TIGER CONSERVATION PLAN

MUKANDRA HILLS TIGER RESERVE

2025–26 TO 2035–36

Prepared by,

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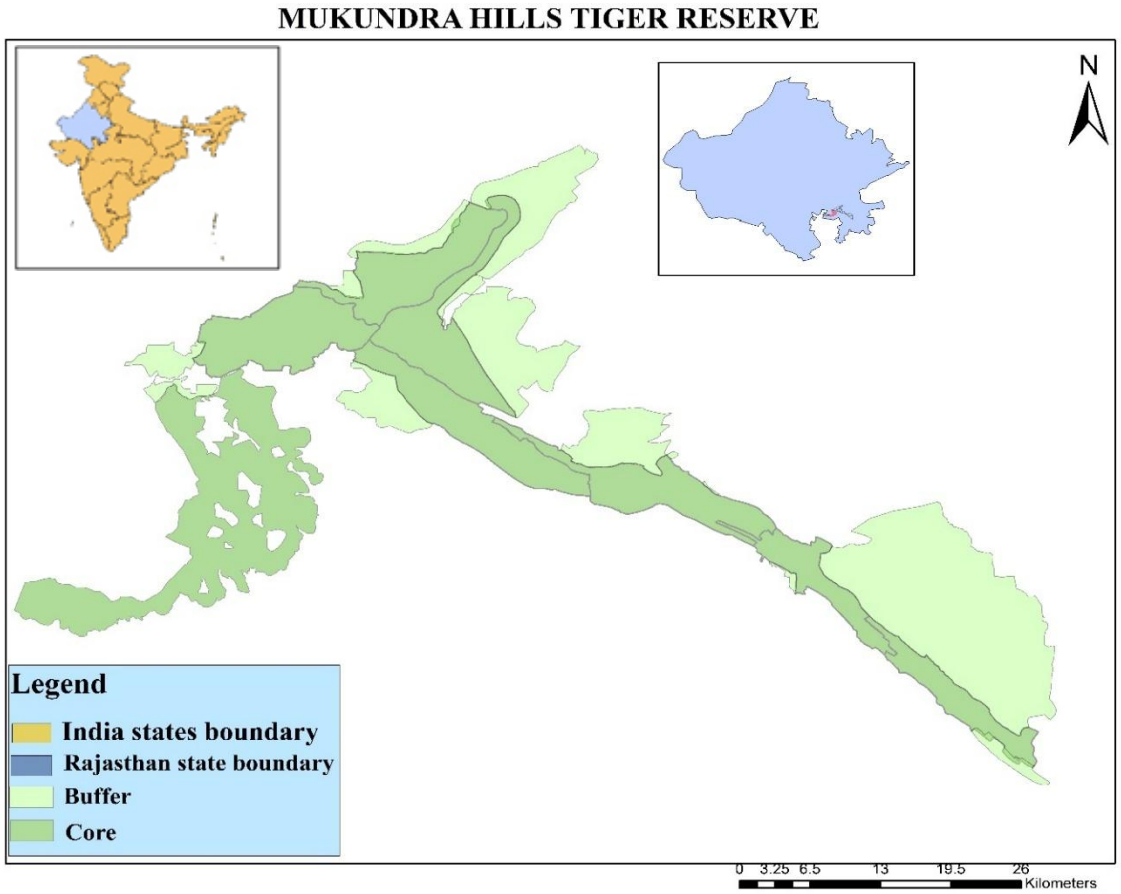
The Tiger Conservation Plan would not have seen the light of the day without the collective efforts of all the members of the Mukandra Hills Tiger Reserve administration. Therefore, I would like to thank all of them for making this Plan a reality.

Sugna Ram Jat, IFS

INTRODUCTION

1.1 Description

Mukandra Hills Tiger Reserve (MHTR) is named after the Mukandra hill range which got its name from former ruler of Kota Shri Maha Rao Mukund. The administrative head quarter of MHTR is situated at Kota, Rajasthan. However, this tiger reserve is spread over four districts of Rajasthan which are Kota, Bundi, Chittorgarh and Jhalawar. MHTR approximately lies between 24°38′ to 25° 7' N Latitude and 75°26' to 76°12′ E Longitude.



MAP 1.1: Geographical Location of Mukundra Hills Tiger Reserve, Rajasthan, India.

Prior to the formation of the state of Rajasthan, these forests were part of the erstwhile Kota, Chittorgarh, Bundi and Jhalawar princely states and managed as hunting reserves. After independence, these forests came under the control of the Government of Rajasthan. A part of the forest was declared as Darrah Sanctuary under Section 5 of the Rajasthan Wild Animals and Birds Protection Act 1951vide order No. F 39 (2) Forest / 55 dated 07.11.1955 read with Rajasthan Entrance to the Game Sanctuaries Rules 1958 although the ex-rulers retained their

rights of hunting in these areas till 1971-72. Later, Jawahar Sagar Sanctuary and Mukandra National Park were notified in the years 1975 and 2007. Subsequently Mukandra Hills Tiger Reserve was notified vide order No: F3 (8) FOREST 2012 dated 09-04-2013 which includes Mukandra National Park, Darrah Sanctuary, Jawahar Sagar Wildlife Sanctuary and part of National Gharial Sanctuary.

The 2006 amendment to the Wildlife Protection Act 1972 has defined "core" and "buffer" areas of a Tiger Reserve, the former being the critical or inviolate area and latter, the peripheral area to foster co-existence with local people for safeguarding the integrity of the core.

Some forest areas of Kota, Bundi and Chittorgarh have been transferred to administrative control of the Tiger Reserve administration which serve as multiple use area and may encompass conservation of community reserves, apart from revenue lands, private holdings, villages, towns and other production sectors.

Bhainsrodgarh Sanctuary has been a new addition to Mukandra Hills Tiger Reserve vide order 4854336 dated 05.10.2023. It has been made part of core of tiger reserve but currently is under administrative control of DCF wildlife Kota division.

1.2 Legal provisions contained in the wildlife (protection) act regarding tiger conservation plan and brief description of their relevance in the tiger conservation unit/landscape

The Wildlife (Protection) Act, 1972 was amended in 2006, and a separate Chapter (IVB) has been added on the "National Tiger Conservation Authority", which has replaced Project Tiger. This Chapter, *interalia*, has enabling provisions (Section 38V) for preparing a "Tiger Conservation Plan" for the proper management of a tiger reserve, which will also include staff development and deployment plan while ensuring livelihood and rights for the local communities inhabiting the landscape.

