
3. The management plan is effective.
4. There is effective participation of the stakeholders.
5. The habitat restoration programmes are appropriate.
6. The protection is strong. The anti-poaching camps are strategically located, and there is patrolling on land and in the reservoir (by boat), with the routes being recorded on GPS.
7. The personnel and resources are adequate.
8. There is good support from NGOs.
9. The local communities are on board and extend full support. Priority is given to their employment, providing them health care, walls and power fences to protect property, fishing concessions in the reservoir, with sustainable practices, improvement of school facilities and medical camps.
10. The intensity of people-wildlife conflict is low, and incidents are addressed promptly.

### B. Management Weaknesses

1. The area is an isolated habitat island with large stretches of the surrounding areas under human occupation.
2. Although the zonation is mostly appropriate, the visitor zone is not fully demarcated.
3. The monitoring of populations using a sighting register is not effective.
4. There is little information about the PA in the public domain.

### C. Immediate Actionable Points

1. It is important to continue extending strong protection.
2. The tourism zone needs to be demarcated appropriately. The visitor facilities need to be upgraded such that the security and integrity of the habitats and wildlife are not compromised.
3. Appropriate techniques need to be adopted for estimation/monitoring populations regularly, evaluation and interpretation of data and further actions as necessary.
4. The website of the Forest Department can provide appropriate space for the PA. What management-related information is posted will be determined by the department's policy.

11

## Mathikettan Shola National Park, Kerala

### A. Management Strengths

1. The values and threats are documented well.
2. The level of human interference is quite low.
3. The protection is effective.
4. The resources, such as vehicles, buildings and equipment, are adequate.
5. A concerted effort is being made to address the livelihood issues of the tribal community dependent on the area, including welfare measures. This has been very successful.
6. There is excellent outreach via a well-designed website that includes the features of the national park and the other PAs within the Munnar Wildlife Division. There are brochures as well.
7. Considering the small area of the national park, the visitor facilities and programmes are very good, with local guides and safety measures.

### B. Management Weaknesses

1. The area previously had coffee and cardamom plantations. While the eradication of cardamom plantations has met with considerable success, there are niggling problems in getting rid of the coffee plantations for the reasons stated in the report. This is a considerable hurdle in the matter of restoration of habitats although there is no let-up in the efforts, with alternatives being tried.
2. Since the park is more or less an isolated area, the prospects of integrating the PA into a wider network in the landscape are low.
3. The staff vacancy amounts to 38% of the sanctioned strength, and specialized training in wildlife management is lacking. This needs special mention since Kerala is ahead of most other states in training personnel in this discipline.

4. No NGO is working in the area although Kerala is known for NGOs with wide interests and objectives.
5. Monitoring populations of vertebrates—at least the better known species—is lacking.

### C. Immediate Actionable Points

1. The current approach, including the experiments for eradication of coffee plantations, needs to be continued. This can be bolstered by laying plots that could be used to measure the success of the techniques employed.
2. Staff vacancies need to be filled up on priority, and a target of training at least 30% of the personnel in wildlife management may be considered. This should be possible since the area is small.
3. Efforts need to be made to explore the possibility of engaging NGOs with experience in natural history, nature interpretation and education, social welfare, especially concerning integration of women's groups, etc. These are examples. These are required to be set up with the help of dialogue with people including visitors and the non-tribal communities living adjacent to the national park.
4. The conservation values and threats of the park have been documented very well. The documentation can be used to establish monitoring protocols. There is a primary need to consider all the threatened species. The pulse of the management can be tested by the trends indicated by the outcomes.

12

## Kanyakumari Wildlife Sanctuary, Tamil Nadu

### A. Management Strengths

1. Excellent wildlife management plan
2. The conservation values and threats have been defined well.
3. Human-wildlife conflicts are resolved on priority.
4. The landscape has been defined well, and there is coordination with KMTR Tiger Reserve.
5. There is good support from NGOs in important areas of management.
6. The livelihoods and other issues of the Kani tribal community are adequately addressed.
7. There are excellent visitor facilities, and the plans to expand these are on track.
8. There is good support from the Kani tribal community.
9. Given the inadequate resources, every effort is being made to protect the area and address some of the niggling issues.

## B. Management Weaknesses

1. Besides the 47 habitations of the Kani tribals, there are several scattered estates of rubber and some that grow cloves and pepper.
2. The vine *Mucuna bracteata*, introduced by the Rubber Corporation, has escaped from the estates and is invading the natural forests, posing a great threat to the regeneration of the forests.
3. The demarcation of external and internal boundaries including those of the management zones is yet to be finalized because of several problems inherited from the Travancore State of the past.
4. The habitat restoration programme is inadequate.
5. Overall the vacancies among the field personnel are to an extent of 36%.
6. Funds reach the field during the third or fourth quarter, creating problems in utilization.
7. There is a lack of staff members trained in wildlife management.
8. The outreach is weak.
9. There is little monitoring of wildlife populations.

## C. Immediate Actionable Points

1. Overcoming the problems in defining and delineating the external boundaries is not easy. An agreeable solution has to be reached on which a resurvey must be based. This task will need adequate funding and needs to be accorded the highest priority. The complications will increase if the task is allowed to drag on.
2. The problem created by the weed *Mucuna bracteata* needs to be addressed on priority. It is an aggressive vine regenerating by suckers. Thus this task also demands adequate funding on a continuous time frame basis so that there is no let-up in the operation.
3. Adequate coordination with the rubber estates is needed so that the amount of disturbance can be reduced.
4. Besides attending to the sources of water, which is important, the habitat restoration needs and locations need to be firmed up with the necessary strategies.
5. Vacancies in the management ranks need to be filled up on priority. This would need to be accomplished at the appropriate state level.
6. The problem with late release of funds needs to be addressed at the concerned ministries of the state government. Funding to the wildlife management sector has always been poor across the country, but at least the areas of urgent needs within the sanctuary need to be considered for adequate funding.
7. Plans need to be made for phased training of personnel in aspects of wildlife management. The thematic courses that are available need to be considered.
8. The outreach can be improved by an adequately designed website—it could be part of the department's website. Brochures or pamphlets spelling out the features of the sanctuary would be effective along with some excellent plans for visitors that have already been implemented or are in the pipeline.
9. While the conservation values and threats have been defined well, programmes for monitoring wildlife populations with emphasis on threatened species need to be

systematically conducted so that trends can be derived and issues that might emerge could be effectively addressed.

10. Landscape-based management is the need of the hour. The sanctuary has a ring of protected areas in Tamil Nadu and Kerala. If the common problems are identified and the needs are addressed, it would be a great achievement. This is not just about the Kanyakumari sanctuary but the entire country. Such management needs to be formalized in relation to planning and actions including across state borders.

13

## Pulicat Lake Bird Wildlife Sanctuary, Tamil Nadu

### A. Management Strengths

1. The assessment of the values and threats is very effective. A valid option for rationalization of the PA boundary based on this assessment is suggested.
2. The zonation (core, tourism and traditional use/buffer zones) is well conceived.
3. The participation of the local communities in the planning and management is adequate.
4. Even given the odds, the protection is as effective as it can be, with volunteer forces joining hands and students acting as 'eyes'. More than 60 sign boards have been installed to denote the boundary.
5. The area is networked with the larger portion of the lake in Andhra Pradesh. There are joint action plans and management on the ground.
6. The inhabitants of 13 villages have been taken on board. Service to the community has been emphasized—39 ponds have been deepened, 13 schools now have compound walls, there are black-topped roads where these are needed, furniture has been provided to 13 schools, and threshing floors have been provided in three villages. There are regular meetings with stakeholders to solve issues. The management has benefitted with some quid pro quo.
7. Good scientific surveys have been conducted. The information generated is being used for management.

### B. Management Weaknesses

1. There are 13 villages within the PA, with a population of 44,000 people. There is a serious clash of the provisions under the FCA and WPA 1972.
2. The management plan is good but can be made more effective if the approved framework is used.
3. Traditionally the inhabitants of 52 villages in the surrounding area are dependent on the lake for their economic well-being. The pressures are overwhelming. Over-fishing, use of destructive methods for fishing crabs and prawns (exported to Chennai) and pollutants entering the lake from industries and installations are major problems.
4. The staff is quite inadequate. One RFO, one Forester and six anti-poaching watchers looks after three wetlands. Two guards are shared across three areas.

5. The lake is silting at the rate of 1 m per century. During the 17th century, when the Dutch used portions of the lake for navigation, the average depth was 3.8 m. At present it has been reduced to 1 m. The three mouths to the sea get clogged seasonally, which affects the ecology of the lake.

### C. Immediate Actionable Points

1. The proposal to exclude the villages and add an equal area of backwaters to the PA is valid and needs to be acted upon at the earliest.
2. The approved framework must be followed for the next management plan.
3. Dependencies on the Sanctuary cannot be wished away nor can these be corrected in the foreseeable future. Maintaining the status and enabling gradual change over time is the only way possible. As for industries, installations and prawn culture farms, the polluters-must-pay principle needs to be enforced.
4. There has to be realistic force planning for this important area, and recruitment needs to be made at the earliest. As this is a brackish water ecosystem, the staff needs specialized training. The financial support needs to be significantly increased.
5. Actions that can be taken up include monitoring the silt load and rate, trying to improve the catchment capability in Andhra Pradesh and testing the validity of opening the mouths of the lake with the sea.

14

## Mahavir Harina Vanasthali National Park, Telangana

### A. Management Strengths

1. The area is totally protected by fencing—partly masonry, partly chain link fencing. As funds are available, there are plans to convert the chain link sections to masonry walls. There is a perimeter road for monitoring the fence. The fence is respected by local communities and all citizens.
2. There is complete cooperation from the surrounding habitations including colonies of Hyderabad city.
3. There is good participation of the stakeholders in the planning and management.
4. Because of the constraint of the small area, the approach to managing the populations of the Blackbuck and Spotted Deer—capture and translocation to other PAs where these species could do well—is appropriate. This has resulted also in the development of the requisite skills and capabilities and the transfer of these to other wildlife managers.
5. The Centre for Environment Education and visitor facilities are very good. There is excellent scope for outreach.
6. The participation of NGOs is good, and veterinary care support is regular.
7. Most of the livelihood issues of the dependent communities of the four villages along the periphery have been addressed. There are a number of welfare programmes. These are

needed by the people. This has gone a long way in enlisting the cooperation and support of these communities.

8. The resources of vehicles, communications equipment and buildings are adequate.

## B. Management Weaknesses

1. The national park is small and fenced. It is a landlocked island with typical ecological and biological problems. Even if there were no fence, there is no area available for wildlife dispersal since the park is surrounded by the developed city. Having been an open grazing area in the past, it has inherited several aggressive weeds such as Lantana, Parthenium, wild Ocimum, Dodonaea and Cassia tora. In small patches, Prosopis juliflora has made its appearance. There have been plantation activities in the past, resulting in some dense canopies.
2. While some weeds are being addressed through control strategies, the monitoring is inadequate.
3. The number of staff positions is understandably small, but the vacancies amount to 60%, with the key position of the single RFO being vacant. There is no staff training.
4. There is no central funding support even though proposals have been sent.

## C. Immediate Actionable Points

1. Weed control needs to be repeated annually, and new targets have to be added. Since there are four blocks, weed control by species could be addressed separately—experimentally—and depending upon the habit of the species, there could be nested plots of different dimensions for the purpose of monitoring the response to the treatment. Besides this there could be plots in areas not being treated to track how the weed abundance is changing and what drives it. There are several scientific institutions participating. Experienced NGOs could be invited to participate. The monitoring and treatment could be developed in a project mode.
2. Some of the plantations need thinning for creating gaps of adequate size since the Blackbuck is a species of open areas and the Spotted Deer thrives in a mosaic of ecotones/edges. However, given the abundance of weeds, this is not recommended till favourable habitat restoration takes place. However this matter requires to be kept in contention requires appropriate/further consideration.
3. The staff strength is small, and therefore all vacancies need to be filled. It should be ensured that there are no vacancies that matter in the future, especially since the park is located in Hyderabad, where the headquarters of the forest department and wildlife management are on show.
4. While the park personnel are capable of transferring their skills of capture and translocation of animals to others, they could do well to receive training in different aspects of management at the training centre—an academy—at Dulapally, within the state.
5. The area might be small, but because of its isolation, abundance of weeds and closed canopies, the park needs constant attention for restoration and maintenance of habitats. Weed control poses a serious challenge under any situation. The operations need to be intensive and are necessarily expensive. Therefore there need to be concerted efforts to secure central funding for project-driven strategies. CSR sources of funding also need to be explored.

## Manjeera Crocodile Wildlife Sanctuary, Andhra Pradesh

### A. Management Strengths

1. Values and threats are effectively articulated.
2. The human-wildlife conflict relating to crocodiles is well contained in spite of a shortage of staff.
3. All complaints are properly logged and addressed on a priority basis.
4. Fishing is the major vocation. The members of the EDC of fishermen are trained in techniques of sustainable fishing, with areas assigned to them. This is working well.
5. There is a good nature education centre, with well displayed dioramas, videos on the PA and brochures. It conducts awareness programmes especially for students. There are four rowing boats, a floating platform, a watchtower and a well-conceived tourism zone. There are binoculars and bird books. Future strategies are on track.

### B. Management Weaknesses

1. An ad hoc framework is used for the management plan, which at times causes confusion.
2. There are some protection problems—local people surreptitiously lifting water for irrigation and grazing livestock along creeks and outsiders fishing in spite of an EDC of fishermen. The staff is quite inadequate.
3. There are problematic weeds—Lantana, Eupatorium, Ipomea and Prosopis.
4. Besides the fishermen there are other stakeholders, such as farmers and cattle raisers, who are not on board.
5. The proposed core zone has some islands, but the creeks have not been considered. These are important for crocodiles. These are also areas of conflict.

### C. Immediate Actionable Points

1. The approved management planning framework needs to be used.
2. Adequate planning by rank is needed for the staff along with strategies for patrolling and protection. The PA is a wetland with birds and crocodiles, and therefore the staffs need proper training.
3. Weed control needs to have high priority and is dependent on the availability of an adequate staff and resources.
4. Listing out the stakeholders and getting them on board with their participation in planning and management is necessary. Good strategies are planned, but unless manpower and resources are provided, these will not go forward.
5. The core zone needs reassessment. There are some good plans to address creeks but those that are significant and also such islands need to be considered.

## Pakhal Wildlife Sanctuary, Telangana

### A. Management Strengths

1. The threats to the sanctuary have been stated clearly and are being reduced.
2. Well-organized protection strategies, supported by the necessary mobility and communication
3. High morale of forest and wildlife managers at all levels and resolute stewardship. All the forests, inclusive of those in the sanctuary, are being clearly demarcated, including areas from which encroachers were evicted during and after insurgency by Naxalites. All areas under encroachment have been identified, and there is a relevant database on a GIS platform that is being put to excellent use. The road map for eviction of encroachments is in place. After the cut-off year of 2005, 78 sites have been identified for the first phase of encroachment eviction.
4. Full backing of the government at the level of the Chief Minister for protection of forests, eviction of encroachments and restoration of habitats. A large number of encroachments have already been evicted. People understand that the government means business. To establish quickly the identity of areas recovered after eviction of encroachment and to meet the demand, at least in the short term, for firewood, these areas are planted with Eucalyptus, giving a message to the people involved in past acts and to others and helping protect the remnants of the natural forest vegetation. It might sound strange that areas planted with an exotic species are listed as strengths, but there is immediate and short-term logic in it as clarified.
5. Convergence of multiple agencies to support the security of the soil, water and natural vegetation
6. The progress of tasks is monitored by the Chief Minister at weekly meetings.

### B. Management Weaknesses

1. There is dual control in the management of the sanctuary, by North and South Warangal territorial divisions, with the core area managed by Warangal Wildlife Division. The names of the divisions were being changed at the time of the committee's visit, with the earlier 10 districts in the state being recast into 31 districts. All the forest divisions will be coterminous with the new district boundaries, entailing major reorganization of jurisdictions. The sanctuary would continue to be under multiple controls of territorial divisions with overlapping wildlife divisions. This would create severe problems in cohesive management planning as well as in the implementation of management actions, with PA tracts being clubbed with territorial tracts of the concerned divisions.
2. Large-scale encroachments have been inherited as the fallout of the Naxalite insurgency over many decades and the disturbances thereafter.
3. The areas evicted from encroachment are planted with Eucalyptus. However, Eucalyptus is an exotic species. There are issues relating to allelopathy in the soil via the humus.
4. Natural forests that have escaped the attention of encroachers but have understandably

disturbed habitats have been identified are being protected, and where necessary, interplanting of native species, including Bamboo, has been undertaken. Waterholes are being given adequate attention.

5. Against the background that has been outlined, the EDCs of the past are all dysfunctional, and there is little or no stakeholder/people's participation.
6. There are delays in the release of central grants, which is something that is common with PAs across India.
7. Absence of trained personnel at all levels
8. Absence of research/monitoring
9. No NGO support

### C. Immediate Actionable Points

1. The problem of multiple controls has to be addressed on priority. PAs need to be independent units of management under the control of the respective wildlife managers. The boundaries may not be conterminous with district boundaries; this could be considered as an essential exception. The wildlife manager could be enabled to interact with district administration units falling in different districts when there are such overlaps. This can only happen through the highest level of administration.
2. The encroachments have to be evicted on priority, and this is being done vigorously. Please see Management Strengths (items 2-4).
3. Eucalyptus plantations that have been/are being raised on most of the forest lands over which encroachments have been evicted would need to be replaced by native forest species by planting such species. The aspect of allelopathy at such sites would need to be addressed suitably. This needs to happen sooner than later. It is conceded that relevant plans are afoot.
4. Although stakeholders'/people's participation is lacking, using the term 'people' in the inclusive sense, multiple government agencies have already been engaged for the purpose of ensuring the security of the soil, water and natural vegetation. Planting trees and other vegetation outside the forest areas according to the demands of the local people is being promoted strongly. Even the police department is required to set up nurseries for the purpose. This is just to put on record the fact that while getting people, especially local communities, on board is important and is acknowledged by the management, given the history, it will take some time but needs to be pursued vigorously.
5. The delays in the release of central grants need to be resolved at the levels of the ministries involved in the state.
6. While the immediate priorities are being addressed by the forest department/sanctuary managers, it is necessary to take stock of the quantum of trained personnel needed to manage the PA at different levels of responsibilities. There is an excellent training centre of the forest department at Dulpally that offers wildlife and other training courses and specialized thematic modules. It is necessary to take full advantage of the facility to train personnel in phases and utilize the training opportunities at WII for higher levels of managers. Such planning needs to be undertaken at the earliest to complement the quite difficult tasks currently being undertaken with excellent success in the field.
7. At this point some straightforward monitoring needs to be undertaken: (a) estimation of populations of wild animals by choosing appropriate techniques from the many that are

available now and (b) laying nested plots of different sizes on predetermined grids to track natural regeneration—grasses/herbs, shrubs, trees—in planted areas as well as in those areas that have been spared by encroachers but have disturbed natural vegetation.

8. NGOs need to be listed by their expertise, capabilities and work ethics. The appropriate ones could be enlisted/taken on board to support the various ongoing tasks.

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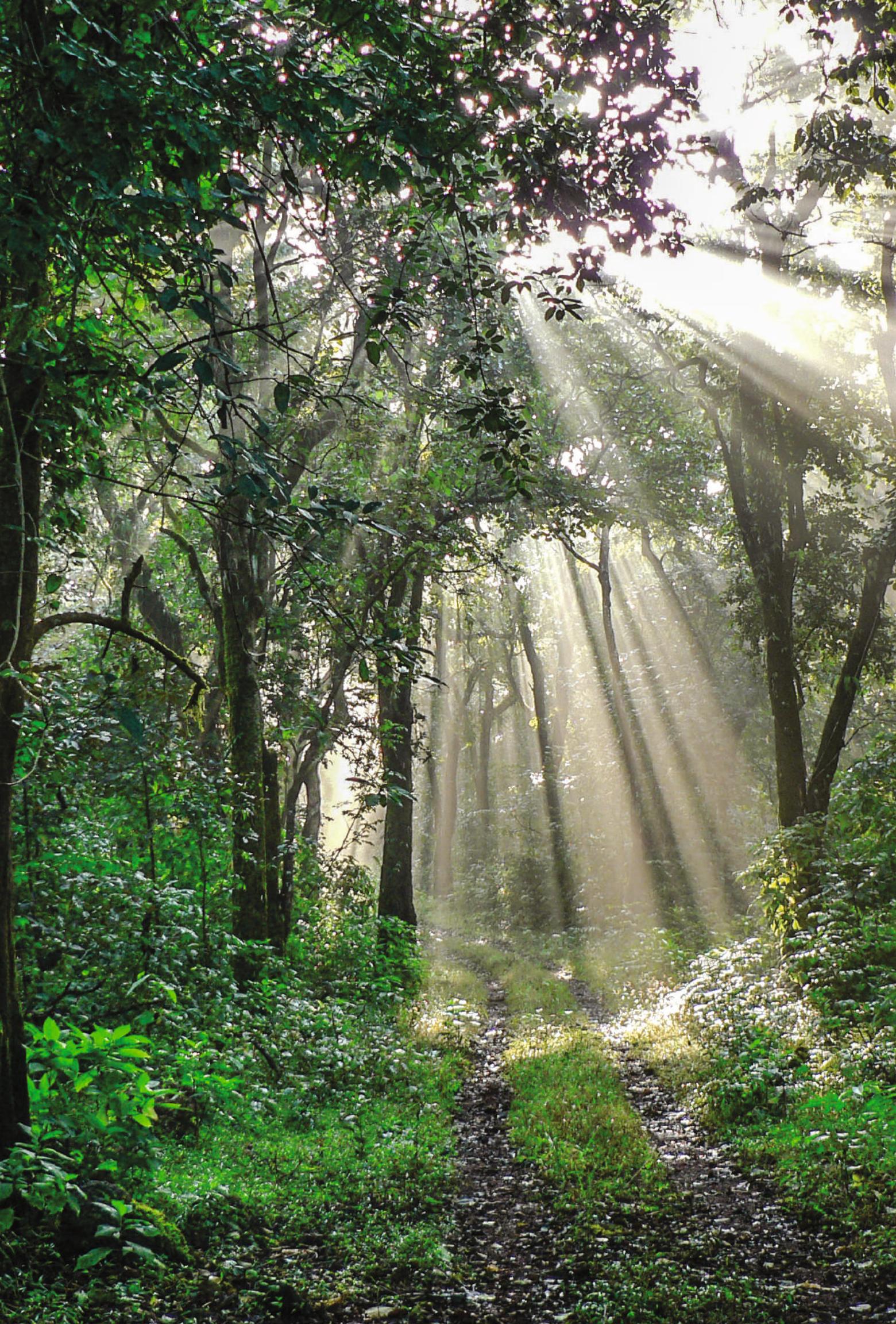