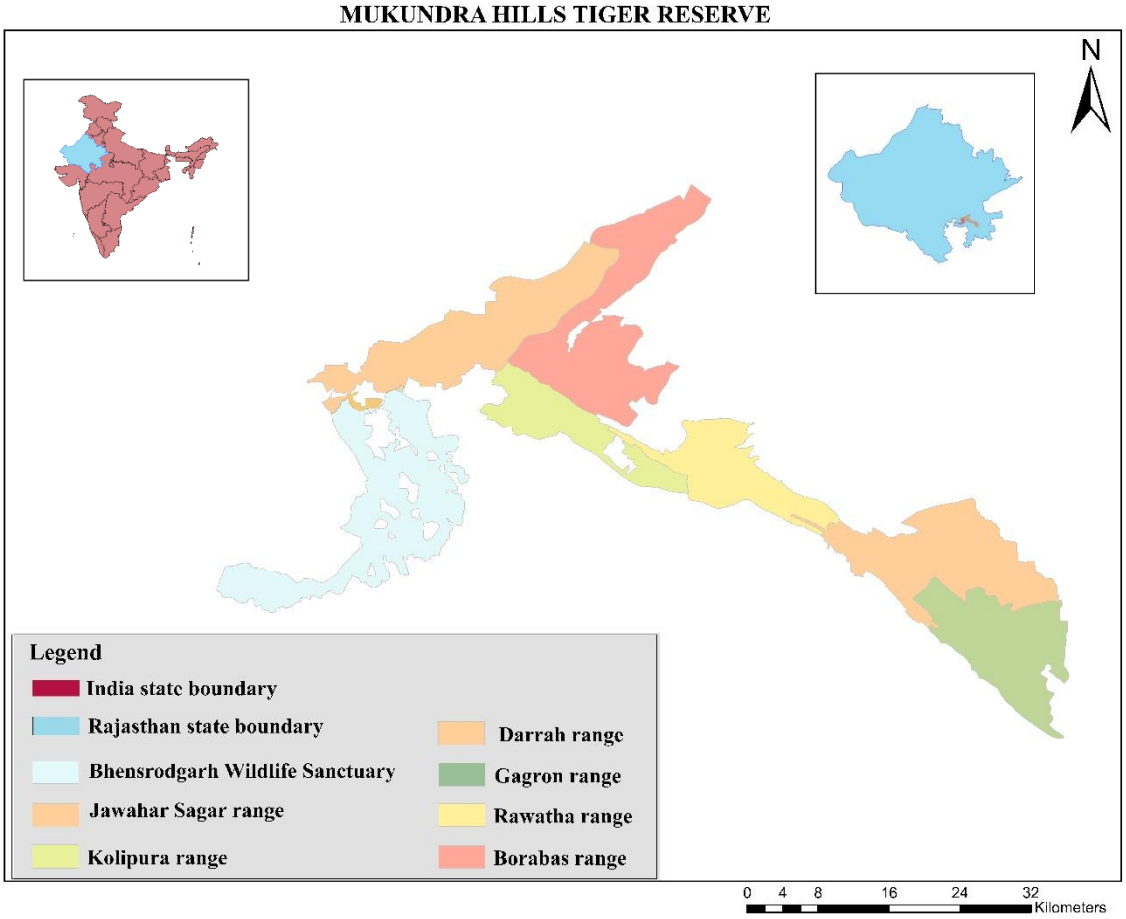
According to the Act, the core or critical tiger habitat is required to be kept as inviolate for the purpose of tiger conservation. The buffer or area peripheral to critical tiger habitat is required to ensure the integrity of the critical tiger habitat with adequate dispersal for tiger species and which aim at promoting co-existence between wildlife and human activity with due recognition of the livelihood, developmental, social and cultural rights of the local people. The adjoining landscape is required to act as corridor to ensure gene flow of the wildlife moving between the protected areas.

Area Statement: Total area of Mukandra Hills Tiger Reserve is 1135.787 sq. km is as follows:

Table-1.1: District wise area of MHTR Core or Critical Tiger Habitat (CTH)				
S. No.	**District**	**Forest area (in Sq. Km)**	**Revenue area (in Sq. Km)**	**Total area (in Sq. Km)**
1	Kota	230.46	11.98	242.44
2	Bundi	97.61	0.00	97.60
3	Jhalawar	30.69	1.84	32.53
4	Chittorgarh	236.19	81.94	318.23
	Total	**594.95**	**95.76**	**690.71**

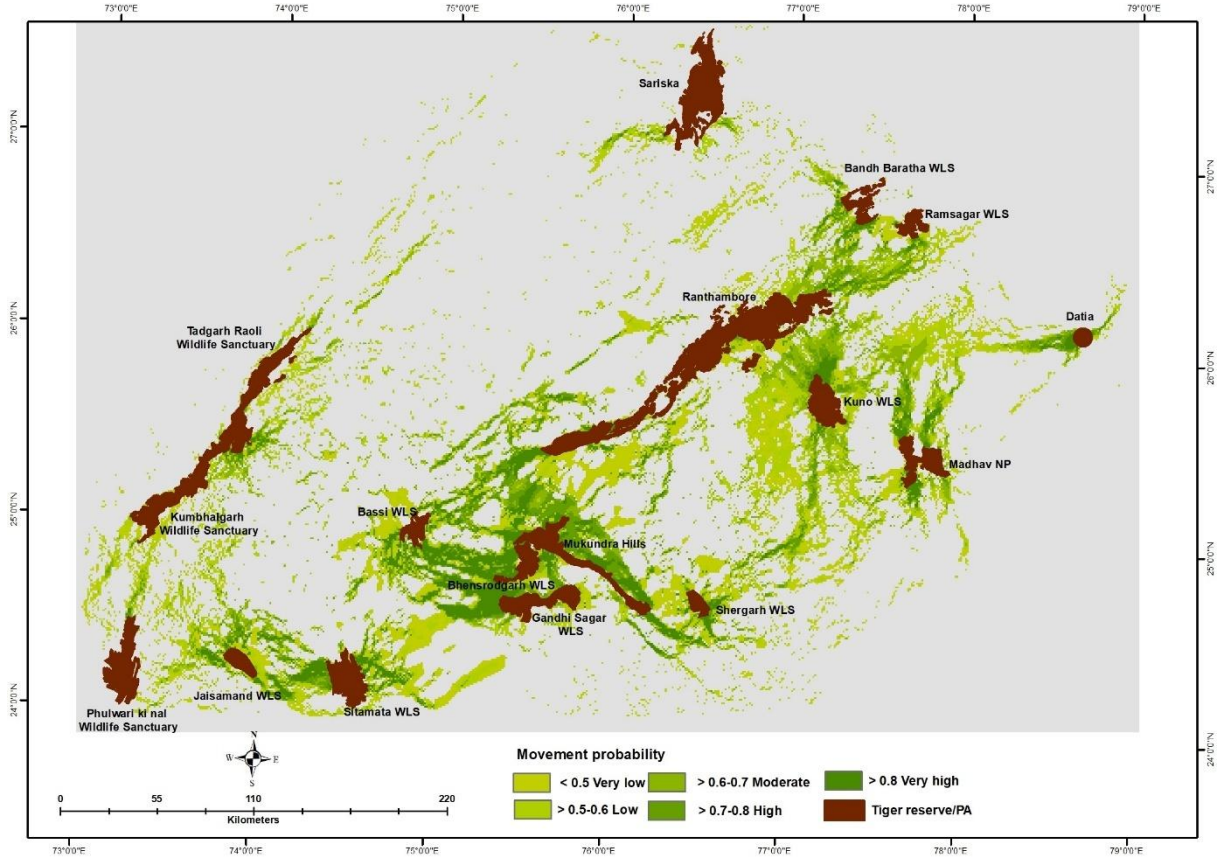
Table-1.2: District wise area of MHTR Buffer