3.3

**MANAGEMENT  
STRENGTHS,  
WEAKNESSES AND  
IMMEDIATE  
ACTIONABLE POINTS**

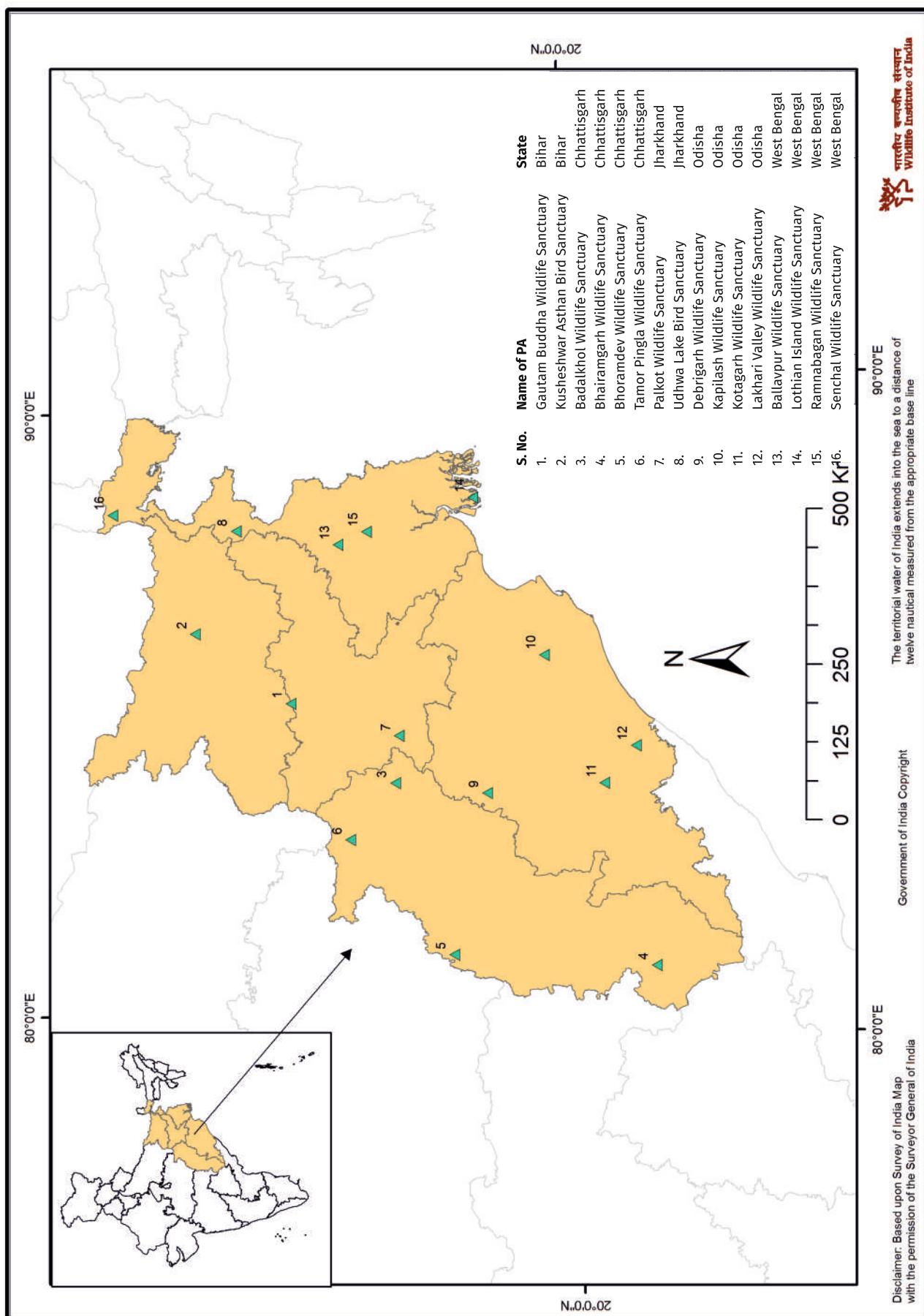
**EASTERN REGION**



## 3.3

## EASTERN REGION

S. No.	State	Protected Area
1.	Bihar	Gautam Buddha Wildlife Sanctuary
2.	Bihar	Kusheshwar Asthan Bird Sanctuary
3.	Chhattisgarh	Badalkhol Wildlife Sanctuary
4.	Chhattisgarh	Bhairamgarh Wildlife Sanctuary
5.	Chhattisgarh	Bhoramdev Wildlife Sanctuary
6.	Chhattisgarh	Tamor Pingla Wildlife Sanctuary
7.	Jharkhand	Palkot Wildlife Sanctuary
8.	Jharkhand	Udhwala Lake Bird Sanctuary
9.	Odisha	Debrigarh Wildlife Sanctuary
10.	Odisha	Kapilash Wildlife Sanctuary
11.	Odisha	Kotagarh Wildlife Sanctuary
12.	Odisha	Lakhari Valley Wildlife Sanctuary
13.	West Bengal	Ballavpur Wildlife Sanctuary
14.	West Bengal	Lothian Island Wildlife Sanctuary
15.	West Bengal	Ramnabagan Wildlife Sanctuary
16.	West Bengal	Senchal Wildlife Sanctuary



## Gautam Buddha Wildlife Sanctuary, Bihar

### A. Management Strengths

1. Although no attempt has ever been made to write a management plan for the sanctuary, the latest working plan of Gaya Division, in operation from 1980–1981 to 1999–2000, clearly indicates that the forests around Dhanua and Bhalua are rich in wildlife. The existence of at least two tigers in the area was recorded during a census conducted in 1978. Despite the fact that sanctuary is disturbed by the presence of a National Highway and a large number of villages, the area was always found to be rich in wildlife in the past.
2. The habitat of the sanctuary provides the catchment areas for two major rivers and many tributaries and rivulets. Except for the river Mohane, the water sources dry up in late winter and summer. The Mohane is the lifeline for many villages, at least during summer. The sanctuary has very important value, and therefore it must be protected at all costs.
3. Some spots in the forests and some trees are considered to be of religious significance, and villagers ensure that no harm is done to these patches, which helps protect the sanctuary.
4. The forests and wildlife are said to be enjoying better protection in such circumstances. The local villagers preserve all trees, especially fruit-bearing species such as chiraunji, mahua and bel. The villagers report that Naxalites leave only dead and fallen trees for consumption by the village.
5. The plantations raised in the interior areas are very good, as no one ever dares to destroy these plantations, fearing Naxalites.

### B. Management Weaknesses

1. The sanctuary is managed as two territorial ranges of Gaya Forest Division, namely Barachatti Range and Gurupe Range. Ninety-five percent of the sanctuary falls in Barachatti Range, and the remaining 5% falls in Gurupe Range. In addition to these, both ranges also have other forest areas of the Territorial Division. An exclusive focus on wildlife is, therefore, missing. The presence of a National Highway and 33 villages in Barachatti Range and four villages with large human and cattle populations in Gurupe Range is a threat to the sanctuary. The disturbances make protection very difficult. No under-passes have been provided for wild animals to cross the National Highway.
2. The Bihar Government has not recruited RFOs, Foresters and forest guards for more than a quarter century. Many posts at the crucial level are lying vacant, which is a very big challenge for the protection of the sanctuary. Whatever recruitments are made, are made on compassionate grounds, and the personnel remain untrained. It is heartening to note that some recruitment of forest guards is in the pipeline.
3. There are only one Forester and two forest guards for the protection of the sanctuary. The jurisdiction of these persons extends to the forest areas beyond the sanctuary.
4. The forest staffs managing the sanctuary are not trained in wildlife management. They do not understand the behaviour of the wild animals and are not conversant with their signs.
5. Disturbance due to Naxalites, heavy grazing by the cattle present in the sanctuary, collection

of fuelwood and dependence of people on the forests, especially fruit-bearing species such as mahua, chiraunji and bel, are important issues to be addressed by the management. Solving some of these issues is beyond the scope of the Forest Department.

6. The sanctuary has no wildlife management Plan and as a result, all habitat improvement works are approved by the Chief Wildlife Warden on an annual basis. During the field inspection, it was noticed that the works are implemented without proper application of the mind: for instance, water holes were constructed close to the perennial river. The water holes visited in the Tetaria and Sankhawa protected forests were found to be technically defective. Attempts have been made to create wells to tap the subsurface water, but the Conservator of Forests Gaya is of the opinion that all the water holes will have to be supplemented during summer. Natural drains were found to have been disturbed when constructing these water holes. Dams need to be constructed across important tributaries and rivulets to impound water so that it will last longer. The area chosen for grassland development has the root stock of miscellaneous species. Also, many village cattle were found grazing in this area. We find that this patch is unsuitable for grassland development.
7. Old records suggest that the area was rich in wildlife once, but during our visit to some of the patches in the sanctuary, we did not come across adequate evidence supporting the presence of wild animals.

### C. Immediate Actionable Points

1. The state government should find a competent person/agency and outsource the writing of the management plan of the sanctuary. The DFO Gaya is overworked, and he will not be able to do justice, if he is entrusted with this work. It is better to coordinate with the state of Jharkhand and draw up an integrated management plan for the sanctuary that involves both states.
2. The state government should hasten up the process of recruitment and providing training to staff. A routine exercise has to be introduced through which the fitness of all staff members is maintained/ enhanced. Unless they are able to take up aggressive patrolling in the forests, the conservation of the forests and wildlife will be threatened.
3. Modern geospatial tools need to be used for the complex task of collecting baseline biodiversity data and information. Appropriate capacity building initiatives are needed.
4. In addition to present staff, the sanctuary should be provided with some protection forces and anti-poaching camps. If a force is stationed at Bhaluachatti, it can be rushed to any part of the sanctuary to conduct raids on poachers and smugglers.
5. The habitat improvement programmes require more application of mind on the part of the DFO and CF. Selection of sites for check dams, gully plugs and water holes and the design of these structures require proper probing in the field. No water hole needs to be constructed to tap subsurface water when the storage is to be supplemented during summer. Under no circumstances should natural drains in the area be disturbed. Tributaries and rivulets may be dammed with properly designed waste weirs for discharge of the overflow. Similarly, experts should be consulted for selection of sites and choosing local species for grasslands.
6. The question of alternative livelihood options for forest resource-dependent communities must be addressed. During our discussion with EDC members, we observed that communities are willing to help the Forest Department with protection of the forests and wildlife. Many EDCs were established in the past, which have become defunct. The

only EDC that was found to be functional was established recently. EDCs require support from the Forest Department in the early stages.

7. A sufficient number of under-passes of appropriate design should be built across the National Highway to allow wild animals to cross from the northern part of the sanctuary to the southern part and vice versa.
8. There is evidence of degradation of forests due to fire in some parts of the sanctuary. Correct fire protection measures should be an important component of the management of the PA.

2

## Kusheswar Asthan Wildlife Sanctuary, Bihar

### A. Management Strengths

1. The sanctuary receives many migratory birds during winter every year.
2. The Kusheswar Asthan Shiva temple is very famous and attracts many devotees round the year. These devotees could be tourists of the sanctuary in winter, provided proper facilities visits and staying are developed.
3. The sanctuary could be an ideal place for researchers doing research on various aspects.

### B. Management Weaknesses

1. The Government of Bihar has not recruited Foresters and Forest Guards in the last 3 decades. Many positions across the state are lying vacant. Though some trackers are engaged in the protection of birds in this sanctuary part time, but their numbers are never enough to keep the illegal activities in check.
2. Fishing is rampant in Mahamari Lake and Ashman Lake. These lakes are supported by the water overflowing from the Kamala River. The lakes swell between June and September due to the large quantity of water coming in from Nepal. As a result, the protection strategies need to be strengthened.
3. There are 14 villages in the sanctuary. There are very dense human and cattle populations in the sanctuary. As the sanctuary is on revenue land and private holdings, it is very difficult to implement the Wildlife (Protection) Act 1972 in its true spirit.
4. The work of construction of a railway line from Sukari to Kusheswar Asthan through the sanctuary is in progress. The railway line is proposed to be extended to Khagaria and on to Saharsa. This is being done without the approval of the National Board for Wildlife. Also, an environment impact assessment has not been carried out. The construction of an embankment for laying the rails, without a provision for the passage of water is likely to disturb the wetland. This will in turn damage the habitat of the migratory birds.

### C. Immediate Actionable Points

1. The state government should commence recruitment of Foresters and Forest Guards. Unless trained personnel are available, protection and monitoring of wildlife will not be implemented properly.
2. Fishing and hunting of birds in the sanctuary are illegal. Education and awareness campaigns are necessary to bring such illegal activities to a halt.
3. The trackers who are being engaged as part time staff require training in wildlife subjects. They also require training in legal matters. In view of the vastness of the area, their numbers also need to be increased.
4. The state wetland authority should immediately take over the management of the sanctuary, which has been neglected.
5. Pockets of wetlands are to be identified, not only for the migrant birds but also as a natural stocking ground for fishes. This may help shift the pressure of catching fish to these identified pockets.

3

## Badalkhol Wildlife Sanctuary, Chhattisgarh

### A. Management Strengths

1. The most important value of the sanctuary is its hydrological value. The gently undulating terrain of the sanctuary gives rise to many streams, some of which are perennial, flowing into the Ib River. The power-and-irrigation project on this river is the lifeline of a large population.
2. The sanctuary provides connectivity to a larger ecological network. Elephant herds from Odisha use the sanctuary as a corridor for their movements. The anti-depredation squad also finds it easy to chase the elephant herds from the human-dominated landscape.
3. As some important animal and plant species appearing in the IUCN Red List are found in the sanctuary, it has biodiversity value.
4. Chhuri falls and Gullu falls are important tourist places in the sanctuary. The Forest Department can make use of these facilities and take up education and awareness programmes for the stakeholders.
5. The Korva tribe living in the vicinity of the sanctuary has a vast store of knowledge about utilizing the medicinal plants from the area. This knowledge should be utilized, and the tribe should be trained to prevent destructive harvesting of any plant species.

### B. Management Weaknesses

1. There are four villages inside the sanctuary and 31 villages on its fringes. The presence of large human and cattle populations in the sanctuary is a very big disturbance. During our

perambulation on foot on 27 November, we found that illicit felling of trees had been taking place regularly along a stretch of nearly 7 km in Compartment No. 59. We also found that stems of *Boswellia serrata* had been injured for collection of resin. Such injuries are sites of infection. The cattle movements inside the sanctuary are a matter of great concern. Many forest patches in the vicinity of habitations show no signs of regeneration. If the cattle pressure is maintained, there will be no forage left for the wild animals.

2. The roads in the sanctuary are maintained by the Forest Department. Borrow pits are excavated on both sides of the roads to spread earth on them. This practice is very old, and the repair of the roads is not in conformance with the technical requirements. Side drains are also not maintained. In flat terrain, side drains must be maintained to ensure that the roads are not damaged due to rains. The earth excavated from the side drains should be spread on the road, and the practice of excavating earth from borrow pits should be discontinued.
3. Stop dams are built across the perennial streams, which is undesirable. Similarly, water holes are constructed without considering the topography of the area. Many water holes are rectangular in shape and are provided with bunds on all four sides. These are technically incorrect structures and are not likely to hold water in the lean season. These structures are also likely to be breached. Water holes should be constructed by creating a bund across the streams, which go dry for two months during summer, duly providing for waste weirs and clearing inlet channels for maintaining the inflow.
4. The people of the Birhor tribe living in some of the villages on the fringes of the sanctuary kill monkeys for consumption. These are hunter gatherer communities and are not agriculturists. The Government of Jharkhand has taken steps to rehabilitate this tribe in Saranda by providing pigs. A similar step may be thought of by the Government of Chhattisgarh.
5. The Ib River runs partly along the northern boundary of the sanctuary. The construction of a 24 MW hydel power project is under way, with a barrage being built across this river at Gullu. An extent of 13.69 ha of forest land has already been diverted for submersion and a dump yard under the project, under the Forest (Conservation) Act 1980. The construction of a 5.2 km long underground tunnel along the left bank of the river in Jaspur Territorial Division has been completed. A penstock running from a storage tank for 690 m is envisaged under the project. A fall of 40 m is provided in the tunnel, and a further 200 m fall in the penstock is envisaged. The inflow in the river varies from 1 cumecs to 1150 cumecs. The project site is not more than 100 m from the sanctuary boundary. The manipulation of the inflow in the river without approval from the National Board of Wildlife is in contravention of the Wildlife (Protection) Act 1972.
6. The management plan of the sanctuary expired in 2013–2014. The new plan is not yet in place.
7. Two posts of Deputy RFO out of five and two posts of forest guard out of 20 are vacant in the sanctuary. Although the recruitment of protection staff has been started by the state, there are still many vacancies. It is learnt that the recruitment has slowed down for lack of adequate infrastructure for training. The state may explore the option of utilizing the training facilities of other states.

## C. Immediate Actionable Points

1. As are vacant posts in the staff, the State may step up recruitment and training so that all the vacant positions are filled up.
2. Ex post facto clearance of the hydel project at Gullu must be obtained from the National Board for Wildlife.

3. Road repair works inside the sanctuary should be taken up on technical principles. Side drains must be excavated, and the earth should be spreading on the surface of the road. The practice of excavating earth from borrow pits should be discontinued.
4. There is no need for constructing stop dams on perennial water streams. The topography of the land must be considered when locating, designing and constructing water holes. It must be borne in mind that these are technical works.
5. The Forest Department had built a rectangular water tank for the water requirements of Rajpur village. It was called Lata pani do muhan. This structure was built nearly 100 m from a point where the stream branched naturally, on the left branch, overlooking all technical requirements. Once the water in the left branch was obstructed, the right branch accommodated the overflow, resulting in heavy erosion and gully formation. It is obligatory on the part of sanctuary management to treat the right branch with engineering and vegetative methods. There is a stop dam under construction at the branching point.
6. The management plan should be prepared without any loss of time.
7. There should be a rehabilitation programme for the Birhor tribe living in villages on the fringes of the sanctuary. Or else the monkey population of the sanctuary and other adjoining forests will be wiped out.
8. Compensation for the damage caused to crops by elephants and wild pigs is unduly delayed. During the interactions with the villagers in the four villages inside the sanctuary, it was found that payment of compensation was not cleared even for the last year. The sanctuary management is expected to keep the villagers in good humour. These four villages have now become revenue villages. The Nageshia, Khatia and Pahadi Korva tribes of Dumarpani village complained that they had a problem in getting caste certificates from the Subdivisional Revenue Officer. They also complained about the lack of job opportunities in the village. The sanctuary management must play a proactive role and take up all these matters with the Collector, Jaspur.
9. The waterfalls and other spots in the sanctuary could be developed under ecotourism initiatives, providing a source of income to the local community.
10. The area is very rich in medicinal plants. The local medicinal plants could be grown on private lands, which will provide a source of income for local communities. The eco development concept should be implemented in the villages to seek the cooperation of the villagers.
11. The 10 vulnerable points that have been identified for locating patrolling stations should be provided with all facilities so that staff members can camp there.
12. An additional patrolling vehicle and two motor cycles should be provided in each camp, and there should be at least 20 additional forest guards and two game watchers in each forest compartment for better protection.
13. The staff should be made to undergo wildlife management training.

## Bhairamgarh Wild Buffalo Sanctuary, Chhattisgarh

### A. Management Strengths

1. The sanctuary provides the catchment of the River Indravati. The flora and fauna of the sanctuary need to be preserved in the interest of overall conservation and arresting climate change and its damaging consequences.
2. It has been proposed that the sanctuary be included in the buffer zone of Indravati Tiger Reserve. It is home of Tigers dispersing from the source population.
3. There are un-surveyed areas with good quality vegetation in the north of the sanctuary, along the right bank of the River Indravati. These areas are in Bijapur and Narainpur districts of the state of Chhattisgarh. They provide a very useful corridor for the movements of wild animals.
4. The plant and animal biodiversity of the sanctuary is rich. The sanctuary also provides refuge for many rare, endangered and threatened species. It must be managed for posterity.
5. The sanctuary has unexplored potential of high value for genetic diversity of important tree species such as Pterocarpus marsupium.

### B. Management Weaknesses

1. The sanctuary is threatened by the presence of villages with human and cattle populations. The basic needs of these villages are met from the forests of the sanctuary. The villagers obtain all their requirements of timber, poles and fire wood from the forests.
2. Cattle are sent to the sanctuary in large numbers for grazing. Cattle grazers also start fires in the forests. The habitat of the wild animals is damaged.
3. Collection of Mahua and other NTFP from the forests also depletes the food available to wild animals.
4. Shifting cultivation was prevalent in the area in the past. This has left behind many gaps in the forests. Unless the pressure from humans and cattle is minimized, it will be difficult to reclaim the gaps, and they will develop into grasslands.
5. The claims of tribals under Forests' Rights Act have been settled on several occasions. Dissatisfied persons make fresh applications and exert pressure through extremist groups. The clearing and burning of forests goes on unabated to enable the tribals to file fresh claims. The act continues to be misused, and we are in the process of losing more forests.

### C. Immediate Actionable Points

1. The purpose of the Forests Rights Act was to grant rights to those who were in possession of forest land as on 5 December 2005. Why can't the Act be repealed now?
2. The proposal to notify a buffer area for Indravati Tiger Reserve has been modified. Some areas with high human density have been excluded, and some other areas, along with this

sanctuary, have been included in the proposed buffer of the Tiger reserve.

3. Habitat improvement works are limited to the creation of new water holes and maintenance of old ones. During the visit the team found that the villagers and their cattle are also dependent on many of these water holes for their requirements of water. We must prevent the entry of cattle into the interior of the sanctuary. More water holes should be constructed in the interiors so that wild animals can use them exclusively.
4. The gaps created in the forests as a result of shifting cultivation in the past should be taken up for grassland development.
5. Because of left-wing extremism, the sanctuary does not have permanent protection camps in the forests. Some more mobile units may be required for effective protection.
6. Some Forest Guard and Forester posts are vacant. The state has been recruiting and training in the last 3 years, and there are very few vacancies at this level of the staff in other places. It appears that the officials are unwilling to be posted in areas disturbed by left-wing extremism. The state should bring staff members to such places from other places and post them there for a fixed tenure of 2 years. After completion of the tenure, the staff members should be transferred back to a place of their choice.
7. It may be necessary to monitor changes in the habitat periodically using remote technique techniques in view of the inaccessibility of the forests due to left-wing extremism.

5

## Bhoramdeo Wildlife Sanctuary, Chhattisgarh

### A. Management Strengths

1. The sanctuary has the catchment for some tributaries of the River Mahanadi and two reservoirs. One of the reservoirs provides water to Kawardha town and adjacent villages, and the other provides water for irrigation to agricultural crops.
2. This is an important sanctuary in the corridor connecting two Tiger Reserves: Kanha Tiger Reserve, of Madhya Pradesh, and Achanakmar Tiger Reserve, of Chhattisgarh. Other forest areas of Kawardha Division are in corridors connecting Kanha Tiger Reserve and Indravati Tiger Reserve. Thus it is an important sanctuary for the dispersal of Tigers. Monitoring during Phase IV of the All India Tiger Estimation revealed that some tigers have established their home ranges in this sanctuary.
3. There is political will to develop this sanctuary. The management must cash in on this.
4. The ecotourism initiative at Chilphi wherein facilities have been provided for tourists to stay overnight and experience the wilderness through trails has been widely appreciated by the public. A jungle safari for tourists in the core area of Bhoramdeo Range that has been opened recently is also liked by people. Visitors often sight wild animals such as the Blue Bull, Indian Gaur, Leopard, Sāmbhar and Spotted Deer.
5. Some of the villages inside Bhoramdeo Range have been vacated by the people. There are enough open areas where grasslands can be developed.

## B. Management Weaknesses

1. There is plenty of cattle movement in the sanctuary, especially in Chilphi Range. This leads to degradation of the habitat.
2. The grazing by cattle, collection of Mahua and other NTFP, presence of humans in the sanctuary and their dependence on the forests lead to forest fires, illicit felling of trees, encroachment, poaching, etc.
3. There are villages in Kanha Tiger Reserve that are being relocated. Some of these villages are in the vicinity of Chilphi Range of the sanctuary. Many villages of Chilphi Range are extensions of Kanha villages. The state of Chhattisgarh should have a similar programme of relocation for these villages, or they will exert pressure on the forests of Kanha as well.
4. There are vacancies, especially at the level of Forest Guards and Foresters, which is hampering the protection duty. The management feels that some additional posts of Forest Guard and Forester should be sanctioned by the state government to provide better protection.

## C. Immediate Actionable Points

1. The management has innovated a cheap method of plugging streams and impounding water for wild animals. The flow of a stream is obstructed by sand-filled gunny bags arranged in layers that taper towards the top. Similarly, the gates of stop dams are closed using wood and bamboo, which has been found to be effective. This system should continue.
2. The management should explore the possibility of relocating some of the villages, especially those on the fringes of Kanha National Park.
3. The state of Chhattisgarh should fill up the existing vacancies of Forest Guards and Foresters. Sanctioning of some more posts of field functionaries is also necessary for better protection.
4. Training programmes in wildlife conservation and monitoring should be organized for the field staff on a regular basis. Training relating to mobile-based data collection may also be provided.

Some vehicles should be provided for the mobility of the staff for protection of the forests and wildlife. Essential equipment such as wireless sets, GPS and camera traps should also be provided.

## Tamor Pingla Wildlife Sanctuary, Chhattisgarh

### A. Management Strengths

1. The sanctuary provides connectivity with a larger ecological network. Elephant herds from Odisha use the area as a corridor for their movements. Nearly 15 elephants are believed to have established their home range in this sanctuary.
2. The sanctuary is the catchment area of the River Pingla and River Moran. Apart from this, there are several artisan wells in the sal forests, which are responsible for the perennial water

flow. The irrigation projects on these rivers help the people in the respective command areas.

3. All seven families belonging to Durgai, the only village in Tamor Range, are willing to be relocated outside the sanctuary. The management should grab the opportunity, seek assistance from the state government and take up the relocation at the earliest. As the sanctuary is a proposed tiger reserve, attempts must be made to make it inviolate in the interest of the long-term survival of the tiger, co-predators and prey animals.
4. The sanctuary has several palatable species for elephants and ungulates. In Compartment No 945 of Tumbibari Beat, Pingla Range, several *Chloroxylon swietenia*, *Boswellia serrata*, *Lannea grandis* and *Grewia hirsuta* trees were found to have been damaged and uprooted by elephants. Elephants had fed on the roots and leaves of *Chloroxylon swietenia*, the bark and soft branches of *Boswellia serrata* and the leaves of many other species. Further, elephants like to consume the leaves and pith of *Cochlospermum religiosum*. Barring a portion of the sanctuary area in the vicinity of the villages, the sanctuary has very good habitat. Although sufficient evidence was found confirming the presence of wild boar, sloth bear, barking deer, gaur, blue cow, etc., the team did not have any direct sighting of any of these species. This indicates that the density of ungulates is meagre. Unless patrolling is taken up in the sanctuary and illicit felling and hunting are controlled, the ungulate population will not bounce back.
5. The field staffs are young, energetic, locally drawn and able to move in the forest. They may be trained in wildlife management and retained in wildlife divisions.

## B. Management Weaknesses

1. The management plan of the sanctuary expired in 2013–2014. The new plan has not yet been brought in.
2. It is recorded in the wildlife chapter of the working plan of Surajpur Division that only a few artificial water holes need to be created in Tamor Range and that there is no need to create any water hole in Pingla and Khod ranges. There are lots of artisan wells and perennial streams flowing in these ranges. Despite this vision, the management has continued to construct stop dams across many streams. In many places rectangular water ponds have been constructed, which are technically faulty. Pachgadahi pond, in Injani, Khod Range, is an example. The inflow has been obstructed, and because of vertical cuts all round, there is very little space for elephants to access the water.
3. Many a time technical principles are not followed in repairing roads. Side drains must be provided, and the earth excavated from there should be spread on the road. Under no circumstances should borrow pits be excavated in the forest on either side of the road.
4. Cattle-proof trenches were excavated in the past to demarcate the sanctuary from the forests of the Territorial Division. The practice has been discontinued and should never be restarted.
5. The sanctuary has forest guard posts, of which 15 are vacant. The post of Range Forest Officer, Khod is also vacant. The state government should step up the recruitment to fill up all the vacancies. If the training facilities are inadequate, the personnel can be trained in adjoining states.
6. There are seven villages inside the sanctuary and many more on its fringes. The human and cattle populations depend on the sanctuary for their timber, firewood, non-timber forest products, grazing, etc. The extra pressure on the sanctuary results in degradation of the habitat.

7. During our interactions in some villages, it was found that payment of compensation for crop damage caused by elephants and wild boars is delayed. There is a complaint that the compensation amount is meagre. The management must ensure that any damages are assessed liberally and that compensation is paid without any loss of time.

### C. Immediate Actionable Points

1. The management plan of the sanctuary should be finalized early so that the works are carried out in a systematic manner. Once the sanctuary is notified as a tiger reserve, a tiger conservation plan has to be in place.
2. The state government should step up the recruitment of forest guards and Range Forest Officers, considering all the vacancies that are likely to arise in the future as well. The state has increased the retirement age from 60 years to 62 years, and there has been no retirement during the last two years. The sanctuary management is likely to face a more acute problem if the recruitment is not stepped up.
3. Technical principles should not be sacrificed in taking up works relating to road repairs and water hole construction. Side drains must be cleared along the road, and the excavated earth should be spread on its surface. The practice of excavation of borrow pits in the sanctuary on either side of a road should be discontinued.
4. Unless there are special reasons, the perennial streams should not be blocked. In many places, stop dams were found to have been constructed with gates. If such a construction is on a perennial stream, then the expenditure is wasteful. The topography of a place must be looked into before the site is chosen for construction of a water hole. The flow of water should be blocked by duly providing a proper waste weir and clearing the inlet drains so that the inflow is maintained.
5. Durgai village is an enclosure in Tamor Range of the sanctuary. It is a small village of seven families, and all of them are willing to be relocated. The management must take up the matter with the state government and ensure that these families are relocated without any loss of time. As the sanctuary is proposed to be notified as a tiger reserve, it is all the more necessary that the villages be relocated and inviolate space provided for the long-term survival of tigers, co-predators and prey animals.
6. The PA should look after the resource-dependent community of the PA, and some income generation activities should be started, especially for women. The help of local NGOs should be taken under this programme for better community participation and for the programme to be effective. The district programme for village development could be channelized also for these villages.
7. The staff should be provided with field monitoring and documentation equipment such as field cameras, GPS and range finders. The range should have animal cages for emergency use. There should be game watchers in each beat to monitor the area effectively.
8. Patrolling camps with all staff amenities and patrolling vehicles should be in place (at least two in each range) to control poaching.
9. The local NGOs, schools, colleges, and Panchayat Raj institutions should be involved in generating awareness generation about the importance of wildlife, threats faced by wildlife and steps for its protection, conservation of biodiversity and halting climate change.
10. Research and documentation are tools of management. They have to be strengthened with the help of colleges and universities.

## Palkot Wildlife Sanctuary, Jharkhand

### A. Management Strengths

1. The sanctuary is a part of a larger ecological landscape providing connectivity with Badalkhol Sanctuary, in Jaspur District, Chhattisgarh. The connectivity extends to Timor Pingla Sanctuary and Guru Ghasidas National Park, in Chhattisgarh.
2. There are many streams and rivulets originating from the sanctuary. This water is the life line for several villages.
3. The natural caves provide protection to Sloth Bears, especially females using the place for rearing their young ones.

### B. Management Weaknesses

1. The sanctuary is disturbed by left-wing extremism. The members of the staff do not perform their duties freely. As a result, the protection of forests and wildlife suffers and so also the implementation of habitat improvement programmes.
2. In the total geographical area of 910 km<sup>2</sup>, the extent of the sanctuary is only 182 km<sup>2</sup>. To say that the villages are enclosures in the sanctuary would be wrong. The correct statement would be that the sanctuary forests are enclosures in human-dominated landscapes. The presence of such heavy populations of humans and cattle is going to degrade the sanctuary further.
3. The department has not even made a slow beginning in providing alternate livelihood options to the resource-dependent tribals and other communities living in these villages.
4. The ever-increasing number of claims under the Forests Rights Act, 2006 will result in degradation of the habitat of the wild animals. This will increase the conflict and threaten conservation.
5. Forest fires in the sanctuary are reported to be severe every year. This is a very big threat to conservation.

### C. Immediate Actionable Points

1. The department must enlarge the scope of providing alternative livelihood options to resource-dependent communities. It is absolutely necessary to halt the process of degradation of the habitat.
2. Claims made under the Forests Rights Act, 2006 should be settled judiciously. No claim should be processed without proper verification of consecutive satellite images from the relevant period.
3. Special efforts should be made to contain forest fires.
4. It is necessary to identify corridors and the problems associated with Elephant movements, crop damage, etc.

## Udhwa Lake Wildlife Sanctuary, Jharkhand

### A. Management Strengths

1. The sanctuary is on the migratory route of various bird species and is one of the most important wetlands of the eastern region of the country.
2. It is an important spot for conservation of biodiversity, particularly endangered, threatened and rare animal and plant species.
3. It is very good tourist spot in winters. It is a destination for day tourists. Thus, it provides employment opportunities for local residents.
4. Many EDCs have been established in the villages on the fringe of the sanctuary. Some EDCs, such as the ones established at Kistopur and Bagpinjara, are helping the Forest department in controlling the menace of illicit poaching.

### B. Management Weaknesses

1. During the construction of the Farakka barrage, in 1956, the private lands that fell in the area that is presently notified as the sanctuary were submerged and were acquired by the authorities. Although compensation was paid in many cases, some land owners were dissatisfied. They protested against the acquisition on the ground that the compensation was unpaid/partially paid. Subsequently the area around the sanctuary was occupied by many illegal migrants from Bangladesh. Whenever water recedes, nearly 150 ha of the bed of Berhail Lake is cultivated by the original owners (20%) and Bangladesh migrants (80%). These illegal cultivators transport their men, material and agricultural produce through the sanctuary in boats.
2. The sanctuary area is not well demarcated, and some original owners, who still contest the compensation paid to them, have continued to occupy some patches of the sanctuary. As mentioned in the foregoing, illegal migrants from Bangladesh cultivate a portion of the sanctuary when water recedes during summer.
3. As the MEE team moved about in the sanctuary, it was found that fishing is rampant in the area. Any number of bamboo structures, fishing nets, fishermen's boats, small tents and other camping equipment are to be found in the sanctuary. Illegal fishing in the sanctuary is a source of disturbance, and the Forest Department is not equipped to counter this menace.
4. The headquarters of the Range Officer in charge of this sanctuary is at Giridih, which is 300 km away. In addition to this sanctuary, the Range Officer manages two more sanctuaries.
5. The state of Jharkhand has not recruited Foresters and forest guards in the last two decades. Many posts are lying vacant, and some of the incumbents are not fit enough to carry out the rigorous work of forest protection.
6. None of the personnel, up to the Range Officer, manning this sanctuary have been trained in wildlife management. They do not have the skills needed to understand animal behaviour, nor are they conversant with animal signs.
7. Siltation, spreading of water hyacinth and infestation with weeds are the threats faced in management of the birds. Soil conservation works need to be planned in consultation with experts and implemented.

### C. Immediate Actionable Points

1. The sanctuary has been notified under section 18 of the Wildlife (Protection) Act 1972, and the final notification under section 26 of the said act is still pending. Since the Farakka barrage authorities have not fully compensated the original land owners, the Chief Wildlife Warden, Bihar, in consultation with the Collector, Sahibganj, may consider admitting some rights to cultivation and fishing in certain portions of the sanctuary. The portion of the sanctuary where these rights are admitted can become a conservation reserve or community reserve. We can take people on board, which will certainly help conservation.
2. An exclusive wildlife range should be created for the management of this sanctuary. In addition, a protection squad may be formed for collection of intelligence and aggressive patrolling in the area.
3. It is learnt that the staff selection board of Jharkhand has initiated the process of recruiting 2200 forest guards. This process may be expedited and a crash training programme organized.
4. The response of the EDCs was found to be quite positive. The Forest Department should take a more proactive role in creating opportunities for generating income for these groups. In many water-logged areas, Corchorus is grown, and the cultivators extract raw material for ropes from this plant. They may be trained in adding value so that they can manufacture and market jute bags, etc.
5. Ponds are created in private lands using EDC funds, with assurances from the land owners that they will permit the farmers of the adjoining lands to use the water for cultivation. The design of these ponds needs to be improved.
6. All seasonal land use patterns can be obtained from satellite imagery. This will help resolve the dispute and conduct a survey to fix the sanctuary boundary. Help should be solicited from the Revenue Department for fixing the sanctuary boundary and providing alternative livelihood options to the communities.
7. Adequate funds should be provided for developing infrastructure, habitat management, ecodevelopment and ecotourism. This will go a long way in improving the livelihood options of the families residing on the fringes of the sanctuary, which will, in turn, earn their support and help the management.

### Debrigarh wildlife sanctuary, odisha

#### A. Management Strengths

1. The sanctuary abuts the Hirakud reservoir and forms a very valuable catchment of the Mahanadi river basin.
2. The sanctuary has only two villages inside it, and there are two more villages just on its fringes. The two villages inside the sanctuary are Debrigarh and Jhagadabehera. Debrigarh has already been vacated by its people. The recognition of their rights under the FRA has been completed, and all the families have alternate places of living. They are holding on to

their property in this village to get compensation. The CWLW said that the sanctioning of compensation is in the final stage and for all practical purposes this village can be taken as vacated. Jhagadabehera has 39 families, and a sincere attempt is being made by the management to relocate these families from the sanctuary. There are two villages at the fringes of the sanctuary, Lambipalli and Mundokatti. There is no immediate proposal to relocate them.

3. Through Dechua RF, of Baragah District, and the forests of adjoining Chhattisgarh state, this sanctuary is connected to Sunabeda Sanctuary. Despite the fact that the connectivity is through some human-dominated areas, Elephants do use it as a corridor for their movements.
4. There are 12 anti-poaching camps located strategically in Kamgaon and Lakanpur Ranges of the sanctuary. Though 21% of the frontline staff positions are vacant, the management of the sanctuary has recruited 80 daily wages staff members and strengthened the patrolling force. There is a good system of protection of the forests. Also, forest fires are kept under check.
5. The management also focuses on checking the areas below transmission lines outside the sanctuary so as to prevent farmers from drawing power illegally and connecting it to their solar fences to protect the crops from Wild Pigs and other wild animals. Such checking outside the southern boundary of the sanctuary, where there are many villages, is quite intense.
6. The road maintenance work in the sanctuary is very good. As far as possible, side drains are provided on both sides of the roads and there are hardly any borrow pits in the forest area. Causeways and culverts are also maintained well. This maintenance helps the mobility of the protection staff. Tourists are also happy moving in the designated area.
7. The sanctuary is free of encroachments.

## B. Management Weaknesses

1. There are 74 villages within 5 km of the boundary of the sanctuary. The communities residing in these villages depend on the forests of the sanctuary for their requirements of timber, fuel wood, fodder, bamboo, etc. Some miscreants residing in these villages are involved in hunting and poaching of wild animals.
2. The area between the highest flood level and usual maximum submergence is tree growth. In fact these are as good tree growth as in the sanctuary. The management says that these areas are in the administrative control of the Water Resources Department. The tourism infrastructure at Barkhandia has been established in one such area. Although it is technically outside the sanctuary, it disturbs the peace and tranquility of the sanctuary. The approach road is through the sanctuary. It provides for 14-bed accommodation, a dining place, etc. and is being run by the management of the sanctuary. There are rumours that similar infrastructure is to be created in other pockets and that the infrastructure at Barkhandia will be expanded. This should not be allowed.
3. There is water scarcity in summer in the hilly areas away from the reservoir. All the ponds constructed are close to the high flood level of the reservoir. Thus the density of wild animals such as the Sambhar, Gaur, Chousingha and Chital etc is high in areas abutting the reservoir. The management should create water holes in the higher ridges and remote locations of the hilly terrain.
4. Planting of fruit-bearing species is done on the bunds of all the artificially created water holes. Though tree guards have been provided, many of these plants have not grown well. Better seedlings and Ficus cuttings need to be planted.

5. There is no research and monitoring of the status of wild animals. Action must be taken to rope in some researchers (NGOs and universities) to carry out periodical censuses of important animal species.
6. The ecosensitive zone on the northwestern periphery of the sanctuary is restricted to only 2 km as against 5 km in other areas. It has been done to see that Dongri Lime stone mine, which is sold to ACC cement, can function smoothly.
7. The presence of industries to the north and northwest of the sanctuary, in Bargah and Jarsuguda districts, results in untreated pollutants being discharged in the River Mahanadi, which also pollutes the water in the reservoir.

### C. Immediate Actionable Points

1. The expansion of tourism infrastructure and construction of new tourism complexes adjoining the sanctuary should be prohibited.
2. Some SMC works of loose boulders check dams be planned and implemented in remote hilly areas away from reservoir. Some of these water holes may have water even in summer. Some of the creeks transport water to interior locations in the rainy season. Check dams should be built across the creeks in consultation with the Water Resources Department.
3. Except the Range Officer Hirakud, no other member of the front line staff has received any training in wildlife management. Short-duration courses (on sign surveys, censuses, the use of camera traps, data analysis, etc.) can be organized so that the staff are conversant with wildlife management. The services of NGOs and university experts may also be sought.
4. The industries discharging untreated sewage and pollutants may be educated so that they run their STPs and discharge only treated pollutants into rivers and water bodies.
5. The protection staff are already patrolling outside the sanctuary to check the illegal drawing of power to protect crops against Wild Pigs. This patrolling is a very good practice and must be continued. Other PAs in the country should also follow it.
6. There is a practice of constructing rectangular water ponds of size 40 m × 30 m × 3 m irrespective of the terrain and natural drainage of the area. No doubt this is successful, but a simpler structure can reduce the cost. The flow of water can be obstructed by a check dam of appropriate size with a waste weir. All the inlet channels will remain open, and there will be sufficient inflow.

10

## Kapilash Wildlife Sanctuary, Odisha

### A. Management Strengths

1. The sanctuary is situated along with other forests of Dhenkanal Division. Together with these forests it provides connectivity between two important Tiger reserves, Simlipal and Satkosia, of the state of Odisha. Of course, the connectivity to Simlipal is through Hathgarh Sanctuary.

2. The forests of the sanctuary are in the catchment of the River Brahmani. It must be protected at all costs.
3. A 125 km<sup>2</sup> area of the sanctuary is contiguous, barring only two villages inside, which were ringed out at the time of notification. The two villages are Bania and Kolha. But the sanctuary is surrounded by many villages.
4. Transmission lines going through the forest division are potential threats of electrocution of Elephants and other wild animals. NTPC has started laying cables for transmission of power, and some of the transmission lines are likely to be replaced by cables in due course. This may reduce the instances of illegal drawing of power by some farmers, which may reduce the electrocution of wild animals.
5. The communities in some villages offer prayers to Elephants. One such village is Sarisapada, situated on the fringe of the sanctuary, in which the villagers do not claim compensation or ex gratia payment for damage inflicted by wild Elephants. The attitude and mind set of the people are positive, which should be utilized to spread the message of conservation in other villages.
6. All the rectangular water ponds created are along the periphery of the sanctuary, where the area is gently sloping. There is water scarcity in remote areas of the higher slopes in summer. The management has been taking up the construction of a series of check dams using loose boulders across the streams originating from the tops of the hills. This is a very good initiative that should be continued for many such streams originating from the tops of the hills.
7. There is a system of stopping the traffic on NH 55 near Gadasila and Meromandoli villages, of Dhenkanal Range, to allow Elephants to cross the road. Also, there is a practice of sending messages to the railway control room at Khurda, which responds favourably and slows down the trains at a particular hour, whenever Elephants cross the railway line.

## B. Management Weaknesses

1. The communities in the villages surrounding the sanctuary are heavily dependent on forests. They extract timber, firewood, poles and grasses from the sanctuary. Cattle are also found grazing in the sanctuary in large numbers. The regeneration of the forests is threatened.
2. Water holes and salt licks created in the sanctuary are also used by domestic cattle visiting the sanctuary. Foot and mouth disease is likely to be transmitted to wild animals because of this.
3. Regali canals (Canals under the Regali Project on the Brahmani) all over Dhenkanal District have fragmented the corridors of Elephants and other wild animals. Power Industries in Dhenkanal and Hindol ranges have also added to the fragmentation. Heavy traffic on NH 55 and rail traffic on the Cuttack-Talcher line have made matters worse. This has resulted in intense human-wild Elephant conflict over the last 7-8 years. This has impacted the lives of wild animals in the sanctuary. As if this were not enough, another railway line is coming up between Talcher and Sukinda. Stage I clearance has already been granted under the Forest (Conservation) Act, 1980.
4. A large numbers of collieries in Talcher and several power Industries in Dhenkanal and Hindol ranges have been polluting the River Brahmani.
5. There is a serious threat of poaching of Elephants for tusks in Hindol Range. The area is adjacent to Attagarh Forest Division, where many poachers reside.
6. The sanctuary management is spread over three ranges of Dhenkanal Division. In addition to the sanctuary, the three Range Forest Officers have to manage the Reserve Forest areas also. However, the Foresters and Forest Guards have exclusive jurisdiction over the sanctuary. The

posts of one Forester and two Beat Guards in the sanctuary are vacant. However, the management has employed 25 daily wage watchers for protection duty as well as for anti-depredation of wild Elephants.

7. The staff members working in the sanctuary have not been provided training in subjects related to wildlife management.