S. No.	District	Forest area (in Sq. Km.)	Revenue area (in Sq. Km.)	Total area (in Sq. Km.)
1	Kota	306.64	7.40	314.04
2	Jhalawar	68.23	9.90	78.13
3	Chittorgarh	39.85	0	39.85
4.	Bundi	13.05	0	13.05
	Total	**427.77**	**17.30**	**445.07**



Map-1.2: Map Depicting the Area of Mukundra Hills Tiger Reserve

Mukandra Hills Tiger Reserve has its own significance in the Rajasthan tiger meta population framework due to its location in the CI-cluster I Central Indian Landscape. Mukandra Hills Tiger Reserve acts as one of the sinks to the spill over tiger population from Ranthambhore Tiger Reserve. The past presence of strayed tigers from Ranthambhore is a proof to this active corridor. If the corridor from Ranthambhore Tiger reserve is developed with developing Ramgarh Wildlife Sanctuary in between, Mukandra Hills Tiger Reserve can be made as a sink for the tiger population, and it will become a solution for the straying tiger issue in the source.



Map-1.3: Corridor Connectivity of Mukundra Hills Tiger Reserve

MUKANDRA HILLS TIGER RESERVE

TIGER CONSERVATION PLAN

2025-26 TO 2035-36

PART - I

CORE AREA PLAN

Tiger Conservation Plan – Part 1 - For CTH

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Part - A

The Existing Situation

CHAPTER 01

INTRODUCTION OF THE AREA

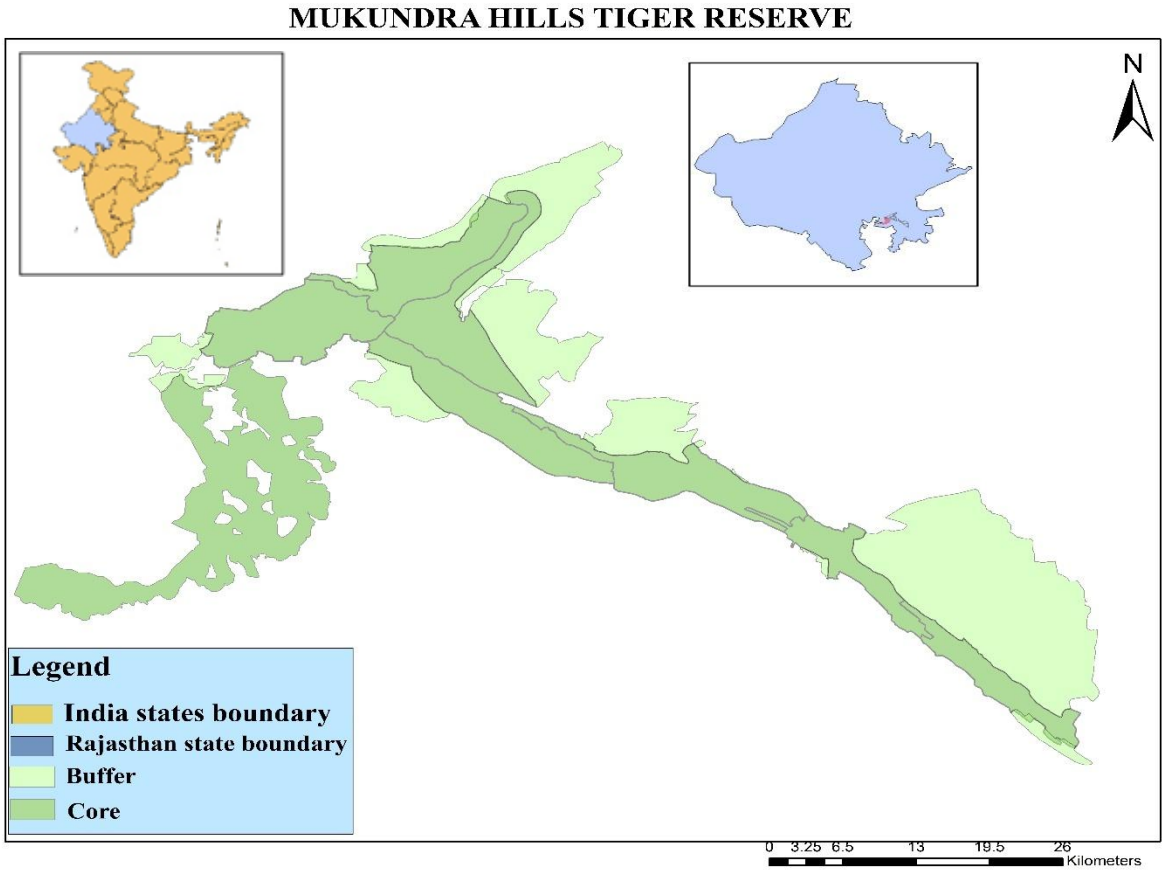
1.1 Name, Location, Constitution & Extent

1.1.1 Name:

Mukandra Hills Tiger Reserve (MHTR) is named after the Mukandra hill range which got its name from former ruler of Kota Shri Maha Rao Mukund.

1.1.2 Location:

The administrative head quarter of MHTR is situated at Kota, Rajasthan. However, this tiger reserve is spread over four districts of Rajasthan which are Kota, Bundi, Chittorgarh and Jhalawar. MHTR approximately lies between 24°38′ to 25° 7' N Latitude and 75°26' to 76°12′ E Longitude.



MAP 1.1: Geographical Location of Mukundra Hills Tiger Reserve, Rajasthan, India.