### C. Immediate Actionable Points

1. Some ecodevelopment works are being carried out in the fringe villages, but this is not enough. During the visit to Ramkrishnapur village, in Dhenkanal Range, it was found that the villagers do not have LPG connections and depend upon the sanctuary for their fire wood requirements. It is high time that the dependence of the communities on the forests is reduced.
2. SMC works of check dams and gully plugs should be attempted in areas on steep slopes. This is the only method of storing water in remote areas. The construction of rectangular water ponds of dimensions  $40\text{ m} \times 30\text{ m} \times 3\text{ m}$  will only work in gently sloping areas. Several such water ponds have been constructed on the fringes of the sanctuary and close to habitations. This will draw wild animals to the fringes of the sanctuary and will be a cause of increased conflict.
3. The team visited a bamboo plantation raised in 2016–2017 in two blocks of extent 15 ha and 5 ha in the sanctuary, near Kolha village. Growing plantations in wildlife areas is very difficult. No fencing has been provided this year and as a result all the bamboo seedlings are browsed. Even village cattle are found to be roaming in this plantation. More sincere attempt should be made in growing such plantations.
4. More underpasses across NH 55 and the railway line should be considered. The structures provided for elephants to cross the canals should be modified after doing some experimental research appropriately to best facilitate elephant movement.
5. Industries and collieries should be prevented from discharging untreated flows into the River Brahmani.
6. Vacancies should be filled up and the staff members working in the sanctuary should be provided short training programmes on subjects related to wildlife management.

## Kotagarh Wildlife Sanctuary, Odisha

### A. Management Strengths

1. The habitat is the catchment area of several streams, which are tributaries of important rivers, namely the Rahul and Chauldhua. The water is used for irrigation, power and drinking.
2. The biological diversity of the sanctuary is rich, which is a very strong reason for providing protection.
3. Part of the sanctuary is situated in the Kotagarh–Chandrapur elephant corridor, which is a

very important corridor for the movement of elephants between Kalahandi and Raigarh. Plenty of bamboo is available in the area, and it provides food to elephants and other ungulates. Thus, instances of human–elephant conflict are minimal.

4. Although there are no statutory compulsions, an area of 1254 km<sup>2</sup>, including 266 revenue villages in 414 km<sup>2</sup> around the sanctuary, has been declared the buffer zone of the sanctuary. This is a positive commitment on the part of the state of Odisha in helping conservation. Mainstreaming wildlife in the buffer area will help conservation further.
5. Young persons from the local Kuttia Kondh tribe are recruited in protection force of the sanctuary. They have mustered local support, which helps with the management.
6. The elephant corridor plan has been mapped on the basis of experience relating to the movements of elephants. This will help track down elephants and minimize human–elephant conflict.

## B. Management Weaknesses

1. The presence of 65 revenue villages in the sanctuary, occupying nearly one third of the geographical area of the core, is a very big threat to conservation. Although some of these villages are covered by EDCs, a lot of effort needs to be put in to extend the coverage. Alternative livelihood options are to be provided to all the needy families in these 65 villages. In addition to these villages, there are several unauthorized encroachments in the sanctuary. They are all claiming titles under the Forest Rights Act. So far, 2172 cases have been granted, and the sword is still hanging over the Forest Department. The maps provided with the titles are simple polygons without reference points in the Forest Block marked. Quite often, the land occupied by the title holder on the ground does not tally with the map.
2. The forest–tribal interface in Kandhamal District gives rise to many conflicts. We are continuously losing forests, and the titles granted to the tribals are not linked with any development. The political leaders in the tribal hamlets decide the forest area to be cleared and crops to be grown. After clearing the trees, the men folk guard the area, and the women folk transport the cut wood, including firewood. Often, the forest protection forces are silent spectators.
3. Habitat development work, such as meadow/grassland development, is not provided for in the management plan. Thus such work has not been taken up. Mid-course correction of the plan may be necessary.
4. Podu cultivation is still in practice in many areas of the sanctuary.

## C. Immediate Actionable Points

1. The water holes constructed in the hilly terrain of the sanctuary were found to be technically faulty. Proper dams/bunds are to be built to obstruct seasonal/perennial flow, with appropriate waste weirs for discharging the overflow. Raising bunds on the remaining three sides is not desirable as they will obstruct the inflow. Having terraces on all four sides is suitable for water holes on nearly flat ground, especially in villages. During our visit to a water hole in Dadang, in Tumulibundh Range, the above-mentioned fault was noticed. This was discussed on 22 June at Bhubaneswar with the CWLW, who promised to ensure that such faults do not recur.

2. Grassland development needs to be taken up near water holes to help conserve the ungulate population.
3. Local miscreants damage watch towers and lay the blame on Naxalites. There has to be a system of regular monitoring and repair of the damaged structures.
4. The protection staff of the Forest Department may be covered by insurance against attacks by wild animals/Naxalites.
5. The final notification of the sanctuary is pending with the state of Odisha. This may be expedited.
6. The core and buffer areas of the sanctuary are administered by three Range Forest Officers working under the territorial DFO. The focus on wildlife is lost at the division level. It would be proper to create a post of Assistant Conservator of Forests exclusively for the management of the sanctuary. The Assistant Conservator of Forests would report to the same DFO, which would help coordination.
7. Tiger reserves have “Tiger Foundations” as required under the provisions of the Wildlife (Protection) Act 1972. Thus even if the release of funds is delayed for some reason, payment of wages to the protection staff is not delayed. It is necessary to create a state-level trust for all wildlife sanctuaries and national Parks, where any donations of money can be parked and utilized for payment of wages and meeting other emergency expenditures. This will go a long way in helping conservation.
8. Starting fires in the forests is a regular practice among the tribals. They do this to clear the trees for podu cultivation. The Forest Department must put in adequate efforts to reverse this trend.
9. The management has sent a proposal to the Government of Odisha to relocate five villages, in which there are 75 families, from the core area of the sanctuary. The villages and families have been identified, and they have accepted the proposal, subject to proper compensation being awarded. The state may act on the proposal quickly.
10. Trained staff is an asset to the management. The staff should be trained in the use of modern wildlife management techniques, wildlife laws and handling modern equipment such as GPS, camera traps and range finders as well as documentation methodology.
11. Incentives and rewards should be initiated to boost the morale of the field staff. The staff should be sent to other PAs for interactions.
12. The universities of the state, institutes and NGOs should be encouraged to take up research and documentation in the PA, which is located in the Eastern Ghats.
13. There is great potential for ecotourism and nature tourism. These activities should be started to seek community support for conservation.

## Lakhari Valley Wildlife Sanctuary, Odisha

### A. Management Strengths

1. Although there are no statutory compulsions, the state of Odisha has declared an area of 371 km<sup>2</sup> around the core area of the sanctuary a buffer area because of its commitment to mainstreaming wildlife concerns. An extent of 118 km<sup>2</sup> of this buffer is forest area, and the rest consists of villages, generally situated on the eastern boundary of the sanctuary. There

is scope to form EDCs in these villages, which may help conservation in due course.

2. Four EDCs have already been formed in villages in the core area of the sanctuary. These EDCs cover all six revenue villages in the core area. A non-formal education programme in these villages is supported by the Forest Department. Several other income-generating activities are also supported by the EDCs.
3. The sanctuary provides the catchment area of three rivers, namely the Rama, Ghodaghata and Bahuda. There are three dams, one on each of the three rivers, have been constructed for which serve the purpose of generating hydroelectric power and for irrigation. Livelihood is also available to fishermen in adjoining villages on the eastern boundary.
4. The biological diversity of the sanctuary is rich, which is a very strong reason for providing protection.
5. The sanctuary is connected to forest areas in the important elephant corridor between Kalahandi and Raigarh. Thus, there is scope for the resident elephants of the sanctuary to migrate. The location of the sanctuary is also useful for the movements of carnivores.
6. Most of the field staff, including women members, are young, energetic and motivated. They are fit enough to take up aggressive patrolling and deal with smugglers and poachers. It is the responsibility of the DFO, ACF and RFO to maintain the fitness of the staff. It is necessary to organize regular drills, running, climbing hills and other physical exercises so as to keep them fit.

## B. Management Weaknesses

1. Apart from six revenue villages, the core area of the sanctuary has 30 unauthorized villages, in which nearly 500 families live. They cultivate encroached forest land. Eighty-one titles were granted under the Forest Rights Act recently in eight of the unauthorized villages. The cattle of these families graze in the sanctuary. Illegal removal of trees, hunting and left-wing extremism make the protection more difficult. This leads to degradation of the habitat and is an impediment to conservation.
2. There are delays in the release of funds, which in turn delays the payment of wages to the protection staff. This results in a lack of enthusiasm for protection.
3. Habitat improvement works such as grassland/meadow development are not provided for in the management plan. Thus, these have not been undertaken.
4. Settlement of rights under the Forest Rights Act is in progress, in which the Forest Department has a very limited role to play. Illegal encroachers have a tendency to clear more forests and occupy more area for titles.
5. The entire sanctuary is under the administrative control of a Range Forest Officer, who works under a territorial DFO. The coordination issues have been properly sorted out, but at the level of the forest division, the focus on wildlife has been lost.
6. The field staff are not trained in wildlife management, monitoring and legal issues.
7. The infrastructure for wildlife monitoring and protection needs to be improved further.

## C. Immediate Actionable Points

1. Many roads in the core area of the sanctuary need to be repaired. It is learnt that Naxalites may not object to these repairs as the people residing in the sanctuary want the roads to be improved.

2. Grassland development needs to be taken up close to water holes for conservation of the ungulate population.
3. Timely release of funds may be ensured so that wages are paid to the protection staff on time. This is likely to enhance their performance.
4. The management plan of the sanctuary envisages that Rs.14 crore is to be spent on the conservation of this sanctuary during the plan period of 10 years. This will help establish conservation plots for research on the biodiversity of the area, create meadows, provide support to the EDCs in minimizing the dependence on forests, provide equipment such as GPS and camera traps, etc. This should be prioritized.
5. Not many research papers have been published on the forests and biodiversity of areas in the Eastern Ghats.
6. Sometimes the staff members of the sanctuary are ill-equipped as regards winter clothing, raincoats, boots/gumboots, etc. The CWLW should ensure that these facilities are provided to the staff. The monitoring wildlife and the transport facilities provided for patrolling should be on par with tiger reserves.
7. Borrow pits were found to have been excavated on the sides of the forest roads for providing earth for maintenance. Spreading fresh earth on these roads before the monsoon makes them slushy. It is advised that the earth excavated from the side drains be spread on the road and heavy rollers be employed to compact it.
8. Water holes constructed in the hilly terrain of the sanctuary were found to be technically faulty. Proper dams/bunds are to be provided to obstruct the perennial/seasonal flow with appropriate waste weirs for discharging the overflow. Putting up bunds on the other three sides is not desirable as it obstructs the inflow. Providing terraces on all four sides is suitable only for ponds on nearly flat ground, especially in villages.
9. The final notification of the sanctuary is pending with the state of Odisha. The notification may be expedited.
10. It is better to create a post of ACF Wildlife. This officer can be given exclusive control of the sanctuary and buffer area and may be asked to report to same DFO, in the interest of coordination.
11. The management plan should be updated according to the present requirements and approved. Wildlife management planning, corridor and landscape connectivity planning, providing enhanced visitor services through ecotourism and nature tourism and climate change planning are also suggested.
12. The constitution of the steering committee at the state level and the coordination committee at the DFO level should be according to the Wildlife Protection Act 1972.
13. A wildlife trust should be created for all the sanctuaries of the state so that there is better fund flow and assistance is received from other agencies. The funds can be utilized for all emergency services and timely payment of wages to the protection staff.

## Ballavpur Wildlife Sanctuary, West Bengal

### A. Management Strengths

1. This 200 ha PA is located within the city limits of a very important tourist place 'Santiniketan'. An ecotourism initiative is being administered by the State Forest Development Agency (SFDA). The revenue is credited to the agency.
2. Three wetlands attract a large number of water birds and other migratory birds during winter. They are an additional attraction for tourists.
3. The population of Spotted Deer is growing, and the animals can be reintroduced in any other PA of the state.
4. The PA status helps protect the flora and fauna of the sanctuary.
5. This sanctuary is a perfect example of an urban PA within city limits and has immense potential in terms of conservation education and providing a clean and high-quality environment to its citizens. As such, the PA should be developed with good investment of resources.

### B. Management Weaknesses

1. There are four villages adjoining the sanctuary. These are Khaspada, Kalipanj, Pear Sampalli and Lalbagh. The villagers indulge in unauthorized collection of medicinal plants, mushrooms, dry sticks, poles and fuel wood. The important medicinal plants collected from the sanctuary are Kalmegh, Shatmuli, Sarpagandha, Adathoda vasica and wild garlic.
2. The sanctuary boundary requires a permanent fencing. Similarly, the wetlands require maintenance. The chain link fencing provided to the 60 ha Spotted Deer enclosure is getting rusted. It is therefore advisable to go for a compound wall along the 8 km perimeter of the sanctuary.
3. There is a shortage of permanent staff members. Similarly, there is a shortage of staff members trained in different wildlife subjects.
4. There is an acute shortage of funds that is affecting routine maintenance works such as maintenance of the boundary fencing/wall, habitat improvement and wetland maintenance.

### C. Immediate Actionable Points

1. The most important protection measure requiring immediate attention is construction of a boundary wall along the 8 km periphery of the sanctuary.
2. There is a bird trail for educating tourists and promoting awareness among them. Winter birds add to the attraction. The PA should initiate bird watching facilities and promote them through the media.
3. Experts may be consulted for maintenance of the wetlands. A master plan/management plan should be prepared for taking up the works of weeding, de-silting, etc. Once there is an

approved master plan/management plan, priority works can be implemented whenever funds are received. If necessary, the existing management plan, which is in currency till 2020, can undergo a midterm revision.

4. The revenue realized from eco-cottages and tourist visits is credited to the SFDA. Part of this fund should also be made available to the DFO Birbhum for carrying out maintenance works of the facilities at least on par with North Bengal PAs.
5. The growth of the Spotted Deer population needs to be controlled strictly. If the population continues to increase, it will exert an immense pressure on the limited resources of the land, funds and staff, and as a result the forest department receives undue flak. Sterilization of males should be considered as a first step in this direction. The excess population should be rehabilitated in any deficient area.
6. If Spotted Deer have to be kept within the sanctuary, there must be an indentified location in the sanctuary to control their maximum number.
7. The potential of this sanctuary arises from its three wetlands, which attract a large number of migratory winter waterfowl. The sanctuary may also be named a bird sanctuary or managed as a bird Sanctuary with all facilities and infrastructure.
8. There is a need to upgrade and renovate the existing nature interpretation centre and interpretive materials. The fossils should also be part of the interpretation programme.
9. There are plantations of *Acacia auriculiformis* and *Cassia tora* within the sanctuary. These should be replaced by local plants, particularly *Ficus*, in due course after making the initiative a part of the habitat development prescriptions of the management plan.
10. The importance of the PA in climate change and its role in carbon capture should be highlighted and included in the updating mechanism of the plan.

14

## Lothian Island Wildlife Sanctuary, West Bengal

### A. Management Strengths

1. Estuarine areas are heavily populated and any ecological imbalance may result in disasters such as tsunamis and cyclones and take a heavy toll on the population. Coastlines throughout the world are facing problems of coastal erosion and the threat of rising sea levels. Mangrove forests are between the land and sea and can provide better protection to the shoreline compared with any engineering and technological solutions. Mangroves also act as catalysts in reclaiming the land from the sea. The state government has rightly notified this area as a sanctuary and is making all-out efforts to protect it.
2. The sanctuary island is free of human and cattle populations. There are two patrolling camps, one in the northern portion and the other in the southern portion. The presence of forest officials in these camps and their patrolling on the island ensures better protection of the flora and fauna from illicit cutting of mangrove trees and hunting of wild animals. There is a monitoring protocol in place, and the patrolling of the staff is recorded and monitored by senior officers who inspect the sanctuary.
3. The sanctuary is a part of the Sundarbans Biosphere Reserve, which is a UNESCO World Heritage site. It provides connectivity to a larger ecological network. Its protection is a key to averting/minimize the effects of any disaster hitting the area.

4. The state government has initiated steps for creating an ecosensitive zone of a width of 2 km all around the sanctuary. This zone being a water body is under threat due to the movements of fishing trolleys and boats carrying persons likely to indulge in illicit cutting of mangrove trees and hunting in the sanctuary. With the notification of the ecosensitive zone, the management will be in a better position to exercise checks and controls against the aforesaid illegal activities.

## B. Management Weaknesses

1. The islands around the sanctuary are heavily populated. The livelihoods of the sizeable population at Namkhana and the block headquarters, Patharpratima, depend upon fishing and crab collection. When we moved in a launch from Namkhana in the River Hatinia Doania and joined the River Saptmukhi, we came across many boats and trolleys moving in the water body in the vicinity of the sanctuary. Fishing nets were also spread in these rivers by a large number of fishermen.
2. There are two anti-poaching camps established on the sanctuary island. At least four members, comprising permanent watchers and casual daily workers, are present in each camp. The post of Forester and one of the two posts of forest guard are vacant in the sanctuary. The West Bengal government has not taken up recruitment of Foresters and forest guards for several years. It may not be practicable to protect the sanctuary without the assistance of adequate trained staff members.
3. Several saline banks can be seen from the watchtower of the south camp of the island sanctuary. The vegetation in these banks is damaged, as salt water has remained stagnant for lack of proper drainage during low tides. The Forest Department has to remain alert against fishing and crab collection communities blocking drainages.
4. Planting of casuarina and mangrove species has been taken up on shores of sanctuary as well as other adjoining Islands. Fishermen while spreading their nets damage the rows of some of the plantations. As ascertained during interaction with Forest Protection Committee members of Bhagwatpur village, the livelihood of nearly one third of the house hold is fishing.

## C. Immediate Actionable Points

1. As explained previously, the islands adjoining the sanctuary are heavily populated, and a sizeable portion of the population depends on fishing and crab collection. This poses a threat to the sanctuary. Since an area of 2 km width all round is becoming the ecosensitive zone, the fishermen in this belt may be helped to find alternate livelihood options.
2. The ecosensitive zone may be notified early.
3. The state government should regularly recruit and train forest guards and Foresters so that these posts do not remain vacant in critical areas where there is a threat of smuggling and poaching.
4. No census of herbivores has been taken up. It is advised to take up a herbivore census periodically so that the status of the wildlife and the effectiveness of management interventions are determined at regular intervals.
5. During an interaction with the Forest Protection Committee of Paschim Darokhapur, it was found that nearly 400 out of the 1130 families are tribal and of Santhal Pargana origin. These tribal families were moved for coupe work during British rule. In those days, couples were

laid in mangrove forests. It is the responsibility of the Forest Department to provide livelihood options for these families.

6. The sanctuary requires two more speed boats. An additional jetty needs to be constructed for the patrolling staff for better connectivity.
7. The management plan (2010–2020) requires a midterm review. New schemes dealing with climate change need to be included.

15

## Ramnabagan Wildlife Sanctuary, West Bengal

### A. Management Strengths

1. Despite the sanctuary being located in a city that is a district headquarters, it is very well protected against illicit felling of trees, grazing and fire. The fencing and compound wall running all around the sanctuary provide foolproof protection. The protection staff have shown their commitment and sincerity and ensured that tourists visiting the zoo and sanctuary do not cause any harm to the flora and fauna.
2. The sanctuary area is low lying. It retains rain water for long durations, thereby sparing the township from heavy floods. During the years 1999-2000 and 2000-2001 the sanctuary remained under 3-4 feet of water for nearly 10 days. The sanctuary has, thus, a very important hydrological value.
3. Fodder is being developed in the sanctuary in two blocks of 1 ha each. The plots are opened for rotational grazing to the deer population.
4. The growth of the deer population in the sanctuary has helped reintroduce deer in forests across the state.
5. The biodiversity of the sanctuary is rich. The presence of diverse floral species in the sanctuary, which is located in the heart of the town, provides a very good resource for conducting education and awareness programmes for students of life sciences.
6. There are three water holes in the sanctuary, and these have been maintained regularly. In addition, concrete tubs have been placed at various places in the sanctuary for providing water. Thus there is no dearth of water for the animals.

### B. Management Weaknesses

1. The sanctuary does not provide any connectivity with a wider ecological network as it is an isolated patch located in the middle of a town, which is a district headquarters. Construction of enclosures inside the sanctuary, for Bardhaman Zoological Park, is in progress.
2. The Forest Department is treating the sanctuary as an urban forest and zoo. No real purpose is being served by the sanctuary.
3. Polyalthia longifolia is proliferating like weeds. Although the management is taking action to clear it, it has not been successful.

### C. Immediate Actionable Points

1. The state government should review the situation. If this sanctuary is being treated as an urban forest and zoo, then the objectives of the sanctuary management need not be pursued. However the sanctuary should never be denotified, as its current status ensures better protection.
2. The Government of West Bengal has not recruited forest guards and Foresters for several years. As a result there is a shortage of young blood at the field level. The protection of forests in general is suffering. The government should review its action and commence recruitment early.
3. As this sanctuary is an appropriate place for conservation of urban biodiversity, the state and national biodiversity boards should consider granting some funds for the purpose. Also, studies relating to urban biodiversity should be taken up by recognized institutions. The CWLW may approach the state biodiversity board in this regard.
4. The management plan expired in 2011-2012, and a new plan has been in place with effect from 2012-2013. The new plan requires the approval of the Chief Wildlife Warden of the state.
5. Medicinal plants have regenerated well in a patch near the sloth bear enclosure. It must be preserved at all costs.
6. The biodiversity of the area is rich. Name plates with the scientific names may be fixed on plants. This will help education and awareness programmes.

16

## Senchal Wildlife Sanctuary, West Bengal

### A. Management Strengths

1. The sanctuary has very important significance as it is the catchment of artificial reservoirs with water storage for Darjeeling town. Protection of the forests will not only help wild animals but is very necessary for optimal water harvesting from the catchment.
2. The sanctuary has upper and middle hill natural forests, which support an immense diversity of plants and animals.
3. Villagers in the vicinity of the sanctuary practice organic farming. Fruits, vegetables and crops are grown without using chemicals.
4. All of Darjeeling District is under the Gorkha Hill Council. There are no village panchayats in any village. The process of granting rights to the land occupied by tribal and forest dwellers has not been initiated in this district. During discussions with the officers, it was gathered that the Forest Rights Act, 2006 is by and large not misused in West Bengal.
5. In order to overcome the loss of trees for fire wood consumption, especially in winter, LPG connections are being provided in villages. Although many households are still to be covered, there are positive signs, and the situation is likely to improve.
6. Extraction of trees in areas above 600 m in altitude is prohibited in the state. However many trees were cut down during protests in the 1980s demanding the Gorkha Hill Council. Old Cryptomeria japonica trees are also drying up and falling due to the wind. All such degraded areas are taken up for plantation with natural broad leaved species. During the MEE we visited

some good plantations of broad leaved species such as *Bucklandia edulis* (Pipli), *Machilus edulis*, *Ficus hukkeri*, *Swertia nepalensis*, *Eriobotrya petiolata* (Maya), *Machilus gamiana* (Kavalu), *Acer kamtschaticum* (Maple) and *Quercus lensifolia*. A sincere attempt is therefore being made in the sanctuary to improve the habitat for wild animals.