1.1.2 Constitution:

Prior to the formation of the state of Rajasthan, these forests were part of the erstwhile Kota, Chittorgarh, Bundi and Jhalawar princely states and managed as hunting reserves. After independence, these forests came under the control of the Government of Rajasthan. A part of the forest was declared as Darrah Sanctuary under Section 5 of the Rajasthan Wild Animals and Birds Protection Act 1951 vide order No. F 39 (2) Forest / 55 dated 07.11.1955 read with Rajasthan Entrance to the Game Sanctuaries rules 1958 although the ex-rulers retained their rights of hunting in these areas till 1971-72. Later, Jawahar Sagar Sanctuary and Mukandra National Park were notified in the years 1975 and 2007. Subsequently Mukandra Hills Tiger Reserve was notified vide order S. No: F3 (8) FOREST 2012 dated 09-04-2013 which includes Mukandra National Park, Darrah Sanctuary, Jawahar Sagar Wildlife Sanctuary and part of National Chambal Gharial Sanctuary.

The 2006 amendment to the Wildlife Protection Act 1972 has defined “core” and “buffer” areas of a Tiger Reserve, the former being the critical or inviolate area and latter, the peripheral area to foster co-existence with local people for safeguarding the integrity of the core.

Some forest areas of Kota, Bundi and Chittorgarh have been transferred to administrative control of the Tiger Reserve administration for effective management of contiguous habitat. Bhainsrodgarh Sanctuary derives its name from the historical town Bhainsrodgarh. Bhainsrodgarh Wildlife Sanctuary is in the Aravalli Hills in Chittorgarh, Rajasthan in Southeastern part of Rajasthan. Approximately 1/3 part of the sanctuary boundary surrounded by "RANA PRATAP SAGAR DAM" Rawatbhata and the BRAHIMANI RIVER. It is situated between 75° 20′ and 75° 35′ East longitude and 24° 40′ and 25° North latitude.

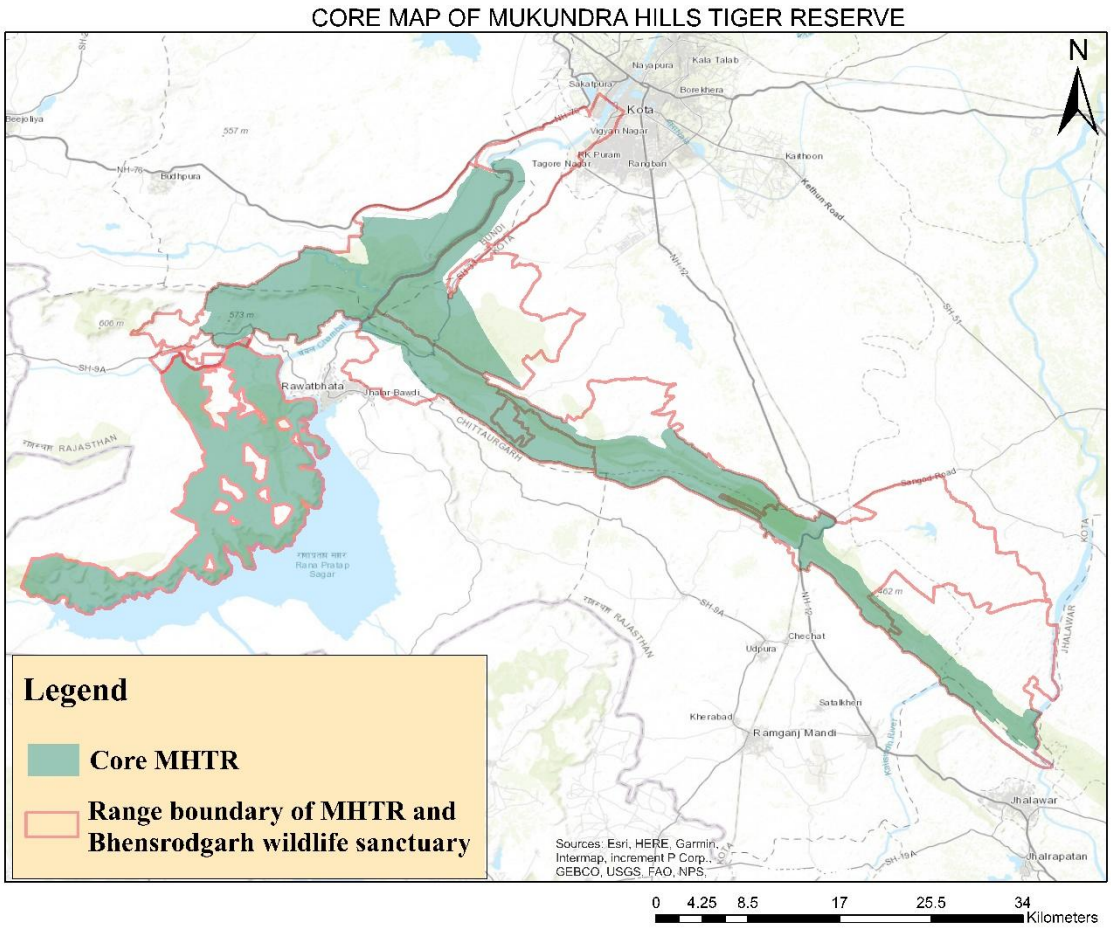
Table-1.1: District wise area of MHTR Core or Critical Tiger Habitat (CTH)

S. No.	District	Forest area (in Sq. Km)	Revenue area (in Sq. Km)	Total area (in Sq. Km)
1	Kota	230.46	11.98	242.44
2	Bundi	97.61	0.00	97.60
3	Jhalawar	30.69	1.84	32.53
4	Chittorgarh	236.19	81.94	318.23
	Total	**594.95**	**95.76**	**690.71**