7. The ecotourism facilities of the forest department and the home stay at Chhatakpur have provided employment opportunities for many villagers. Similarly, ecodevelopment works in the villages have also helped provide alternate livelihood options.

## B. Management Weaknesses

1. Villagers and many labourers in adjoining tea gardens depend on the forests for their fire wood requirements. Although a beginning has been made in providing LPG connections, we have still to go a long way.
2. Maling Bamboo (*Arundinaria maling*) has covered the degraded areas in the sanctuary and even outside. The new shoots of this species are the food of the Himalayan Black Bear, but heavy infestation has degraded the habitat. The Maling Bamboo has been cleared, and plantations of broad leaved species are being raised, but a large area is still to be covered. It was found during the MEE that only an extent of 40 ha is taken up for plantation annually in the sanctuary.
3. No important institution is engaged in research in the sanctuary. The reason for the extinction of the Mountain Quail in the recent past in the sanctuary needs to be investigated. Research should also be conducted on other threatened animals. The PA is part of a biodiversity hotspot, and special attention is required to preserve rare beetles, newts and other important wildlife.
4. During our interaction with the EDC at Rampuria village, we learnt that some households have still not been provided LPG connections, the houses built under the Geetanjali scheme by contractors are of poor quality and potato and maize crops damaged by Wild Boars, monkeys and Hares have still not been adequately compensated in all cases. Those involved may please address these grievances.
5. Half of the frontline staff positions are vacant. The state has not taken up recruitment of Forest Guards and Foresters for more than 10 years. Similarly, there is a shortage of personnel who are trained in wildlife management.
6. There is a shortage of four-wheel patrolling vehicles and two wheelers, which the staff need to, cover the difficult terrain.
7. There is very little monitoring equipment (camera traps, GPS, range finders, communication facilities) available.

## C. Immediate Actionable Points

1. Providing LPG connections to villagers who are yet to be covered should be taken up on priority.
2. In the adjoining tea estates where labourers are dependent on the forests of the sanctuary, alternatives must be found. The owners of tea gardens must be impressed to invest 2% of their budget in corporate social responsibility to find alternate livelihood options for EDC members. It was learnt that Cardamom and other aromatic plants are not damaged by wild animals. Ginger and Turmeric are other plants that suffer minimal

damage due to wild animals. The villagers must be educated about this.

3. Compensation for damage caused by wildlife should be paid timely. The rates for ex-gratia payment require periodic reviews. After a few years, old rates become irrelevant.
4. Regular recruitment of frontline staff members should be restarted. The PCCF (HoFF) and CWLW must explain the urgency to the government and prevail on them to take favourable action.
5. Reputed institutions should be involved in research in the sanctuary. A biodiversity survey of the area should also be conducted and reports documented.
6. The sanctuary provides connectivity with the forests of Nepal via Singhalila National Park and the territorial forests of Darjeeling, Kurseong, Sikkim, Kalimpong, Jaldapara and Bhutan. The working plans and management plans of these areas should have appropriate prescriptions in the interest of landscape-level conservation.
7. The benefits of ecotourism should be shared in the ratio 1:1:1 between Government Revenue, the ecodevelopment committee and development charges. This will attract the local community towards conservation.
8. Patrolling vehicles, monitoring facilities and communication facilities should be provided to the staff at the earliest.
9. The plantation area should be doubled to restore the habitat. The plantation rates should be revised to meet the extra expenses involved in replacing maling.
10. Capacity building of the staff in terms of modern monitoring and documentation techniques should be a regular feature.

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3.4

**MANAGEMENT  
STRENGTHS,  
WEAKNESSES AND  
IMMEDIATE  
ACTIONABLE POINTS**

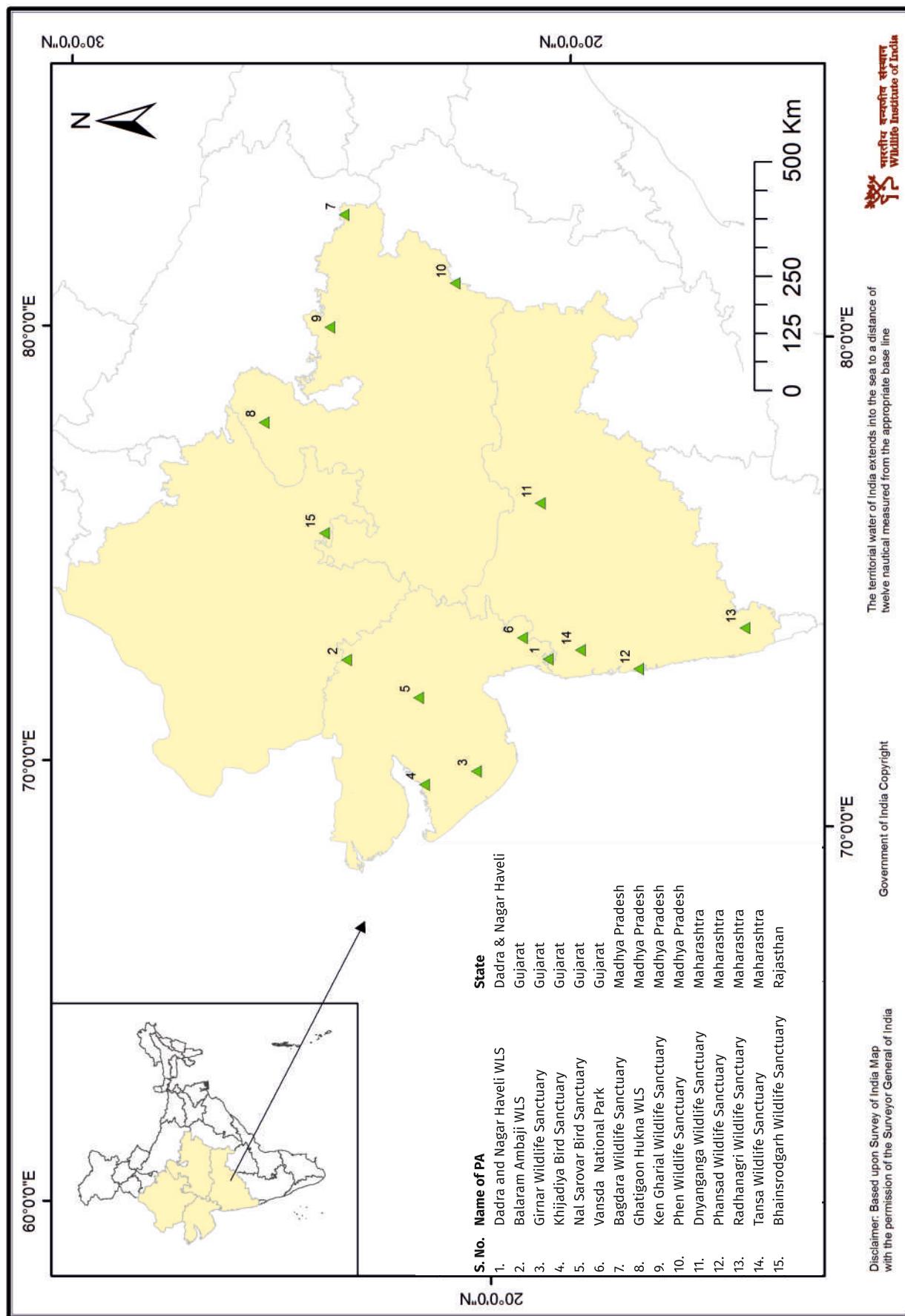
**WESTERN REGION**



## 3.4

## WESTERN REGION

S. No.	State	Protected Area
1.	Dadra & Nagar Haveli	Dadra and Nagar Haveli Wildlife Sanctuary
2.	Gujarat	Balaram Ambaji Wildlife Sanctuary
3.	Gujarat	Girnar Wildlife Sanctuary
4.	Gujarat	Khijadiya Bird Sanctuary
5.	Gujarat	Nal Sarovar Bird Sanctuary
6.	Gujarat	Vansda National Park
7.	Madhya Pradesh	Bagdara Wildlife Sanctuary
8.	Madhya Pradesh	Ghatigaon Hukna Wildlife Sanctuary
9.	Madhya Pradesh	Ken Gharial Wildlife Sanctuary
10.	Madhya Pradesh	Phen Wildlife Sanctuary
11.	Maharashtra	Dnyanganga Wildlife Sanctuary
12.	Maharashtra	Phansad Wildlife Sanctuary
13.	Maharashtra	Radhanagri Wildlife Sanctuary
14.	Maharashtra	Tansa Wildlife Sanctuary
15.	Rajasthan	Bhainsrodgarh Wildlife Sanctuary



## Dadra & Nagar Haveli Sanctuary, Dadra & Nagar Haveli

### A. Management Strengths

1. A good team of sincere officers and staff members.
2. Being located at the foothills of a biodiversity hotspot—the the Western Ghats—this area must support a rich and diverse array of plants and animals (smaller vertebrates) and harbour a number of endemic/rare species.
3. A 100 m ecosensitive zone.
4. The presence of a local NGO, Kartavya, a registered society with a wide range of objectives, from forest protection and livelihood improvement to creating conservation awareness among the local people and visitors.

### B. Management Weaknesses

1. The lack of a management plan leads to ad hoc interventions.
2. At present, the focus of the management is mainly on the deer park and the lion safari, which are within the sanctuary.
3. Paucity of staff and dual responsibility
4. Sporadic and insufficient training programmes to impart skills
5. Small and highly fragmented habitat
6. Fragile connectivity
7. Lukewarm relationship with local villagers
8. Impact of FRA
9. Free-ranging populations of large mammals (herbivores) are absent—there are only sporadic reports of the presence of the Leopard. Because there are no instances of cattle-lifting or attacks on humans, doubts are raised about the presence of Leopards in the sanctuary.
10. The biodiversity of the sanctuary has not been documented in a comprehensive manner.
11. The Wildlife Advisory Board has not been reconstituted after 2001.
12. No scientific assessment of the habitats, flora and fauna of the sanctuary has been carried out so far.
13. Threats—grazing, encroachment, illicit felling of trees, Teram and Chorti cultivation, poaching, MFP collection and honey collection

### C. Immediate Actionable Points

1. The management plan is to be completed at the earliest.
2. Vacant posts are to be filled and full-time field personnel provided to the sanctuary.
3. A comprehensive survey of the flora and fauna must be taken up immediately (some benchmark information may be available with the Botanical Survey of India and Zoological Survey of India).

4. A concerted effort to build a rapport with the local villagers must begin—regular meetings, exposure tours and livelihood interventions carried out with the help of NGOs and resorts may be thought of. Hospitality and catering training and security guard service training programmes for the Adivasi youth may be useful. The local hotel industry and industrial houses may be able to offer them employment.
5. Once trust is built up, efforts should be made to promote cooking gas and reduce the dependence on firewood. Efforts should be made to persuade the villagers not to practice chorti farming within the forests as this destroys degrades the forests and prevents regeneration.
6. Periodical training of the field staff in wildlife management, crime investigation and conservation education would help build the skills necessary for managing the sanctuary.
7. The local NGO Kartavya, may prove a beneficial partner in building a good rapport with the locals and in protecting wildlife. Their potential needs to be harnessed fully.

2

## Balaram–Ambaji Sanctuary, Gujarat

### A. Management Strengths

1. The sanctuary is ensconced within the adjacent forests of Rajasthan and Jessore Sanctuary. A concerted and sincere effort to improve the habitat and availability of water, reintroduce the lost species and contain the man–animal conflict will help the sanctuary regain its lost glory.
2. The sanctuary attracts large numbers of pilgrims. There is potential to develop ecotourism once the habitats improve and the wildlife populations (including the Chital and Sambar) build up as the sanctuary is positioned next to a national highway and close to a major railway station and other tourist destinations.
3. Bear and Leopard densities in the sanctuary are good.
4. The staffs are enthusiastic and eager to learn. A large number of staff members are young and energetic. The proximity to Jessore WLS gives them opportunities to learn from their peers posted there. They have also begun using camera traps.
5. There is a good rapport with the district administration and the police.
6. The WLS is contiguous with other PAs and forests to the north, east and south.

### B. Management Weaknesses

1. This PA does not have a secure boundary as the cairn pillars are either in disrepair or have been dismantled by unscrupulous elements.
2. The officers and field staff are not trained.
3. There are a large number of villages inside the WLS.
4. Though poaching and retaliatory killings have taken place, the officers and staff appeared to be complacent about the threat from poachers and hostile villagers.
5. Some herbivores, such as the Chital and Sambar, have gone extinct locally.

6. Water is scarce and is not distributed well. A large number of the anicuts are damaged and are incapable of impounding water.
7. Inadequate equipment such as binoculars, GPS, camera traps and camp equipment
8. The field personnel do not maintain record of observations made during patrols.
9. The provision for compensation is for either death or “grievous injury”; victims of wild animal attacks suffering minor injuries do not get any compensation. This is a cause of resentment among villagers.
10. There are a total of 95 villages, 41 within the sanctuary and the rest around the periphery, exerting extreme biotic pressure—heavy grazing and illegal activities such as tree felling, lopping, poaching, gum tapping and honey collection.
11. Numerous stone quarries still operate just outside the sanctuary. There is mining activity just outside the sanctuary.
12. Prosopis is rapidly spreading, threatening local plant species.
13. Retaliatory killings of Leopards and Wild Pigs have been reported.
14. Annually, 20–25 lakh pilgrims visit the sanctuary. They disturb the sanctuary and divert the attention of the officers and staff from their core activities.
15. Defecation in the forest along the water sources by the huge number of pilgrims, over a short period, poses a threat of diseases to the wild animals and staff.
16. The local inhabitants continue to use the forest resources and compete with the Bears for the same resources, leading to conflicts. Heavy lopping of *Boswellia*, *Aegle marmelos*, *Butea monosperma*, *Dalbergia latifolia*, *Mitragyna parvifolia* and *Soymida febrifuga*.
17. The local people collect non-timber forest produce such as the fruits of *Limonia acidissima*, *Aegle marmelos*, *Zizyphus* spp., *Diospyros melanoxylon*, *Sapindus emarginatus*, *Tamarindus indica*, *Emblica officinalis* and *Terminalia bellerica* and honey. These are also major food sources for bears.
18. Medicinal species such as *Chlorophytum borivilianum* and *Commiphora wightii* are threatened due to unsustainable exploitation.

### C. Immediate Actionable Points

1. Remove Prosopis and Lantana, and plant native fruit-bearing trees.
2. Undertake ecodevelopment initiatives to improve soil and moisture conservation and the availability of food/fodder.
3. Provide skill-oriented training to the officers and staff.
4. Re-vegetate the barren hills in the restoration zone through watershed-based habitat restoration.
5. Reintroduce Chital and Sambar. Some areas identified for inclusion in the sanctuary appear to be suitable for Sambar.
6. Repair all the damaged anicuts and other water sources.
7. Map all the perennial water sources as well as the water-deficient areas and create perennial water sources.
8. Many of the water storage troughs are not suitable for wild animals as they are too high for most of them. Besides, the system of manually filling up these troughs using water tankers is unsustainable. Solar-powered pumps may be a good option here.
9. Map all the roads and fire lines.
10. Provide adequate recurring funds for the maintenance of the fire lines, roads and water sources.

## Girnar Wildlife Sanctuary, Gujarat

### A. Management Strengths

1. A well-drafted management plan
2. Catchment of the Ozat River and several rivulets
3. Young and energetic field personnel
4. Efficient trackers
5. Efficient use of wireless network for monitoring Lions daily
6. Compact area and peripheral protection chowkies afford excellent protection.
7. Pressures of use of minor resources by local villagers
8. Supportive villagers
9. The effort to protect the Greater Gir landscape by a joint effort with territorial divisions through the Lion Foundation Society
10. An effective rescue team
11. Staff camps are provided with all the necessary equipment and radio sets.
12. A resurrected habitat presents a good opportunity for increasing the prey base by reintroducing herbivores.
13. As the population of wild animals is building up, there is good potential for developing responsible wildlife tourism.

### B. Management Weaknesses

1. Excessive human intervention to save weak and ailing Lions
2. Vacant staff positions
3. No control over development activities in the critical corridor area
4. Poor and delayed flow of funds from Central Government
5. Inability to manage human excreta produced during the festive season
6. The notification of the sanctuary under Section 26 A is not in order as the process of settlement of rights was never carried out. The rights of the local to the trees, grazing of livestock, cultivation, etc., granted by the ruler of Junagadh State, still continues within the sanctuary.
7. Rapid industrial development, development of highways, an ingress of workers from other areas and the proximity to the city and the villages threaten the safety of the Lions when they move through the corridor.
8. The fragmented Greater Gir landscape is under threat from rapid development. If such development continues without appropriate safeguards to maintain a viable corridor between Gir and Girnar, the long-term continuity of Lions in Girnar may not be feasible.
9. The rapidly rising numbers of Lions and Leopards within Girnar may lead to an escalation of the human-wild animal conflict.

10. There is a serious threat of an outbreak of gastro-enteritis and other faeces-borne diseases among the wild animals and staff, as 10 lakh pilgrims use the sanctuary as an open toilet during Parikrama and Mahashivratri, contaminating the grounds as well as the water sources.
11. There is a threat of retaliatory killing of Lions as about 70% of the Lion's diet consists of cattle.

### C. Immediate Actionable Points

1. It would be wise to stop management interventions to save individual Lions and cubs as this may lead to an unnatural augmentation of the Lion population and escalate the Lion-human conflict.
2. Most of the water storage troughs are not suitable for wild animals as they are too high for most wild creatures and the system of manually filling up these troughs using water tankers is unsustainable. As the water table is high, solar-powered pumps may be a good option here.
3. Lions have been seen crossing the main roads in Junagadh City. It would be wise to place signage and speed-breakers on the main roads and record all cases of road-kills.
4. Measures may be taken to stop/curb all unsustainable and incompatible development in the Gir-Girnar corridor.
5. The present practice of going very close to lions on foot must cease as it breeds an unhealthy familiarity of Lions with humans and may result in human injury or mortality.
6. The subsidized farmland fencing scheme is a good initiative, but it suffers from a serious flaw—the condition that a proposal must be for at least 30 hectares of farmland dissuades small landholders who do not wish to come together for a joint fence. It would be necessary to either amend this condition or persuade small landowners through EDC meetings to make this scheme popular.
7. Many useful prescriptions of the management plan for habitat improvement, water development, reintroduction of prey species and monitoring have not yet been implemented. The sanctuary management needs to work on this.
8. Much of the habitat is dominated by Teak. Measures should be taken to remove Teak trees along with the rootstock to improve the quality of the habitat for Chital and Sambar. This will help increase the populations of these animals to provide more wild prey for the Lions and Leopards.

## Khijadiya Wildlife Sanctuary, Gujarat

### A. Management Strengths

1. The sanctuary is an extension of a large aquatic ecosystem including a marine NP and WLS and extensive salt pans, extending from dry land to deep into the sea and coastal islands. Thus, along with the adjoining PAs, it offers the local and wintering birds of the region a huge diversity of habitats, fresh water to marine.
2. The sanctuary is on the north-south route of the migratory birds as a large number of birds use the surroundings of the sanctuary even in years when the rainfall is low.

3. The sanctuary is close to a big city, which can act as a source of visitors.
4. The sanctuary has no conflict with the local population as there is virtually no dependence of the people on the resources of the sanctuary.

## B. Management Weaknesses

1. The sanctuary is completely rain-fed and suffers from a serious water deficit in most years. Whereas this diverts the bird populations elsewhere, the lack of birds in the sanctuary disappoints visitors, who can see more birds outside than inside the sanctuary.
2. The sanctuary has no staff members trained in wildlife or wetland management except the CCF.
3. The sanctuary has no website, and not much information is available in the public domain.
4. There is a 40% shortage of staff, which creates serious administrative problems.

## C. Immediate Actionable Points

1. As the sanctuary is a very small part of a large aquatic ecosystem consisting of the neighbouring salt fields, marine sanctuary and marine NP, the entire landscape should be managed under a single integrated management plan so that the needs of the species inhabiting areas outside the PA are also looked into.
2. The heavy infestation of the sanctuary by *Prosopis juliflora* needs to be actively managed as it has now become a serious disincentive for the birds to land in the sanctuary. The woody vegetation of the sanctuary needs to be heavily thinned to expose the ground to birds, and only roosting trees should be retained in the sanctuary.
3. Although large populations of birds can be seen even outside the sanctuary, bird-watching facilities are available only in the sanctuary. As there are virtually no birds in the sanctuary during dry years and seasons, there is intense visitor dissatisfaction. Therefore, the possibilities of maintaining small water bodies artificially round the year in the visitor area must be explored.
4. Birding trails should be created deep inside the sanctuary so that all parts can be visited. At present, there is no supervision in the interior of the sanctuary due to the limited number of walking trails.

## Nal Sarovar Bird Sanctuary, Gujarat

### A. Management Strengths

1. This is the largest natural shallow lake in India. It is listed as a Ramsar wetland and is home to a very impressive diversity of birds.
2. It is a priority conservation area of the state due to the international recognition. Therefore

it gets adequate financial resources for protection and management.

3. The sanctuary is well known in tourism circles and can easily become an international birding destination.

## B. Management Weaknesses

1. Nearly 35% of the staff positions are vacant, and most of the staff are past their prime. None of the personnel has had any training in wildlife management.
2. Although the sanctuary has great tourism potential, visitors are not allowed to go out of a 5 km<sup>2</sup> tourism zone. This has overburdened the tourism zone with heavy numbers of visitors, and the visitors miss the environment of a bird sanctuary. A visit to this sanctuary has virtually become an urban boating experience rather than being a connection with nature.
3. The incidence of bird trapping is high, which indicates an inherent weakness of the management of the sanctuary. As most of the cases are not registered as offences, the threat to the biodiversity of the sanctuary does not get the attention of the authorities to the extent it deserves.
4. The interaction of the park management with visitors is minimal due to the shortage of staff members. Therefore, the management misses out on converting the visitors into nature lovers.