1.1.4 Extent (Area Statement & Legal Status)

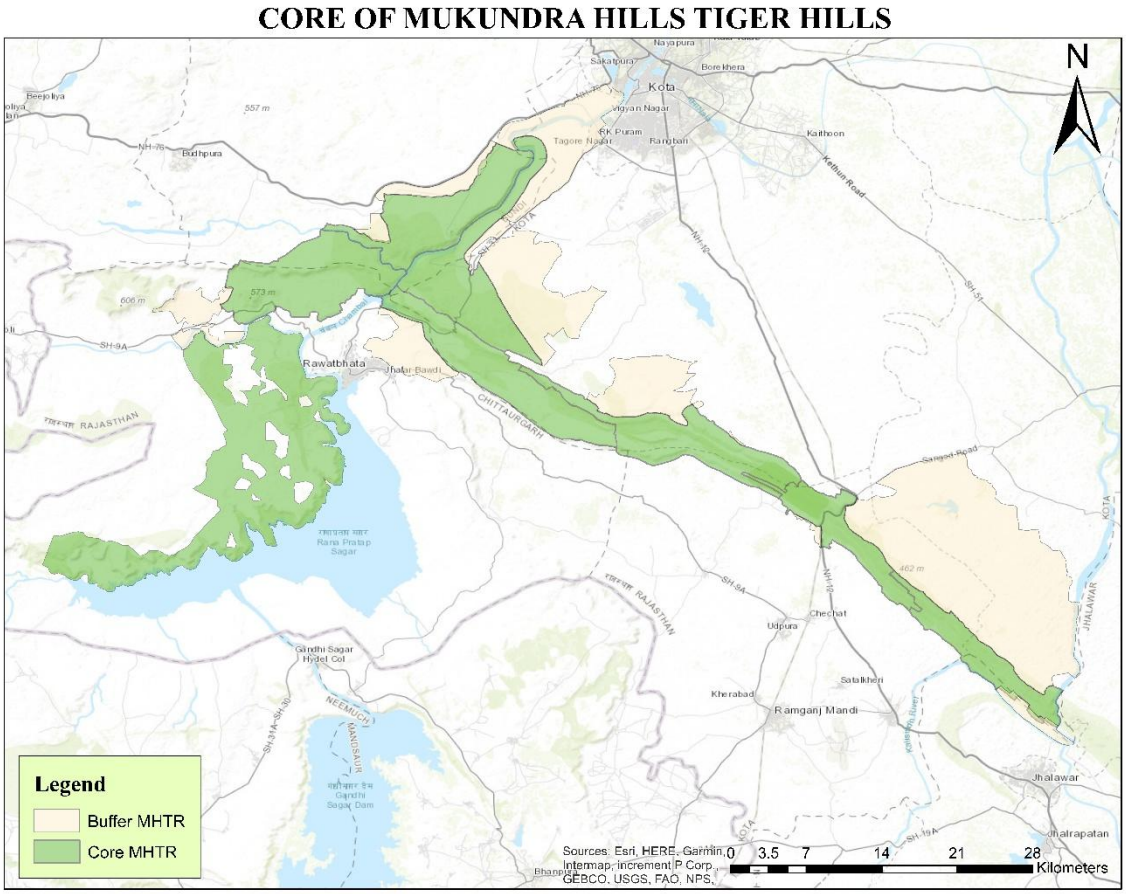
Area Statement:
The total area of Mukandra Hills Tiger Reserve is 1135.787 sq. km as follows:

Total Core (CTH) Area :690.71 sq. km



Map 1.2: Core Area Delineation of Mukundra Hills Tiger Reserve

Please refer **Annexure-1** for area statement of Mukandra Hills Tiger Reserve (Core or Critical Tiger Habitat Area) and **Annexure-2** for area statement of Mukandra Hills Tiger Reserve (Revenue Village)



Map 1.3: Map Depicting the Core Area of Mukundra Hills Tiger Reserve

1.2 Notifications:

Subsequently Mukandra Hills Tiger Reserve was notified vide order S. No: F3(8) FOREST 2012 Dated 09-04-2013 which includes Mukandra National Park, Darrah Sanctuary, Jawahar Sagar Wildlife Sanctuary and part of National Chambal Gharial Sanctuary. Bhainsrodgarh Sanctuary has been a new addition to Mukandra Hills Tiger Reserve order wide 4854336 dated 05.10.2023. It has been made part of core of tiger reserve but currently is under administrative control of DCF wildlife Kota division. Please refer **Annexure-3** for MHTR notification

1.3 Approach and Access:

The administrative head quarter of MHTR Core is Kota which is approachable by rail and road from Jaipur and Delhi. Kota is approximately 250 km from Jaipur by road and 458 km from Delhi by rail. Kota falls on Bombay- Delhi broad gauge railway line. From Kota tourists can visit Darrah, Jawahar Sagar, Kolipura, Rawatha and Gagron which are situated approximately 40-50 km away from district headquarters.

1.4 Statement of Significance:

Mukandra Hills Tiger Reserve Core displays all the intricacies of natural ecosystem in the form of various ecosystem pyramids of different producer-consumer chains, geological history, and river orientation, management of wild habitat and watershed development and management. Beautiful Chambal gorges and unique landscape also form part of MHTR Core.

Mukandra Hills Tiger Reserve Core comprises of dense forest (canopy density 0.6 to 0.7). Dhok & Khair are the predominant species. Several species of algae, fungi, bryophytes, pteridophytes and angiosperms are available here. It is also rich in tuberous plants. Valley and streams are habitat of several species of medicinal plants, many of which are vital from ethno-medical view. It is connected to Ranthambhore through the forests of Bundi and Kota districts.

MHTR Core was once a very good habitat of India's national animal and flagship species tiger. Besides the highly endangered Indian Tiger, the reserve also harbours a wide range of faunal species some of which figure prominently in the IUCN Red Data List. MHTR renders protection to rare and endangered fauna such as leopard, sloth bear, wolf, four horned antelope, chinkara, black buck, crocodile, smooth coated otter, alexandrine parakeet, vulture, kingfisher etc.

MHTR Core serves as catchment of rivers like Kalisindh, Ahu, Amjhar, Eru, Brahmini, and Chambal. Water bodies such as Sawanbhado dam, Laximpura talai, Giridharpura talab, Bewada Talai, Kadap Ka Khal, Phoot Talab, Hatoli Talab, Bhawanipura Talab and Chambal River attract lot of migratory birds.

MHTR has some important archaeological sites within as well as in the vicinity such as Gagron Fort which is a UNESCO World Heritage site, Abli Meeni ka Mahal, Ranwtha Mahal, Badoli group of Temples etc. Some of the important religious pilgrimage sites are Garadia Mahadev, Gapernath, Ambarani Mataji, Nahar Singh Mataji, Padajhar Mahadeo, Kalsiya Mahadeo etc.

Hence MHTR Core provides an ideal attraction to tourists. There is also a good opportunity for promotion of ecotourism which has got a new lease with reintroduction of tigers in the reserve.