## C. Immediate Actionable Points

1. The sanctuary is a unique ecological entity in India. Perhaps there is no other shallow lake like this one in the country except some deltaic formations. The following actions are suggested to improve the conservation of the sanctuary lake:
2. In view of the ever-present threat of poaching, the strength and quality of the staff need to be improved. More young officials should be posted at the lower ranks, and they should be properly trained in wetland management.
3. The sanctuary seems to suffer from a serious shortage of bird perches and roosting facilities as there are no trees except on the fringes. Therefore, the management should consider developing floating perches, suited to the needs of target species, to ameliorate this shortage.
4. As the economy around the lake has been traditionally dependent upon the resources of the lake, in the form of bird poaching, fishing and grazing, the management should pitch strongly for providing the local people with alternative livelihoods. Unless their livelihood issues are resolved, the sanctuary will not be safe from conflict and pilfering.
5. At present, tourism in the sanctuary is limited to only one location and only one activity (boating). As a result, the location is overcrowded and the visitor experience is not good. Moreover, the visitor does not go back with the feeling of having experienced serenity and peace in the wilderness. Due to the limitation of having to operate tourism activities in a small tourism zone, the residents of only one or two villages benefit in economic terms, while the other villages continue to be busy with poaching and fishing. It is, therefore, suggested that rather than limiting the tourism to the existing tourism zone, efforts should be made to spread it thinly all over the lake so that no part of the lake is overused and more villages can participate in providing tourism-related services. This will also improve the protection of the lake as tourism automatically brings better protection to natural resources.

## Vansda National Park, Gujarat

### A. Management Strengths

1. The park enjoys considerable sentimental support from the local people because of its being a representative of the famous Dangs forests of Gujarat.
2. The small, compact nature of the park makes it easy for the management to protect it well with the available resources. The park is reasonably well funded.
3. The strong focus of the management on improving the livelihoods of the local people generates public support in favour of conservation.
4. The presence of dense bamboo in the park ensures a sufficient supply of food for herbivores throughout the year.
5. The park receives heavy rainfall, and there are several perennial sources of water. These can help improve the stocks in the park.

### B. Management Weaknesses

1. Vansda NP is a very small PA. Therefore, its effectiveness in protecting the representative biodiversity of the region is limited.
2. No member of the management staff has undergone any professional training in PA management. This severely limits the ability of the staff to provide quality management.
3. The presence of two villages inside this small NP further limits its effectiveness as a PA as the pressure of grazing, MFP collection and fuelwood collection can seriously damage the habitat.
4. The presence of a busy highway (Surat–Saputara–Nasik) inside the park fragments the park habitat and leads to animals dying in road hits. Any future plans to widen the road will hit the park very hard.

### C. Immediate Actionable Points

1. Relocation of the two villages situated within the park is a critical requirement to make the park an effective conservation entity. Therefore, all efforts must be made to relocate them at the earliest.
2. The management should propose realignment of the Surat the following areas for action emerge Saputara road as the traffic density of the road will grow exponentially in the future and demands for widening it will arise. Every possible way of shifting the road outside the park must be explored.
3. The management plan for the park has been under development for a long time. It must be finalized at the earliest, and a strong emphasis on ecotourism should be the hallmark of the future plan.

4. Although very few cases of poaching of wild animals have been recorded in the past, the density of mammals is low, indicating a high incidence of wildlife utilization by the local people. Therefore, the department must review its protection strategy and must ensure that the local people are discouraged from hunting wild animals. A strong ecotourism programme can help control poaching in the park.
5. Although several research studies have been carried out in the park in the past, the reports are not available with the DFO. Hence it is suggested that an all-out effort be made to collect and analyse all the research reports and use them to improve the management of the park.

7

## Bagdara Wildlife Sanctuary, Madhya Pradesh

### A. Management Strengths

1. Impressive biodiversity values
2. Adjoining Kaimur Sanctuary and Son Gharial Sanctuary
3. Villagers supportive of the management of the PA
4. After a gap of about five years, the presence of the Tiger was recorded during a census exercise conducted in January 2001. This was confirmed by a kill (Dr. A.P. Dwivedi, 2007, unpublished).

### B. Management Weaknesses

1. 53 % of posts vacant
2. Poor funding and delayed release of funds
3. Lack of rapport with some villages
4. Lack of trained staff
5. Very bad roads
6. Habitat degradation
7. 106 km of open electric line within the sanctuary poses a threat of electrocution for animals
8. Threats include illicit felling and collection of firewood, overgrazing, forest fires, encroachment, invasive weeds, poaching, electrocution and illegal mining
9. Boundary disputes with the revenue department in certain areas
10. The condition of the roads and buildings is very bad owing to the lack of a maintenance budget. The Blackbuck is stated to be the iconic species of the sanctuary but its population is going down. There are reports of fawn predation by the ever-increasing population of village dogs. Besides, the sanctuary has Wolves in good numbers. Leopards have been sighted occasionally, but their number seems to have gone down.

### C. Immediate Actionable Points

1. Improve relationship with villagers.
2. Revive lost habitats in partnership with villagers.
3. Train staff in crime investigation, reading signs and evidence, population estimation, conservation awareness and eco-development.
4. Fill up vacant posts and provide additional staff members for protection.
5. Allocate sufficient funds for protection, eco-development and maintenance.
6. Control the population of village dogs.

8

## Ghatigaon Great Indian Bustard Sanctuary, Madhya Pradesh

### A. Management Strengths

1. Ghatigaon Sanctuary was constituted in 1981 with the objective of conserving the endangered Great Indian Bustard and other animals of the area along with their habitats.
2. The interest shown by the DFO and CCFs in the management of Ghatigaon is sufficient.
3. The field staffs are responding to the current initiatives.
4. The people were consulted before habitat restoration work was taken up, and the strained relationships have thawed a bit.
5. Good rapport between the police and the administration has helped contain illicit mining.
6. The Bustard has been reported from areas nearby.
7. The latest initiatives to take the villagers into confidence have thawed the ice in some hostile villages.
8. There is an opportunity to make Section 20 ineffective by finally notifying the sanctuary under Section 26A.
9. The rampant illicit mining has been controlled effectively. Now about four compartments in Ghatigaon Range are prone to mining. It takes 80% of the energy and the time of the staff to keep the pressure on to contain the mining. As these vulnerable compartments are located on the south western boundary of the sanctuary, these compartments may be denotified and the sanctuary boundary fenced.

### B. Management Weaknesses

1. Untrained staff
2. Key posts vacant
3. Inadequate budget

4. Strained relationship with locals in certain villages
5. Lack of livelihood opportunities for villagers except mining
6. Threats: mining, grazing, illicit felling of trees for firewood, poaching (the presence of 42 Mongia families, belonging to a traditional hunting tribe, in Danda Kidak adds to the problem), encroachment, girdling of *Boswellia* trees for tapping resin, hostility of villagers due to the impact of Section 20, loss of livelihoods, armed forces wanting control of grassbeds (recent development)
7. The habitat is under severe biotic pressure. The habitats of the animals—the kardhai-khair and *Boswellia* forests—have been reduced to scrub in a large part of the sanctuary as there is tremendous pressure from firewood collectors who sell firewood to the dhabas on the Agra-Bomaby highway and in Gwalior city.
8. The last of the Bustards was seen in 2011. There is no authentic information on the presence of the Bustard within or outside the sanctuary limits since then. The causes of the decline and elimination of the Bustard population from the sanctuary are mainly anthropogenic, but the continuous neglect of the sanctuary till 2014 also played a critical role.
9. In Ghatigaon the Great Indian Bustard habitat consists mostly of around 5000 hectares of grassbeds scattered across three sites within the sanctuary. The largest is the military grassbed (notified as an RF) with an extent of 4100 hectares near Barai village. Till the beginning of 2014, all these grasslands were under severe stress due to overgrazing by livestock.

### C. Immediate Actionable Points

1. An inventory of the grasses and the wild and cultivated legumes and lentils needs to be prepared for each enclosure. Wild and cultivated legumes and lentils identified as being suitable for the Bustards should be introduced. The number of *Zizyphus* shrubs within the enclosures is sufficient. The spread of *Zizyphus* may be managed. Building too many water sources within the enclosures should be avoided.
2. In Ghatigaon the bustard's breeding season begins in March and ends by July. The height of the grass in the first enclosure in the military grass bed may deter bustards from using this habitat. Therefore, the grasses need to be cut as soon as possible. Cow dung may also be bought from the villagers and scattered within the enclosures before March.
3. The process of settlement of the people has been completed. Hence the management should get the final notification for the sanctuary under Section 26A. This step will make Section 20 ineffective.
4. Today the threat of mining is present in only four compartments in Ghatigaon Range. It takes 80% of the energy and time of the staff to contain the mining. As these vulnerable compartments are located on the south-western boundary of the sanctuary, these compartments may be denotified and the sanctuary boundary may be fenced.
5. The sanctuary staff should provide technical guidance to the villagers regarding rotational fencing so that grass regenerates. The staff should also provide guidance regarding plantation activities as the villagers are interested in taking up such measures.
6. The panchayats may be permitted to take up the road repair work demanded by the villagers, or the forest department may take up this activity. This step will build trust.
7. The ecotourism activities organised by the EDC at Tighra need support and hand-holding for some more time.
8. *Prosopis juliflora* should never be planted in any forest area.

## Ken Gharial Sanctuary, Madhya Pradesh

### A. Management Strengths

1. The sanctuary is under the control of Panna Tiger Reserve. As a result, the resources available to this sanctuary and the supervision levels are far better than those of a small sanctuary.
2. The sanctuary is endowed with an extremely beautiful geomorphological formation, which attracts a lot of visitors from Khajuraho, which is a world-famous tourist destination.
3. The sanctuary has fairly good tourist infrastructure and attracts a significant number of visitors.

### B. Management Weaknesses

1. This is a linear riverine sanctuary, flanked by a narrow forest belt. The sanctuary does not have the equipment (e.g., boats) and facilities required for protecting and managing a riverine sanctuary.
2. The habitat available to the flagship species of the sanctuary (the gharial) is very limited. Therefore, it is unlikely to support a self-sustaining population of gharial and other aquatic species.
3. The annual flooding of the river during monsoon often washes away gharial and other animals downstream. This militates against richer stocking of the sanctuary with aquatic animals.

### C. Immediate Actionable Points

1. The management should focus all its efforts on protection of the areas where the aquatic biodiversity is greatest, i.e., Muhara Ghat and Bhaura Dah. Patrolling camps and patrolling boats and vehicles should be concentrated only in this area. It should be fairly easy to make the area really safe against any serious crime.
2. The river patrolling capability of the staff should be significantly improved by providing versatile boats and other facilities.
3. As the population of gharials in the river is likely to continue to fluctuate due to flooding and other factors, a reasonable population of the species must be maintained by introducing fresh stock regularly from the Devri Gharial Breeding Centre, in National Chambal Sanctuary.
4. The Madhya Pradesh Forest Department must negotiate a minimum water inflow in the sanctuary from the existing upstream storage facilities (Gangau and Bariarpur reservoirs) in the lean season to meet the requirements of the aquatic fauna.

## Phen Wildlife Sanctuary, Madhya Pradesh

### A. Management Strengths

1. The sanctuary is under the administrative control of the Field Director of Kanha Tiger Reserve. As a result, the sanctuary is very well provided for and supervised.
2. The sanctuary has no human habitation inside, and human presence in its vicinity is minimal. This makes it free of conflict and pressures resulting from dependence of humans on it.
3. The sanctuary is surrounded by a very large forest belt and is connected to the core area of Kanha Tiger Reserve through its buffer forests. It is also connected with Achanakmar Tiger Reserve, in Chhattisgarh. As a result of this connectivity with two important tiger reserves, it has a very special status for preserving the biodiversity of the area.

### B. Management Weaknesses

1. Although the sanctuary is surrounded by a large forest belt, its small size limits its ability to play a significant role in conserving the biodiversity of the region.
2. The relative remoteness of the area creates difficulties for the field staff and sometimes becomes a hindrance in getting quality staff members.
3. Despite its potential, the sanctuary has not made efforts to attract ecotourists so far.

### C. Immediate Actionable Points

1. The area of the sanctuary should be increased to about 300–400 km<sup>2</sup> to enable it to support viable populations of the major mammals.
2. The sanctuary must open its doors to ecotourism and must use the excellent natural wealth for generating resources for conservation and creating a constituency for supporting it.

## Dnyanganga Wildlife Sanctuary, Maharashtra

### A. Management Strengths

1. The values of Dnyanganga Wildlife Sanctuary are well documented, and these include southern dry deciduous and dry mixed forests. The sanctuary is a part of the Ajanta hill range in the Deccan trap.

2. There is a mosaic of habitats, including grasslands and forests, thus supporting wildlife in general.
3. Dnyanganga Wildlife Sanctuary (205.20 km<sup>2</sup>) is a compact biological unit with three well-demarcated zones: (1) Core Zone (181.17 km<sup>2</sup>), (2) Tourism Zone (22.39 km<sup>2</sup>) and (3) Restoration Zone (35.58 km<sup>2</sup>).
4. Dnyanganga Wildlife Sanctuary is a compact unit with just one village inside.
5. The sanctuary is a part of the catchment of the Dnyanganga (19 km inside) and Purna rivers.
6. The VEDC villages are in favour of conservation and extend support to the management.
7. The compact nature of the sanctuary provides a good opportunity to develop a well-managed area with minimal disturbance.
8. There are good opportunities to undertake intensive habitat management interventions to improve the availability of fodder for wildlife.
9. As a result of the location of the sanctuary on the Buldhana-Khamgaon road, the prospects of attracting tourists are good. Conceted efforts need to be made to improve the existing facilities and advertise them on all available media.
10. The reservoirs, particularly the Botha reservoir, can be used for boating after making arrangements for the safety of visitors. The activity will be an additional tourist attraction.

## B. Management Weaknesses

1. The average ages of the RFOs and foresters are 57 and 52 years, respectively, and many of them will be retiring soon. While the efficiency of their field actions may not be optimal due to their age, the PA will lose their knowledge and experience as there are no young staff members at these levels.
2. The extraction practices and heavy grazing that prevailed till 1997 caused severe degradation of the habitat in many areas. While conditions have improved, the poor soil conditions and topography make it difficult to implement the desirable habitat improvement measures.
3. The wildlife populations are very low.
4. The location of the DCF's office, at Akola, is about 100 km from the sanctuary, making it difficult to address the management issues effectively.
5. The threats to the PA have been identified. They include grazing, fire, firewood collection, lopping for fodder and death of wildlife in road accidents.
6. Though the condition of the habitats visited by the MEE team indicates that grazing by cattle and sheep and lopping of trees have been controlled, these activities still remain a big threat to the sanctuary. The highly degraded status of the forests/habitats outside Dnyanganga Wildlife Sanctuary indicates the serious grazing and lopping/cutting pressures.
7. Fire is a big threat. Every year fires burn small and large areas. The topography and the soil are suitable for the grassland habitats, and therefore these habitats are prone to fire unless effective preventive measures are taken.
8. The Buldhana-Khamgoan state highway, passing through the sanctuary, poses a threat to the wildlife. As of now the road is opened for traffic only for a limited period, and no traffic is allowed at night.

### C. Immediate Actionable Points

1. The administrative setup needs to be revamped so that the management of the PA becomes effective and efficient.
2. Habitat improvement measures should be implemented to improve the quality of the forage available for wildlife.
3. State-of-the-art infrastructure needs to be developed for ecotourism. The Nakshtravan needs to be renovated.
4. The available electronic and print media should be used to advertise the available tourism values and facilities.
5. The management should consider adopting the methods prescribed by WII for estimating the populations of the Tiger, co-predators and prey across India. This will ensure that the data are reliable.
6. The budget allocation for habitat improvement, protection and maintenance needs to be enhanced.
7. The cement saucers provided at water holes are not wildlife-friendly, and they do not last long. In areas where water is a limiting factor, solar pumps are a good option. The management has begun installing these.
8. The network of roads in the sanctuary area is not adequate and needs to be developed to facilitate regular patrolling and field visits.

12

## Phansad Wildlife Sanctuary, Maharashtra

### A. Management Strengths

1. This is the only wildlife sanctuary that touches the sea. Therefore, it has the unique potential to develop tourism based on the terrestrial environment as well as the marine environment. The sanctuary is close to Murud, which is an established beach destination.
2. The management of the sanctuary has an excellent rapport with the local people through a people-centric tourism programme and excellent ecodevelopment initiatives.
3. The sanctuary has a very small human population inside. The sanctuary is naturally protected by the sea on its western boundary.
4. The sanctuary has 27 natural springs supplying drinking water to wild animals all over.

### B. Management Weaknesses

1. The sanctuary is a very small and narrow strip of land along the coast. As a result, it cannot provide a habitat and protection to any wide-ranging species or support viable populations of any other species.
2. Despite the potential of the sanctuary to become a major tourist attraction due to its closeness to Murud and Kasid beaches, which are not far from Mumbai, the sanctuary has not become an important centre of nature tourism.

### C. Immediate Actionable Points

1. As the sanctuary is virtually a forest island in the middle of a human-dominated landscape, the state should consider fencing its boundaries to prevent illegal entry as well as to prevent animals spilling into human habitats in search of prey or crops.
2. The state should have a full-fledged ecotourism plan prepared by a wilderness recreation expert to harness the potential of the sanctuary to create jobs for the local people from tourism. More communities should be involved in running tourism facilities in the sanctuary.
3. Vacant staff positions should be filled up as soon as possible. As none of the staff members has got any significant training in PA management, the state must make efforts to start a good training school for the junior staff and send senior field staff members to WII for professional training regularly.

13

## Radhanagari Wildlife Sanctuary, Maharashtra

### A. Management Strengths

1. This sanctuary has a sentimental value for the people of the state for being the first-ever wildlife sanctuary, notified in 1957.
2. The sanctuary has been historically well protected as it was the shooting reserve of the former rulers of Kolhapur state. It is protected by a vertical escarpment on the western and south-western boundaries. The forests of the sanctuary are very dense and are virtually impenetrable. It is heavily infested by leeches, which is also a deterrent to any casual intruder.
3. As the sanctuary is part of the Western Ghats World Heritage serial sites, there is a strong commitment on the part of the state to preserve its biodiversity.
4. The sanctuary is well funded, the staff strength is adequate, and the staff members are committed. There is no shortage of resources.
5. The notified area of the sanctuary does not include the areas of the villages situated within its perimeter, which reduces the scope for conflict with the conservation policies of the state.

### B. Management Weaknesses

1. The forests of the sanctuary are heavily fragmented by the presence of 22 villages and two reservoirs at its heart. The township of Radhanagari is also situated within the perimeter of the sanctuary. The state highway from Kolhapur to Goa also passes through the sanctuary.

### C. Immediate Actionable Points

1. The village relocation programme needs to be expedited as the presence of 22 villages (one is on its way out) in the sanctuary will never allow the wildlife populations to grow beyond the bare minimum.
2. The senior management of the department needs to monitor the management of human-wildlife conflict more closely, and the payment of compensation to the victims of wildlife damage must be streamlined and expedited.
3. There appears to be a serious misunderstanding in the minds of the management that no development work, including construction of new houses, can be undertaken inside the villages, even those that are not part of the notified sanctuary. The stated objective of this attitude, that of forcing the local people to accept relocation, is dangerous for conservation and is unacceptable. Senior officers must review the situation urgently and change this attitude at all levels forthwith.
4. The sanctuary holds a lot of promise for ecotourism. A diversified, well-dispersed and low-impact ecotourism programme must be launched in different parts of the sanctuary, rather than be limited to just one location.
5. The wildlife populations in the sanctuary need to be monitored more seriously. Data are collected every 4 years for assessing wildlife populations as a part of the all-India tiger monitoring programme, but the sanctuary management never gets any analysis report. The state has to develop the capacity to produce PA-wise assessment reports, as in the case of tiger reserves, so that any adverse changes in the population of any species can be addressed in time.

## Tansa Wildlife Sanctuary, Maharashtra

### A. Management Strengths

1. The habitats are generally conducive to wildlife.
2. The Modaksagar and Tansa reservoirs and Tansa River provide water perennially to the wildlife.
3. The sanctuary is connected with forests of Jawahar, Shahapur and Thane divisions.
4. Some VEDCs are actively participating in the ecotourism initiative, and generally most of the VEDCs are in favour of conservation and extend support to the management.
5. The frontline staff strength is full.
6. There are good opportunities to undertake intensive management interventions to improve the quality of the grasslands for the wildlife.
7. There is scope for planned reintroduction of herbivores such as Chital and Sambar into suitable habitats where competition with domestic cattle is minimal.
8. The PA is very close to the Mumbai-Nasik road, and so there is a good opportunity to attract tourists.
9. The reservoirs can be used for boating. This will act as an added tourist attraction.

## B. Management Weaknesses

1. The post of the ACF (Sanctuary Superintendent) is vacant. The average age of the RFOs and Foresters is more than 55 years.
2. The staffs are not trained in wildlife management, and the team sensed a lack of knowledge, interest and aptitude among most of the field personnel.
3. The committee felt that the offences committed by local villagers are either ignored or treated leniently in order to maintain a good relationship with them.
4. Some large mammals have gone locally extinct, and the populations of the remaining ones are on the decline. The wildlife populations are very low.
5. The funds available for protection and habitat management are inadequate.
6. Illicit felling of Khair and Teak trees poses a serious threat. A low and declining population of mammals indicates that hunting is still common and uncontrolled.

## C. Immediate Actionable Points

1. The vacant post of the Sanctuary Superintendent must be filled at the earliest.
2. The staff need to be trained in wildlife management, especially for skills such as reading wildlife signs and evidence, crime scene investigation, forensic evidence collection, packaging and despatching of collected evidence to laboratories, intelligence gathering, interrogation and the skills required for generating awareness.
3. The staffs are sensitive to the illicit felling and are doing good work to contain it, but the same cannot be said about the poaching of wild animals. Therefore, an effective protection strategy to tackle poaching of wild animals needs to be launched without delay.
4. Adequate funds must be harnessed for protection, habitat management and maintenance work. The delay in release of funds sanctioned by the Central Government needs to be minimized.
5. The participatory ecotourism venture should be expanded further, and an effective garbage management system must be put in place.
6. A serious effort must be made to identify suitable areas for reintroducing mammals such as the Chital and Sambar. Habitat improvement work should be undertaken in such areas before actual reintroduction.

## Bhainsroadgarh Wildlife Sanctuary, Rajasthan

### A. Management Strengths

1. The sanctuary is connected to a number of other PAs (Jawaharsagar-Darrah and Bundi) in the vicinity, including the newly declared Mukundara Tiger Reserve.
2. The Forest Guards are mostly young, energetic, newly recruited, well educated and eager to learn.
3. The rapport with the local people and district administration is largely good.
4. Conservation awareness programmes are conducted regularly for students.
5. A very young, educated and energetic team of guards was made available to the sanctuary a few months back. These youngsters can be trained in various skills required for wildlife management.
6. In our interactions with villagers we did not experience any animosity. On the contrary, they, in general, are supportive despite the issue of Section 20 and resource use restrictions. A well-planned ecodevelopment initiative focused on reducing firewood use and alternative livelihood training, especially for goatherds, may help the forests recover around the villages.
7. The process of settlement of the rights of the people was completed long ago by the Collector, but a final notification under Section 26 A or a formal order by the state government accepting the order of the Collector is yet to be issued. If either is issued immediately, the provisions of Section 20 will cease to operate, and this particular action will bring respite to the villagers. The availability of suitable habitats and support from local villagers provide an opportunity to reintroduce Chital and Sambar. An enclosure was fenced earlier, and this needs to be reinforced to make it predator-proof to soft-release the animals.
8. There are many sites in the WLS that could become tourist attractions. At present most of the tourism is for pilgrimage. The location of the WLS near Rawatbhata and Kota and its in close proximity to a nation highway should be exploited to increase tourism.