A. Conservation values*:*

The critical tiger habitat / core area of Mukandra Hills Tiger Reserve is home to the Royal Bengal tiger (*Panthera tigris*), leopard (*Panthera pardus*) and jungle cat (*Felis chaus*). Mukandra also shelters striped hyena (*Hyena hyena*), Jackal (*Canis aureus*) and the Indian fox (*Vulpes vulpes*). The sloth bear (*Melursus ursinus*) can also be seen here in its natural environs. Mukandra is teeming with large population of blue bull (*Boselaphus tragocamelus*), chinkara (*Gazella bennettii*), spotted deer or chital (*Axis axis*) and the wild pig (*Sus scrofa*). Other animals inhabiting the forests are the wolf (*Canis lupus pallipes*), blackbuck (*Antelope cervicapra*), sambar (*Rusa unicolor*), langur (*Semnopithecus entellus*), porcupine (*Hystrix indica*), civets, badgers, pangolin, hares and a variety of snakes, three species of mongoose and marsh crocodile. The four horned antelope (*Tetracerus quadricornis*), smooth coated otter, caracal and were also known to be present here in the past. The recently reintroduced tiger is the flagship species. The forests of the Mukandra Hills Tiger Reserve Core are one of the last intact *Anogiesis pendula* forests of climax type in state of Rajasthan**.**

B. Ecological values:

The Core acts as a multiple catchment of the low land plains adjoining to the area of reserve. All the small streams originate from the catchments and supply water to all the wells in the plains and augment water table. Without these catchment capability, low land plains would not be so productive. The area has immense value in conserving water and acts as a lifeline for the survival of the local people around. A few water reservoirs have been constructed to harness the rainwater flowing out of the reserve. These reservoirs maintain the water table of the area throughout the year and are also important sources of irrigation. A few water reservoirs have been constructed to harness the rainwater flowing out of the reserve. A few of such reservoirs are Sawanbhado Dam, Girdharpura Talab, Laxmipura Talab, Danta Talab etc.

Besides, the forests perform the functions of carbon sequestration; providing resilience to climate change; provide clean air, healthy soil, wild foods and medicines; and conserve diverse gene pool.

C. Recreational values:

The Chambal River in the northern part and the Kali Sindh River in southern part are main tourist attraction. This part of the river Chambal flows in deep gorges of Malwa plateau on the western extreme of Vindhyas. Some of these geological formations

through which this river and its tributaries flow are mesmerizing and breath-taking to watch.

D. Historical values:

It also has some important archaeological sites located inside as well as in the vicinity such as Gagron Fort which is a UNESCO World Heritage site, Abli Meeni ka Mahal, Rawatha Mahal, etc which point to the rich and varied history of the area.

E. Religious values:

Garadiya Mahadev Temple, Padajhar Mahadeo, Kalsiya Mahadeo and Geparnath Temple, Ambarani Mataji, Nahar Singh Mataji, Badoli group of temples etc are the some of the religious sites within as well as in the vicinity of the tiger reserve.

F. Research and Education values:

Students of Wildlife Science, University of Kota take up case studies and dissertation to study on flora and fauna of Mukandra.

G. Resource values:

The Core supports local people especially the schedule tribe and backward classes who are still living inside for fuel wood, fodder and other forest produce.

1.5 Categorization of values in special domain:

The Tiger Reserve is an important site that possesses Global, National, Regional and local values.

Global value: Tiger, Medicinal plants, biological diversity, Tourism.

National value: Tiger National emblem, Tourism, Endangered plant and animal communities.

Regional value: Western region tiger habitat, Chambal River System, Great boundary fault of Aravali- Vindhyan Ranges, Semi-arid Eco-system. Tourism, Natural Heritage and aesthetic

Local value: Employment, Fuel wood, Fodder and Livestock grazing, water catchment area for the adjoining plains.

CHAPTER 02

BACKGROUND INFORMATION AND ATTRIBUTES

The notified Tiger Reserve comprises legally constituted Reserve Forests, Protected Forests and Revenue Areas; from which all rights have been extinguished. There is no boundary dispute, and the National Park and Sanctuary are clearly demarcated on map and on the ground with cement concrete pillars, masonry pillars and cut and cleared boundary lines of Reserve and Protected Forests. The details of boundary description are given below:

- To the North, forests of Jawahar Sagar Wildlife Sanctuary merge with the territorial forest of Kota Division and area of National Gharial Sanctuary
- In the South, it is in continuity with forests of Chittorgarh Division
- In the East, it relates to the forests of Division Kota and Jhalawar
- In the West, territorial forest of Bundi Division and National Gharial Sanctuary are in continuity
- In the North – West, it is linked with Ramgarh-Vishdhari Sanctuary through the forest of Bundi
- In the North – East, it relates to territorial forests of Range Ladpura, Mandana, and Kanwas
- In the South – East, it is in continuity with forest of Jhalawar Range
- On the South – West, it relates to forest of Modak Range

2.1 Geology Rock and Soil

2.1.1 Geology:

The MHTR core is a part of Vindhyan Range system. The MHTR rock is basalt in composition and consists essentially of basic Plagioclase and accessories in the rocks. The trap is usually fine grained and dense. The colour is black and brown. At places amyloidal and angul cavities are filled with zeolite, calcite, chalcedony and its varieties. The trap is hard, tough and heat resistant. Geologically the area comprises of sandstone, limestone and conglomerate rocks belonging to Vindhyan super group. The general strike of the rocks is NW – SE to WSW – ESE. Geology of the MHTR core and the adjacent area is an admixture of complex geological formations belonging

to Archean and Purana group of Algonkian, Archean and toridenian age and consists of the upper Vindhyan systems.

2.1.2. Soil:

The soil in the core of MHTR varies from clayey to clayey-loam and gravel depending upon topography. Black or grey coloured soil is found in patches lying upon the older formations. On the slopes the soil is sandy-to-sandy loam, shallow and covered with stones and boulders. The soil on the plateaus and other flat areas is sandy loam mixed with gravel and boulders and is reddish in colour, murram and infertile. It is generally shallow with outcrops of parent rock. In depressions along the banks of stream and in low-lying areas, the soil is clayey loam and is deep. The depth of soil varies from 20 cm to 2 m at few places. Soil is mixed with pebbles and boulders. The soil in this area is mainly formed by the disintegration of the Ganugarh Shales, Samariya Shales and the Jhiri Shales intermixed with disintegrated sandstone grain. Soil of Mukandra can be divided on basis of parent material as follows

A. Regur or Black Cotton Soil:

The traps give rise to either a deep brown to rich red soil or to Regur (black cotton soil). Regur is rich in plant nutrients such as lime, magnesia, iron and alkalies on which cotton and certain dry crops flourish. It has the property of swelling greatly and becoming very sticky when wetted by rain. On drying, it contracts again with the production of numerous cracks.

B. Lateritic Soil:

Another product of weathering of trap is late rite, a material from which silica, alkalies and alkaline earths have been leached away, leaving behind alumina, iron, manganese and titanium. It has vermicular or pisolitic structures and contains much water. Some laterites which are highly aluminous form deposits of bauxite. The trap scraps are the vital factor in the drainage of the area acting as watershed.