### B. Management Weaknesses

1. The demarcation of the boundary of the sanctuary is defective.
2. Inadequate staff
3. Loss of two ungulate species (Chital and Sambar), reducing the importance of the WLS
4. Inadequate funds
5. Lack of training of the staff in crucial areas of wildlife management, such as crime detection and investigation, identification of signs and evidence, habitat evaluation and management, and ecodevelopment
6. Poor infrastructure and lack of equipment
7. Hostility of a few villages
8. The biodiversity of this rich sanctuary has still not been explored.

9. Deficiency of water sources on the plateau
10. The major threats are poor demarcation of the boundary, illicit lopping, firewood collection, grazing, and encroachment, illicit collection of NWFP, fire and poaching.

### C. Immediate Actionable Points

1. A well-planned training programme in protection, wildlife laws, wildlife crime investigation, reading signs and evidence, and ecodevelopment should be started at once. The help of NGOs such as WWF-India, WCT and WTI should be requested for organizing such training.
2. A systematic study of the biodiversity within the gorges may be carried out with the help of local universities, BSI and ZSI.
3. The discrepancies in the demarcation of the boundary with Jawaharlal Sanctuary should be resolved as soon as possible.
4. The management plan prescribes reintroducing Chital and Sambar, and the management of the sanctuary has already created a 300 ha enclosure with a mesh-wire chain-link fence. But the height of the fence is inadequate, and it is not predator proof. In order to ensure that Leopards, Pythons, Wild Cats, Wolves and other opportunist predators such as Jackals and Hyaenas do not enter the enclosure, it will be necessary to fence the area with a combination fence consisting of solar-powered lower strands and plain upper strands. The height of the fence should be at least 8 feet. All the trees close to the fence or those with branches overhanging the fence must be trimmed or removed if necessary to prevent the entry of Leopards.





3.5

**MANAGEMENT  
STRENGTHS,  
WEAKNESSES AND  
IMMEDIATE  
ACTIONABLE POINTS**

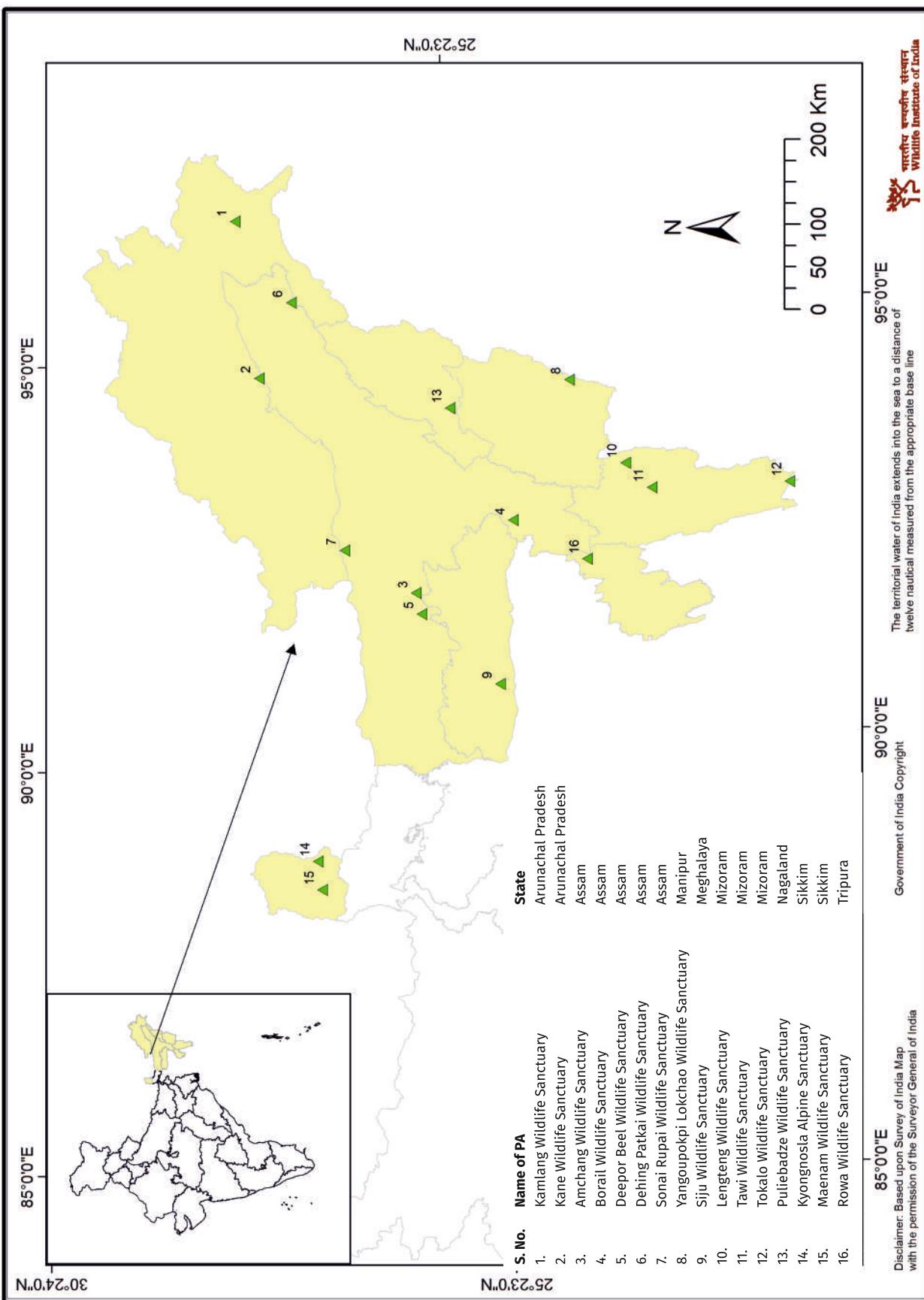
**NORTH-EASTERN REGION**



## 3.5

## NORTH-EASTERN REGION

S. No.	State	Protected Area
1.	Arunachal Pradesh	Kamlang Wildlife Sanctuary
2.	Arunachal Pradesh	Kane Wildlife Sanctuary
3.	Assam	Amchang Wildlife Sanctuary
4.	Assam	Borail Wildlife Sanctuary
5.	Assam	Deepor Beel Wildlife Sanctuary
6.	Assam	Dehing Patkai Wildlife Sanctuary
7.	Assam	Sonai Rupai Wildlife Sanctuary
8.	Manipur	Yangoupokpi Lokchao Wildlife Sanctuary
9.	Meghalaya	Siju Wildlife Sanctuary
10.	Mizoram	Lengteng Wildlife Sanctuary
11.	Mizoram	Tawi Wildlife Sanctuary
12.	Mizoram	Tokalo Wildlife Sanctuary
13.	Nagaland	Puliebadze Wildlife Sanctuary
14.	Sikkim	Kyongnosla Alpine Sanctuary
15.	Sikkim	Maenam Wildlife Sanctuary
16.	Tripura	Rowa Wildlife Sanctuary



## Kamlang Wildlife Sanctuary, Arunachal Pradesh

### A. Management Strengths

1. The sanctuary is located in a well-protected area surrounded by Kamlang Reserved Forests on its north and west and Namdapha National Park on the south. To the east is an uninhabited forest area. A proposal to maintain a 5 km strip along this boundary as an eco-sensitive zone has been submitted to the state government.
2. The sanctuary has rich natural forests of different types, ranging from Tropical Wet Evergreen Forests, in the lower reaches, to Eastern Moist Temperate and Alpine Scrub. These forests are home to many endangered and threatened species.
3. The sanctuary has many water bodies in form of rivers and a lake named Glow Lake. These support aquatic animals and are a source of water for wild animals and birds.
4. There are no human settlements inside the sanctuary, the nearest village being 4 km from its boundary. Human interference is very negligible, and there are no human-wildlife conflicts.
5. The sanctuary was declared a Tiger Reserve (vide Govt. Order No. CWL/D/159/2014/680-1781 dated 06-09-16) due to its proximity to and contiguity with Namdapha Tiger Reserve, an abundant prey base and reports of Tigers in the area.
6. The terrain is rough in most parts of the sanctuary, making it inaccessible to humans.

### B. Management Weaknesses

1. The strength of the staff is inadequate, and less than 50% of the staff strength is in position.
2. The network of roads and trekking/patrolling paths is insufficient.
3. The infrastructure is inadequate.
4. The field staff are not wildlife trained.
5. No wildlife census has been conducted.
6. No research has been carried out on either the flora or the fauna of the sanctuary.
7. The funds are inadequate and are released late.
8. The support of the local people is very limited. Some local people even claim that the sanctuary is their ancestral forest.
9. There are no communication facilities, and there is no interpretation centre.

### C. Immediate Actionable Points

1. Scientific research on and documentation of the flora and fauna of the sanctuary are needed urgently to plan the management of the park systematically.

2. A digital map of the vegetation and topography of the sanctuary is to be developed on priority.
3. The frontline staff are to be trained in wildlife management, handling of camera traps, using GPS, using weapons, etc.
4. A sufficient number of trained field personnel need to be posted, and more funds need to be provided.
5. Forest Rest Houses need to be constructed for touring officers and visitors, and more anti-poaching camps need to be constructed inside the PA.
6. More awareness programmes and eco-development activities need to be conducted to foster the active participation and support of the local people.
7. More infrastructures and a patrolling network need to be created.

2

## Kane Wildlife Sanctuary, Arunachal Pradesh

### A. Management Strengths

1. The forest area is compact.
2. The number of perennial water bodies is adequate.
3. There is no biotic interference.
4. The area is remote.
5. The PA has excellent connectivity with the surrounding forests, which will support landscape-level wildlife conservation.

### B. Management Weaknesses

1. Being looked after by a territorial division (Likabali Forest Division), the management of the PA suffers.
2. The staff strength is insufficient, and the staff are untrained.
3. There are no patrolling paths.
4. Experienced wildlife staff members are being transferred to territorial ranges.
5. There is no dedicated infrastructure for the PA.
6. Hardly any funds are available for managing the PA.

### C. Immediate Actionable Points

1. A dedicated range must be created for the PA and notified, with a sufficient number of staff members.
2. A housing facility is to be developed near the PA.
3. Adequate funds need to be released in a timely manner.

4. The staff need to be trained in wildlife monitoring and management and in wildlife laws.
5. Scientific input is to be incorporated in the management plan, which is to be prepared for the period 2016–2017 onwards as the current management plan is ending in 2015–2016.
6. Animal crossing points are to be incorporated when widening roads (widening of the road from Likabali to Along has already started).

3

## Amchang Wildlife Sanctuary, Assam

### A. Management Strengths

1. The forest area is compact.
2. The number of perennial water bodies is adequate.
3. The PA acts as a green lung for Guwahati.

### B. Management Weaknesses

1. The number of infrastructure projects around the PA is increasing.
2. The land use pattern around the PA is changing fast.
3. The availability of trained manpower is inadequate.
4. A railway track passes adjacent to the northern and eastern boundaries.
5. National Highway 37 passes adjacent to the southern boundary.
6. Coke industries, brick kilns and cement processing industries operate very close to the PA.
7. There is encroachment of land, particularly in the western part of the sanctuary.
8. The release of funds is inadequate and delayed.
9. The infrastructure, such as staff quarters, vehicles, anti-poaching camps and boundary pillars, is inadequate.

### C. Immediate Actionable Points

1. The management plan must be approved quickly.
2. Encroachments are to be removed.
3. The eco-sensitive zone must be notified.
4. Land use changes in the surrounding area that are detrimental to the sanctuary and will block the movements of animals, such as the construction of resorts, big institutions and housing complexes, must be banned.
5. Industries that are listed as banned activities in eco-sensitive zones must be immediately closed.
6. The staff are to be trained in wildlife monitoring and law enforcement.
7. A sufficient number of boundary pillars must be erected to make the boundary of the PA visible.

## Borail Wildlife Sanctuary, Assam

### A. Management Strengths

1. All the stakeholders are supportive of the PA management.
2. There is scope for integrating the site with the nearby reserved forest areas.
3. There are no encroachments or biotic interference within the PA.
4. The habitat supports eight primate species, making it unique as such richness in primates is found in very few PAs in India.

### B. Management Weaknesses

1. The PA is managed in two parts: the eastern part, managed by the Cachar Hills Division and the western part, managed by the Karimganj Division. These are territorial divisions, and wildlife management is combined with territorial works.
2. The first management plan, which has presently been submitted for approval, is not according to the norms of the WII, with major aspects of protection strategies, habitat improvement and involvement of stakeholders in planning missing.
3. The presence of extremists and ultra groups in the close proximity of the sanctuary hinders the management of the PA as the staff feel insecure.
4. Systematic assessment and monitoring of the site values and threats are yet to be taken up.
5. The site is subject to biotic interference along the fringes from the 42 villages present there.
6. There is no separate wildlife staff dedicated to this PA. All the staff members involved in the protection and management of the PA are members of the territorial division staff. Therefore, their orientation towards wildlife conservation is weak.
7. None of the frontline field staff are trained in wildlife management. The ACF and DCF are also not trained in wildlife management.
8. The site has an ad hoc protection strategy due to the paucity of staff members. There are very few options available to the park manager because of this.
9. The resources, both human and financial, allocated for management of the site were found to be inadequate. No dedicated funds were released during the last 3 years.
10. Complaints that are received are normally investigated, but there is no systematic approach to investigation and redressal.
11. There is no systematic schedule for maintenance and management of the minimal infrastructure and assets. Maintenance and management are always dependent on the availability of funds.
12. No systematic or regular census or monitoring is done by the PA management, and no wildlife-related research or studies have been conducted.
13. No resources (vehicles, equipments, buildings, etc.) have been specifically allotted for the PA.

### C. Immediate Actionable Points

1. The possibility of the PA being managed by a single division or by a newly created wildlife division should be given priority and explored immediately. The PA should have two ranges, east and west, for better management. Presently this PA is under two different territorial divisions.
2. The management plan needs a major revision on the lines of the WII guidelines, with strategies for zonation, protection, habitat improvement and management, with the proper involvement of the stakeholders at different levels of planning, which should be done immediately.
3. The values and threats of the site need to be monitored and assessed immediately.
4. The pressure along the fringes is to be mitigated as early as possible.
5. The paucity of staff has hampered many activities of the PA, such as habitat restoration, site protection and safeguarding the threatened biodiversity values, and so the vacant positions need to be filled up early.
6. Adequate resource allocation and timely release of funds are needed for managing the PA better.
7. All the frontline staff, including officers, should be trained in wildlife management in a phased manner to develop the latest skills and to use technology in managing the PA.
8. The management-related wildlife population trends need to be evaluated systematically, specifically for the eight species of primate and other threatened and endemic plants and animals.
9. A systematic study of the flora and fauna of the site needs to be carried out on a priority basis.
10. An effort needs to be initiated towards integrating the management goals into the working plan of the adjoining forest.

5

### Deepor Beel Wildlife Sanctuary, Assam

#### A. Management Strengths

1. This PA is a good representative of a wetland of international importance having the characteristics of the region.
2. It has an appreciable assemblage of rare, vulnerable and endangered species of flora and fauna or an appreciable number of individuals of any one or more of these species. It also has a special value for its endemic plant, animal species and community.
3. The WLS is ecologically an integral part of Rani-Garbhanga Reserved Forest, situated adjoining it to the south.
4. It is situated in the southern periphery of Guwahati City and is very close to educational institutes such as Guwahati University, Assam Engineering College and Assam Ayurvedic Medical College.
5. It is a part of the Deepor Beel Ramsar site.

6. A full-fledged range, namely Deepor Beel Wildlife Range, has been created through government notification no. FRW.11/2004/62, dated 17 February 2011, with two anti-poaching camps under its wing.

## B. Management Weaknesses

1. The railway line between Kamakhya railway station and Azara railway station passes through the site, which will impact the WLS adversely.
2. The long stretch of the PWD Road from Khanapara Road to Rani Gate fragments the contiguous landscape between Deepor Beel and Rani-Garbhanga Reserve Forest.
3. The artificial drainage system of the built-up area of the city is directly or indirectly connected to Deepor Beel.
4. The municipal solid waste dumping site of Guwahati Municipal Corporation is situated at a distance of only about 300 m from the periphery of the WLS.
5. The officers (ACF downwards) and the frontline staff are not trained in wildlife management.
6. There is heavy fishing pressure along the fringes of the PA.

## C. Immediate Actionable Points

1. The management plan, which is under preparation, needs to be completed immediately and approval obtained.
2. Training needs to be imparted to officers below the rank of ACF and to the frontline staff in wildlife and wetland management in the correct manner.
3. The sanctuary suffers from an inadequate staff strength and inadequate infrastructure for the staff. This should be addressed by the state government in a phased manner.
4. The infrastructure and other facilities available for tourists are very insufficient. This needs to be improved immediately.
5. The rapid change of land use- conversion of agricultural lands to industrial use must be stopped immediately by the state government.
6. The municipal solid waste deposition site is situated very close to the WLS. It should be shifted, and there should be a proper disposal plan. Further, the other pollutant, in the form of sewage, needs to be treated properly before it is released into the wetland. This will reduce the degradation of this wetland ecosystem.
7. The fishing along the boundary needs to be regulated through the formation of EDCs in the 11 peripheral villages, and alternative livelihood options need to be provided.
8. The issues relating to the declaration of an ecosensitive zone around the PA must be resolved on priority basis so that other developments in the immediate vicinity of the wetland that would be detrimental can be stopped.
9. Baseline information on the different habitats and the bird species is very important for monitoring and for understanding the significance of this PA, as it is part of a larger wetland, which is a Ramsar site.
10. Monitoring-cum-patrolling camps/towers must be established.

## Dehing Patkai Wildlife Sanctuary, Assam

### A. Management Strengths

1. Threats and values were identified in the last management plan, and the present management plan is under process.
2. There was proposal to define the site into core and buffer areas in the last management plan, but these were not defined in the field with identification lines in the map of the PA; however, efforts are being made to identify them. The necessary prescriptions will be incorporated in the next management plan to manage such defined areas.
3. The latest management plan (2011–2012 to 2015–2016) was approved, and its period ended on 31.03.2016. It was a comprehensive management plan, and efforts are being made to make the current one more field oriented, effective and comprehensive so that the strategic goals can be attained.
4. All the stakeholders participated in most of the planning processes of the management plan.
5. There is scope for integration of the site with the reserved forest areas nearby.
6. The number of personnel of this PA is inadequate, but all the personnel are explicitly engaged for protection and for achievement the specific management objectives.
7. NGO and members of EDCs are being engaged to build awareness among the local people regarding conservation of wildlife, and the man–animal conflicts are mitigated by management of the PA using funds provided by government organisations, NGOs, public sector units, etc.

The site has published brochures in English and the Assamese language that give general information relating to the PA. Some leaflets have also been published by the local forest authority for providing information to the public.

### B. Management Weaknesses

1. The PA is divided by the river Buridehing into two parts: the northern part, managed by the Digboi Division, and the southern part, managed by the Dibrugarh Division. These are territorial divisions, and wildlife management is combined with territorial works.
2. Systematic assessment and monitoring of the site values are yet to be taken up.
3. Some threats have been assessed on the basis of field verification and patrolling, but a systematic assessment of other threats has not yet been carried out.
4. The site is subject to biotic interference from the seven villages nearby.
5. Due to the extreme insufficiency of staff members in this PA, the enforcement is very poor, and safeguarding the threatened values has become extremely difficult.
6. The site has an ad hoc protection strategy due to the poor staff strength. There are very few options available to the park manager because of this.
7. The resources, both human and financial, allocated for management of the site were found to be inadequate.

8. Complaints that are received are normally investigated, but there is no systematic approach to investigation and redressal.
9. There is no systematic schedule for maintenance and management of infrastructure/assets, which are always dependent on the availability of funds.
10. No systematic/regular wildlife-related research/studies are being conducted.
11. The biotic pressure on the PA from the villages on the fringes needs to be controlled to conserve the existing biodiversity.
12. There is no specific allotment of resources (vehicles, boats, equipment, buildings, etc.). All the resources that are allotted to the ranges of this PA are generally used.
13. The PA is being managed by two territorial divisions, which may invite a conflict of interests.
14. It appears that the buffer zone is being targeted for oil exploration as well as for developing a road to bypass Digboi city. This is bound to affect elephant movements in the area, which are already leading to man-elephant conflicts.

### C. Immediate Actionable Points

1. The values of the site need to be monitored and assessed.
2. The threats need to be identified and assessed systematically.
3. The pressure posed by the presence of cattle needs to be mitigated as early as possible.
4. The paucity of staff members has hampered many activities of the PA, such as habitat restoration, site protection and safeguarding the threatened biodiversity values. The vacant positions need to be filled up early.
5. Adequate resource allocation and timely release of funds are needed for better management of the PA.
6. The frontline staff, including the officers, should be trained in a phased manner in the use of technology and to develop the latest skills to manage the PA.
7. A systematic approach to investigating and redressing the complaints received is needed.
8. The management-related trends of estimation of population of wildlife need to be systematically evaluated. A systematic study of the flora and fauna of the site needs to be carried out on a priority basis.
9. The area under Dibrugarh Forest Division needs to be expanded as the PA is slender and linear in this division.
10. The targeting of areas for oil exploration and the bypass needs to be reconsidered dispassionately as these areas harbour rich wildlife and have a migratory route of elephants.
11. The possibility of the PA being managed by a single division or by a newly created wildlife division needs to be considered urgently.

## Sonai Rupai Wildlife Sanctuary, Assam

### A. Management Strengths

1. The areas that have not been encroached upon are well protected and have an adequate number of patrolling camps.
2. The sanctuary is contiguous with Orang Wildlife Sanctuary and Nameri Tiger Reserve, in Assam, forming part of a larger conservation landscape.
3. It is one of the Pygmy Hog reintroduction sites.
4. The undisturbed part of the PA has been notified as a Satellite Core Tiger Conservation Area.
5. The presence of an Assam Rifles camp 3 km northwest of Kamengbari Patrol Camp helps ward off further encroachments in addition to providing security to the field staff of the forest department.

### B. Management Weaknesses

1. There is no management plan in place. Only one management plan was made and that for the period 2003–2008.
2. Nearly 50% (85 km<sup>2</sup>) of the PA has been encroached upon by the local people.
3. The human–animal conflict has intensified.
4. There is no involvement of the stakeholders in the planning process.
5. There is no public information system.
6. The law-and-order problem of the area is hindering the management of the PA.
7. A school has been constructed in the wildlife sanctuary (in the encroached area), and other infrastructure, including roads, has been built by the PWD.
8. The site values are not done assessed or are not available.
9. As most of the staff members are engaged in protection, they are not able to engage in restoration of the habitat and other management efforts.

### C. Immediate Actionable Points

1. A management plan is to be prepared immediately.
2. The zones are to be identified and demarcated on the basis of the objectives of the management.
3. Settlement of the encroached area of the wildlife sanctuary is of high priority.
4. Intensive grassland management in the form removal of weeds, saplings and shrubs that have invaded the grasslands is to be taken up immediately in grassland patches for improvement of the habitat for the Pygmy Hog and other wildlife.
5. The diversity of butterflies, which are pollinators, is good. A butterfly conservation

area/park is to be developed by identifying and restoring their host plants.

6. Year-round monitoring of the elephant populations and movements and preparation of a photo identification register of individual elephants/groups will be of use in managing the park as well as in reducing the human-elephant conflict.
7. Weeds and invasive species are to be eradicated in parts of the PA as a part of the habitat improvement and management activities.
8. The frontline staff need to be trained through experienced wildlife NGOs.
9. Research inputs on the habitat, species and overall biodiversity are needed immediately.
10. A small part of the PA (from Kalamati to Gelgeli) needs to be opened for visitors as soon as possible in the undisturbed area with the minimum required infrastructure and a system needs to be developed along with the Army so that the entry of visitors is smooth.

8

## Yangoupoki Lokchao Wildlife Sanctuary, Manipur

### A. Management Strengths

1. All the stakeholders are supportive of the PA management.
2. There is scope for integrating the site with the nearby reserved forest areas.
3. There are no encroachments or biotic interference within the PA.
4. The habitat supports eight primate species, making it unique as such richness in primates is found in very few PAs in India.
1. Officers above the level of Range Officer are trained in wildlife management.
2. There is coordination with other departments such as paramilitary forces in patrolling the international border and curbing the wildlife trade.
3. The forest of the PA is contiguous with the reserve forest on the western side and with the forest in Myanmar, and so the forest is not fragmented.
4. The connecting districts have adequate forest cover.
5. The steep hills of the area make it inaccessible.
6. Harbours the Indo-Burmese zoo-geographical realms, which are unique to only this PA.

### B. Management Weaknesses

1. Law-and-order problem.
2. There are social conflicts.
3. There is insurgency in the area.
4. The frontline staff are inadequate. The infrastructure available for the staff is not adequate.
5. The frontline staff are not trained.
6. There is severe poverty in the area.
7. The funds are inadequate.
8. There is no baseline information on the threatened/key species and biodiversity in general or on the habitat.

### C. Immediate Actionable Points

1. The draft management plan should be finalized and approval obtained immediately.
2. The final notification of the WLS is to be expedited.
3. The vacancies are to be filled up immediately.
4. The frontline staff are to be trained in basic wildlife conservation and management.
5. The eco-development plan needs to be finalized, and EDCs are to be set up in the legal villages.
6. Award/incentives are to be given to the staff for exceptional/outstanding work toward wildlife conservation and management.
7. Baseline data on the threatened/key species and the general biodiversity (floral and faunal) need to be generated for the PA along with information on the basic habitat needs of the fauna and flora and on the threats faced by them.
8. Awareness needs to be created about the wildlife species the trading of which is punishable among the other line departments that are involved in or helping with controlling the wildlife trade.
9. Basic awareness must be created among the paramilitary force personnel on species of conservation significance and the process of documenting species encountered during regular patrolling. This can help monitoring.

9

## Siju Wildlife Sanctuary, Meghalaya

### A. Management Strengths

1. This is one of the oldest wildlife sanctuaries of the state.
2. There are no human settlements inside the sanctuary.
3. The sanctuary is continuous with Balphakram NP on the eastern side.
4. The PA supports several endangered wild plant and animal species including the blue vanda.

### B. Management Weaknesses

1. The area of the sanctuary is too small (5.18 km<sup>2</sup>) to manage wide-ranging wild animals.
2. Except in the eastern part, the Forest Department does not have any control over the forest land adjoining the sanctuary.
3. Primary scientific information on the biodiversity is lacking, and there is no monitoring of even the key species.
4. The period of the management plan is just 5 years, compared with 10 years in other parts of the country.

5. The management plan is not in consistent with the guidelines of WII, and the concerns of the stakeholders are not incorporated in it.
6. The support from NGOs is very poor.
7. No staff members below the DFO level are trained in wildlife management.
8. The number of patrolling routes is insufficient.
9. The local people are not involved in the management of the PA.

### C. Immediate Actionable Points

1. A scientific comprehensive management plan needs to be prepared in consistency with the guidelines of WII, through a participatory process.
2. The inadequacy of the frontline field staff needs to be addressed, and the vacancies must be filled up immediately.
3. The resources available from the state plan and other sources need to be enhanced and released in a timely fashion.
4. The officers below the ACF and the frontline field staff need to be trained in the wildlife management and basic monitoring of threatened and key species and their habitats.
5. The present patrolling system should be improved and enhanced by developing more infrastructure such as patrol camps, equipment and other related facilities for better protection.
6. The threats need to be documented systematically and monitored regularly.
7. The pressure along the boundary needs to be reduced through a proper eco-development plan that includes resource development and better livelihood options.
8. The infrastructure in the Siju WLS campus for both the staff and tourists needs to be improved.
9. Baseline information on the flora and fauna, threatened/key species and habitat needs to be developed/ generated immediately with the involvement of scientific institutions, NGOs carrying out wildlife research and local universities.

10

## Lengteng Wildlife Sanctuary, Mizoram

### A. Management Strengths

1. The final notification of the wildlife sanctuary has been made after settlement of people's rights.
2. There is strong and active participation of local communities and NGOs in the protection and management of the PA.
3. The PA has a very good landscape and is contiguous with a well-protected village community forest on all sides.
4. The entire notified area of the PA is managed as the Core Zone, and the community forest is managed as the Buffer Zone.

## B. Management Weaknesses

1. The permanent frontline staff are over-aged and untrained, and their numbers are inadequate.
2. The infrastructure in the field is inadequate, affecting the protection work.
3. There is no monitoring mechanism in place in terms of assessing the protection efficiency.
4. The funds are inadequate.
5. No baseline information is available on the threatened species of both the flora and the fauna of the PA.

## C. Immediate Actionable Points

1. The required staff strength needs to be assessed and action taken accordingly on an immediate basis.
2. A wildlife management training programme is immediately needed for both the senior and newly recruited staff members.
3. Well-defined protection strategies need to be put in place, and the performance of the frontline staff should be assessed accordingly.
4. The patrolling routes should be defined well and marked on the ground and on maps.
5. The resource needs of the villages on the fringes need to be assessed. A project needs to be developed accordingly and implemented to improve the livelihoods of the villagers.
6. Information on the status, distribution and habitat availability of the threatened species of the PA is needed immediately.

The sanctuary needs to be studied in terms of its flora and fauna for generation of baseline data.

## Tawi Wildlife Sanctuary, Mizoram

### A. Management Strengths

1. There are no human settlements inside the PA and no encroachment.
2. The PA is part of a larger forested landscape which are safety reserves of the local communities.
3. High species richness within the sanctuary that includes Indo-Burmese species

## B. Management Weaknesses

1. There is no proper approach road to the PA, which is a hurdle for conservation and management.
2. There is a lack of frontline staff, and the present staff are above 50 years of age.
3. The Range Officer does not have a vehicle.
4. The funds available for wildlife management are inadequate.
5. There is no baseline information available on the flora, fauna, threatened/key species and habitat.

## C. Immediate Actionable Points

1. The infrastructure, including vehicles, equipment and roads, needs to be improved immediately.
2. Baseline and regular monitoring of the biodiversity needs to be initiated immediately through research by scientific institutions, NGOs and local universities.
3. The new management plan must be prepared be in line with the WII guidelines and should involve the participation of the local stakeholders.
4. The issues related to the ecosensitive zones need to be addressed immediately.
5. The vacancies at all levels should be filled systematically at the earliest.
6. The frontline staff need to be trained in wildlife management and monitoring threatened or key species.

12

## Tokalo Wildlife Sanctuary, Mizoram

### A. Management Strengths

1. The final notification of the wildlife sanctuary has been made, and there are no villages inside the PA.
2. There is strong, active participation of local communities and NGOs in the protection and management of the PA.
3. The PA has a very good landscape with scope for expansion, with a well protected village community forest on the Indian side as well as the Myanmar side.
4. The entire notified area of the PA is managed as the core zone, and the community forest is managed as a buffer zone.
5. Qualitative Information and lists of the floral and faunal components of the PA are available.

## B. Management Weaknesses

1. The frontline staff members are over-aged and untrained, and their number is inadequate.
2. The poor infrastructure in the field affects protection measures negatively.
3. There is no monitoring mechanism in place for assessing the protection efficiency.
4. The funds are inadequate funds and are not released in a timely manner.
5. No quantitative baseline information is available on the threatened species, both plant and animal, of the PA.

## C. Immediate Actionable Points

1. Certain aspects of the management plan need to be improved immediately, especially conducting proper censuses and research and developing a road network.
2. The required staff strength needs to be assessed and action taken accordingly on an immediate basis.
3. A training programme on wildlife management is to be implemented for existing and newly recruited staff members.
4. Well-defined protection strategies need to be put in place, and the performance of the frontline staff should be assessed accordingly.
5. The patrolling routes should be well defined and marked on the ground and on the map.
6. The resource needs of the fringe villages need to be assessed and programmes developed accordingly and implemented for the improvement of the livelihoods of the villagers.
7. Quantitative information on the status, distribution and habitat availability of the threatened species of the PA is needed immediately. The sanctuary needs to be explored in terms of the flora and fauna to generate a quantitative baseline.

## Puliebadze Wildlife Sanctuary, Nagaland

### A. Management Strengths

1. The area is protected well except for some pressures along the western boundary, which runs through Kohima town.
2. The forests of this sanctuary are connected to a larger contiguous forest that is managed by the local community in Japfu Range, which in turn is contiguous with forests in Manipur, and so there is a possibility of integration with the larger landscape.
3. The site is being protected well and the strength of the field staff is adequate.

## B. Management Weaknesses

1. There is no management plan in place currently, and no management plan has been made to date.
2. There is constant pressure on the sanctuary from the people along the western boundary.
3. No funds have been provided by the Nagaland Government for managing this sanctuary.
4. The stakeholders are not involved in the planning process.
5. There is no public information system.
6. The site values have not been assessed or are not available.
7. None of the staff members are trained in management or the basic laws of the Indian Wildlife Protection Act 1972.

## C. Immediate Actionable Points

1. The area is to be notified as a sanctuary under the Indian Wildlife Protection Act 1972 immediately.
2. A management plan is to be prepared immediately.
3. The frontline staffs (from Ranger to field level) are to be trained in wildlife management, monitoring and laws through experienced wildlife NGOs.
4. Inputs obtained through research on the habitat, species and overall biodiversity are needed immediately.

14

## Kyongnosla Alpine Sanctuary, Sikkim

### A. Management Strengths

1. The site has been demarcated well.
2. All the threatened species, such as the Snow Leopard, Musk Deer, Red Panda and Blood Pheasant, are protected well inside the sanctuary.
3. Due to the presence of paramilitary forces, illegal activity in and around the park has been controlled.
4. The site is integrated well with other PAs and reserved forests.
5. The staff are committed.
6. The tasks performed by the staff are directly linked to the management objectives.
7. Complaints are recorded in proper files, and immediate measures are taken to mitigate the problems.
8. Sustainable livelihood issues are addressed well by the management of the PA.
9. The local community is very supportive of the management of the PA.
10. All the management activities inside the park are carried out with the involvement of the local community.

## B. Management Weaknesses

1. The values of the PA and the threats faced by it have been identified, but they have not been assessed systematically. The management plan has not been revised to date, but now a new management plan is under preparation and only part one of the plans has been submitted to WII for their comments and suggestions.
2. Feral dogs are a great threat to the wildlife. The labour forces used by the BRO for construction of roads are also a major threat as they are involved in collecting NTFP.
3. The management of the PA lacks adequate financial support.
4. There is a lack of frontline staff members trained in wildlife management.
5. A lot of kitchen waste has been generated because of the constant presence of paramilitary forces in the area. The waste lies rotting, which causes diseases at times.
6. Due to the temporary nature of the posting of the army and paramilitary personnel in the area, it becomes a huge task for the management to develop awareness among them constantly.
7. Systematic surveys of the flora and fauna have not been carried out periodically.
8. There is a lack of infrastructure such as a Range Office, living quarters, and checkposts, in the area.
9. Restrictions on entry created by the army for the frontline staff in the area have been a major hindrance even for regular patrolling.

## C. Immediate Actionable Points

1. The lack of financial resources needs to be urgently addressed. The basic infrastructure pointed out in the section on management weaknesses has to be addressed immediately.
2. The major threats created by the army and paramilitary forces due to their presence in the area need to be resolved immediately. These forces generate a lot of garbage and kitchen waste.
3. A proper nature interpretation centre and tourist facility has to be developed in the area.
4. Scientific studies need to be conducted on the flora and fauna.
5. The field staff need to be trained appropriately in all wildlife-related aspects regularly.
6. The entry restriction problem has to be resolved immediately with the army personnel.

## Maenam Wildlife Sanctuary, Sikkim

### A. Management Strengths

1. The PA has pristine forests with negligible human impacts.
2. The buffer around sanctuary has reserved forests, which is also under the control of the DFO of Maenam WLS, and is adequate.
3. There is connectivity with Khangchendzonga NP, which is needed to sustain landscape-level wildlife conservation.
4. No highways or other linear projects pass through the sanctuary.
5. There are eight functional EDCs around the PA, and they extend support.

### B. Management Weaknesses

1. The management plan is not comprehensive, and it is not systematically updated.
2. Basic infrastructure like check posts, quarters for forest guards and watchtowers is not available for protecting the PA.
3. No baseline information is available on any floral or faunal species or habitats.
4. There is no vehicle at the range level.
5. The sanctioned staff strength at the field level is insufficient for carrying out regular patrols and other management-related work.
6. The staff are not trained to undertake monitoring of wildlife and to take up protection measures.
7. The understanding of legal provisions for wildlife crime control among the frontline staff is poor.
8. The funds for undertaking various activities are insufficient and are released late.
9. The resources available from state grants are negligible.
10. The staff of the PA are also involved in work related to crime prevention and human-animal conflicts in the territorial works/RF.

### C. Immediate Actionable Points

1. A comprehensive scientific management plan needs to be prepared and finalized on immediate priority, along with proper zonation. Further, this plan should be updated systematically.
2. Intense coordination with research institutions and universities is needed for generating baseline information on the biodiversity value of the PA and must be taken up.
3. Basic infrastructure required for protection of the PA, such as check posts, quarters for the frontline staff, watchtowers, and a dedicated vehicle for the RFO are lacking and needed to be provided or created.

4. Urgent steps are to be taken to sanction and appoint the required frontline staff to undertake systematic patrolling.
5. The officers below the level of the Range Officer and the frontline staff need to be given proper training in Wildlife management and legal provisions for wildlife crime control.
6. Adequate resource allocation and timely release of funds are needed for effective management. The human and financial resources need to be augmented immediately.
7. The resources provided by the state must be enhanced.
8. The staff of the PA should not be involved in tackling crime and human–animal conflict in the reserved forest.
9. The involvement of the locals should be enhanced through an appropriate eco-development plan by forming EDCs and developing ecotourism for improvement of livelihoods.

16

## Rowa Wildlife Sanctuary, Tripura

### A. Management Strengths

1. The sanctuary, although it is small, is the home of the spectacled langur—Phayre's leaf monkey—which was sighted during the visit.
2. The area has a very rich diversity of plants at all canopy levels, and the bird population is also very rich as evident from the sightings, calls, etc.
3. The last census was conducted in 2013–2014 for the larger mammals.
4. The staff strength is small, but their dedication is evident from the fact that because of frequent booking of offences against encroachers, one Range Forest Officer was hacked to death a few years back. From that time onwards, no illegal activities have been reported from the sanctuary, and the park is well protected.

### B. Management Weaknesses

1. The sanctuary is understaffed, with only 12 positions, of which only five are filled; seven are vacant.
1. The funds provided are perceived as pathetic.
2. There are no designated vehicles.
3. Only one ACF has undergone training, that too at a 21 days' condensed course conducted by WII at Kaziranga.

### C. Immediate Actionable Points

1. The draft management plan needs to finalize and approval obtained on priority.
2. Presently the PA is too small. The extent needs to be increased by including the reserve forest.
3. There are no well-planned systematic protection strategies and resources. These are needed.
2. Wildlife management activities need to be incorporated in the working plan of the adjoining reserve forest.
3. All the managers of the PA need to be trained in wildlife management.
4. The vacancies (58%) at different levels need to be filled immediately, and all staff members should be trained in wildlife management and monitoring.
5. The resources from the state as well as the Centrally Sponsored Schemes (CSS) need to be enhanced and released in time for carrying out management interventions.
6. Infrastructure needs to be provided in the form of an office for the Wildlife Warden, quarters and a vehicle.
7. The basic issues relating to the rights of the local people, especially those of the adjoining villages, in the buffer of the PA, need to be settled immediately.
8. The biodiversity values, including the threatened/ key species, need to be assessed systematically and a monitoring mechanism put in place.





04

# THE WAY FORWARD



**The present MEE process has provided valuable insights into the management processes and practices in all PAs. The strengths, weaknesses and immediate actionable points have been described in respect of all 80 protected areas included in this report. It is observed that PAs have to maintain these Strengths and address their Weaknesses in a systematic manner. Efforts should be made to implement the immediate actions indicated for each protected area. It is critical that each protected area has a good science based Management Plan formulated through a participatory process. Till such time the Management Plans are prepared/revised /updated the Annual Plan of Operation (APOs) should take into account actions required for implementing the results of the evaluation. The MoEFCC must ensure that adequate funds are provided and a system of compliance monitoring is put in place.**

# FILLED IN QUESTIONNAIRES IN RESPECT OF ALL 80 PROTECTED AREAS EVALUATED DURING 2015 TO 2017



## ANNEXURE-I

### Landscape regions, sites, teams for MEE of Protected Areas (NP+WLS) in India, 2015-2017

Regions	States	No. of NP/WLS	Names of Protected Areas (National Parks and Wildlife Sanctuaries)	Teams
Northern	Chandigarh, Haryana, Himachal Pradesh, J & K, Punjab, Uttar Pradesh and Uttarakhand	17 PAs (17 WLS + 0 NP)	Sukhna WLS, Chhilchhila WLS, Khol Hi Raitan WLS, Manali WLS, Pong Dam WLS, Rupi Bhaba WLS, Shimla Water Catchment WLS, Gulmarg WLS, Karakoram WLS, Bir Bhadson WLS, Harike WLS, Chandraprabha WLS, Hastinapur WLS, Okhla BS, Soor Sarovar BS, Askot Musk Deer WLS and Binsar WLS	Chairmans: Shri U.M. Sahai  Members: Dr. Yashveer Bhatnagar, Dr. Kulbhushan Suryawanshi and Dr. Ashish David  WII Faculty: Shri Ajay Srivastava,
Southern	A & N Islands, Andhra Pradesh, Goa, Karnataka, Kerala, Tamil Nadu and Telangana	16 PAs (11 WLS + 5 NP)	Lohabarrack WLS, Mount Harriet NP, Rani Jhansi Marine NP, Sri Penusila Narasimha WLS, Cotigaon WLS, Bannerghatta NP, Bhimgad WLS, Cauvery WLS, Gudavi BS, Idukki WLS, Mathikettan Shola NP, Kanyakumari WLS, Pulicat Lake BS, Mahavir Harina Vanasthali NP, Manjeera WLS and Pakhal WLS	Chairmans: Shri V.B. Sawarkar  Members: Shri Ajay Desai, Dr. Advait Edgaonkar and Dr. E.A Jayson  WII Faculty: Dr. A.K. Bhardwaj
Eastern	Bihar, Chhattisgarh, Jharkhand, Odisha and West Bengal	16 PAs (16 WLS + 0 NP)	Gautam Buddha WLS, Kusheshwar Asthan BS, Badalkhol WLS, Bhairamgarh WLS, Bhoramdev WLS Tamor Pingla WLS, Palkot WLS, Udhwa Lake BS, Debrigarh WLS, Kapilash WLS, Kotagarh WLS, Lakhari Valley WLS, Ballavpur WLS Lothian Island WLS, Ramnabagan WLS and Senchal WLS	Chairmans: Shri Brij Kishore Singh  Members: Dr. S. Narendra Prasad and Dr. D.S. Srivastava  WII Faculty: Shri Aseem Srivastava

Regions	States	No. of NP/WLS	Names of Protected Areas (National Parks and Wildlife Sanctuaries)	Teams
Western	Dadra and Nagar Haveli, Gujarat, Madhya Pradesh, Maharashtra and Rajasthan	15 PAs (14 WLS + 1 NP)	Dadra and Nagar Haveli WLS, Balaram Ambaji WLS, Girnar WLS, Khijadiya BS, Nal Sarovar BS, Vansda NP, Bagdara WLS, Ghatigaon Hukna WLS, Ken Gharial WLS, Phen WLS, Dnyanganga WLS, Phansad WLS, Radhanagri WLS, Tansa WLS and Bhainsrodgarh WLS	Chairmans: Dr. H.S. Pabla and Shri Suhas Kumar  Members: Dr. Diwakar Sharma, Dr. Yogesh Dubey and Professor Jeet Ram  WII Faculty: Shri. P.C. Tyagi
North-eastern	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim & Tripura	16 PAs (16 WLS + 0 NP)	Kamlang WLS, Kane WLS, Amchang WLS, Borail WLS, Deepor Beel WLS, Dehing Patkai WLS, Sonai Rupai WLS, Yangoupokpi Lokchao WLS, Siju WLS, Lengteng WLS, Tawi WLS, Tokalo WLS, Puliebadze WLS, Kyongnosla Alpine Sanctuary, Maenam WLS and Rowa WLS	Chairmans: Shri TTC Marak  Members: Dr. Justus Joshua and Dr. R.K. Singh  WII Faculty: Dr. Pratap Singh and Dr. Manoj Nair
Total States		+ UT= 32	Total 80 PAs (74 WLS + 06 NP)	

## ANNEXURE-II

### Assessment Criteria for addressing issues relating to Climate Change & Carbon capture in the Protected Areas

1. Additional Criteria on Climate Change: Is the protected area 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. Additional Criteria on Climate Change: Is the protected area 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 protected area	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 protected area, but no conscious measures to increase carbon dioxide capture	Good			
There are active measures in place both to reduce carbon loss from the protected area and to increase carbon dioxide capture	Very good			

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







Ministry of Environment,  
Forest & Climate Change



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