C. Sandy Soil:

Most of the area of Core Zone is covered with sandy loam soil. The soil is the result of weathering of granitic gneisses. This soil type mostly occurs on gentle slope and valleys.

D. Kankar and Saline Soil:

This soil type is found in the foothills in areas with less tree cover and forest gaps. They contain large proportion of silica and orthoclase quartz and have low water holding capacity. They are generally mineral deficient and have low productivity. They are easily eroded under insufficient vegetation cover.

E. Alluvial Soil:

Alluvial soils do not really form a definite group. They represent both transported and residual soils, which may have been re-worked to some extent by water. Most of the alluvial soils are found in valleys and nala beds.

2.1.3 Geomorphology:

The elevation of Vindhyan scrap lands is marked with soap stones, which appear to be separated by the slatestones. Steep escarpments on the left bank of Chambal in the north-western parts of the region appear, thereafter, there is a scrap land, which stretches up to Dholpur and Karauli areas. The uplands of Kota and Bundi are large and stony uplands where some deposits of black soils are seen here and there in the valleys. Chambal and its tributaries like Kali-Sindh and Parvati have formed a triangular alluvial basin in Kota. The hills of Bundi and Mukandra are extended to Jhalarapatan through southwestern tracts of Kota.

The tract in the Reserve Core is mainly hilly with interspersed network of streams, nallahs and rivers. The highest peak is situated in Chandbavri forest block. The network of river system is the main characteristics of this Reserve. The river Chambal drains in the Northwest, Kalisindh in the Southeast, Ahu in the East and Amjhar in the South. Many streams like Junapani, Jhamra, Kadap Ki Khal, Damodarpura etc. originate from this Reserve and feed these rivers.

2.1.4 Terrain:

MHTR Core consists mainly of two continuous flat topped and almost parallel hills with the narrow central ridges, which are a part of Vindhyan Range system and extend from river Chambal to Kali Sindh. They are approximately 80 km in length and 2 to 5 km in width. The tract is mainly hilly with interspersed network of streams and rivers. The rivers Chambal and Ahu pass through this Reserve and flow down in northern direction. Many Nallahs pass through this area and feed water to Chambal River. The

highest peak of MHTR is situated in Chandbawri forest block, which is 517 meter above MSL. The general slope of land is from South-East to Easterly direction

2.1.5 Climate:

The climate of this area is sub-tropical, characterized by three distinct seasons as given below:

Table-2.1		
Season	**Duration**	**Peak months**
Summers	Mid-March to Mid-June	April –May
Monsoon	Mid-June to September	July – August
Winters	October to Mid-March	December –January

2.1.6 Rainfall, pattern and distribution:

The South-West monsoon arrives during the months of July to September. Pre monsoon showers occur during May and June. Average rainfall is 730 mm. The rainfall during the period from June-September constitutes over 90% of the annual rainfall. There is a large variation in rainfall from year to year. One or two winter showers are also experienced. The average number of rainy days is 27.

2.1.7 Temperature:

During the summer months of March to June the temperature is on a continuous rise. May and first half of June being the hottest period of the year. The maximum temperature in May and June rises to 46ºC. In the second half of June, normally pre-monsoon showers start which bring down the temperature by 3º to 5ºC. After withdrawal of monsoon by the end of second week of September, days remain hot, but the nights become progressively cooler. After mid-November both day and night temperatures drop. During the winters, January is the coldest month. The daily minimum temperature may drop down around 8^0C.

2.1.8. Relative Humidity:

The relative humidity is generally low in most part of the year; it becomes as low as 10 to 15 % during summer months. However, during rainy days, the relative humidity goes over 60 to 80%.

2.1.9. Wind:

Winds are generally light to moderate. During the pre-monsoon period the north westerly winds are comparatively strong with occasional dust storms. The north easterly winds during winters are mild. In the summer season, hot winds blow from the direction between SW and NW and are known as ‘loo’ and have a desiccating effect. Thunderstorms occur during the period from May to September. Hail may also associate with the thunderstorms during the months from February to May. During the hot season, dust storms are also not uncommon. During the month from January to March, low pressure waves moving from the west affect the area when the situation of ‘cold waves’ develop.

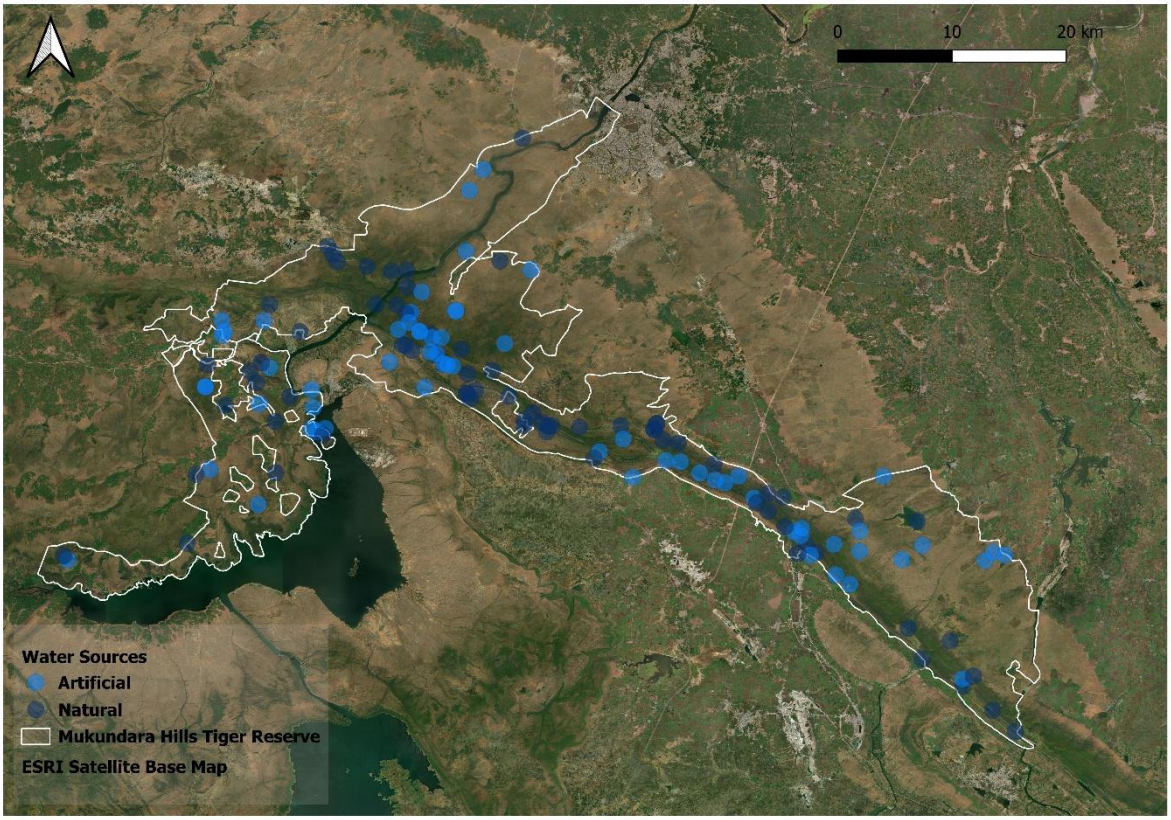
2.1.10 Drought and its periodicity:

Droughts are quite common occurrence in the region. During the drought period there is an acute shortage of fodder inside and outside the core as well as the buffer areas. All the water holes tend to dry up very early and water becomes a limiting factor. It leads to severe conflict between forest staff and the villagers for the use of whatever fodder that is available inside the reserve. During the drought periods, the survival of wildlife is at stake.

2.1.11 Frosts:

Frosts are common in the month of December and January in the valleys and depressions and adversely affect regeneration of Dhonk.

2.2 Hydrology and Water Sources:



Map 2.1: Spatial Distribution of Natural and Artificial Water Resources

The network of river system is the main characteristic of the core area of the MHTR. The core is mainly hilly with interspersed network of streams and rivers. The Chambal and Ahu rivers pass through the core and flow down in north direction. Many nullahs pass through the core and feed water to Chambal River. The river Chambal drains in the Northwest, Kali Sindh in the Northeast, Ahu in the East and Amjhar in the South. Many streams like Junapani, Jhamra, Kadap ki khal, Damodarpura, etc. originate from the core area and feed these rivers. Drainage map of the MHTR is enclosed as **Annexure-4**.

2.2.1 Natural:

Chambal, Amjhar, Ahu and Kali Sindh are perennial rivers but most of them flow only on the outer boundary of MHTR. Jhamra, Junapani, Selzar etc. are some important streams, but they are only seasonal and remain dry for a major part of the year. Some of the springs like Ambarani, Ambapani, Karoundi, Kanjar, Kalyakui, Padajhar, Kalsiya, Mordi and Devkui are perennial sources of water.

2.2.2 Artificial:

The Irrigation Department of the state has constructed two dams namely Jawahar Sagar and Rana Pratap Sagar. They serve as water facilities during pinch period especially in interior areas. The Forest Department has constructed a few water harvesting structures (WHS) in the vicinity of the core namely Mandergarh, Jhamra, Kolipura, Laxmipura etc. They contribute largely to providing drinking water to the wildlife in the vicinity during pinch period i.e. summers, especially in interior areas. Tiger Reserve management has taken up water harvesting construction works like random rubble check dam, water harvesting structures as well as large scale anicuts in co-ordination with the water resources department in the last few years.

2.3 Vegetation Cover Types:

2.3.1 Floral Composition of MHTR Core:

A total number of 347 indigenous and naturalized plants species belonging to 86 families can be observed in the Reserve. There are 83 species of trees, 37 species of shrubs, 48 climber's species, 127 herbs species, 40 grasses species, 2 epiphytes species, 3 parasites species and 7 Pteridophytes species.

2.3.2 The Forest Types:

According to "Revised Forest Types of India" by Champion and Seth (1968), the forests within MHTR fall under **"II Dry Deciduous Forest".** The main species are Dhok (*Anogeissus pendula*), Salar (*Boswellia serrata*), Kair (*Acacia catechu*), Palash (*Butea monosperma*), Kair (*Capparis decidua*), Bamboos (*Dendrocalamus strictus*), Ber (*Ziziphus mauritiana*) etc. the area is having lot of ground flora comprised of shrubs, herbs, grasses and sedges, etc.

The forest scattered and sparse over a large area on various geological and soil formations vary greatly in composition. In the valleys where better soil and moisture conditions exist, the vegetation is comparatively denser. Approximately 35 % of the forest area is either occupied by bare rocks or covered with degraded and poor type of scrub growth. The growth of the principal trees is generally slow, and the height is poor. On an average the height varies from 4.5 m to 7.5 m, but trees of one-meter girth and up to 12m height are also found in favourable areas.

Anogeissus pendula is the dominant tree species, covering over 90% areas of the forests. *Boswelia serrata* and *Lannea coromandelica* grow on rocks and dry slopes.

Acacia catechu is common in valleys, whereas *Dendrocalamus strictus* is found along well-drained reaches of the streams and moist and cooler parts of the hills.

Based on their composition the forest of MHTR can be classified as follows:

2.3.2.1 *Anogeissus pendula* Forest:

Anogeissus pendula (Kala Dhok) is the predominant species. It is generally a slow growing, tree, but trees of one-meter girth and up to 12 m height are also found in favourable areas. At places it can be seen in the form of a scrambling bush, which is the effect of repeated browsing. In the hankas (the forest free from grazing and browsing), the crop is over mature and has started rotting at places. Kala Dhok is mostly gregarious but is also found mixed with *Acacia catechu* (Kair), *Ziziphus mauritiana* (Ber), *Disopyros melanoxylon* (Tendu), *Flacourtia indica* (Kakan), *Acacia leucopholea* (Raunj), *Lannea coromandelica* (Gurjan), *Dichrostachys cinerea* (Goya khair), *Boswelia serrata* (Salar), *Wrightia tinctoria* (Dudhia), *Sterculia urens, Bauhinia racemosa* (jhinjha), *Mitragyna parvifolia* (Kalam), *Ziziphus glaberrima*, etc. On higher slopes, *Anogeissus pendula* (Kaladhi) is replaced by *Anogeissus latifolia* (Safed Dhok) mixed with *Aegle marmelos* (Bel), *Boswelia serrata* (Salar), *Miliusa tomentosa* (Uum), *Dalbergia latifolia* (shisham), etc. At places, kaladhi is found in small patches with *Butea monosperma* (Palash) and *Ziziphus mauritiana* (Ber). The regeneration of dhok is mainly by coppice, seedling regeneration is generally deficient. Reproduction from root suckers can also be seen but only in areas with rich soil cover.

2.3.2.2 *Boswellia serrata* Forest:

Boswellia serrata is another dominant tree species found at the summit of hills. *Anogeissus pendula* (Dhok) is the common tree species mixed with it upto the middle of slopes. The other common tree species found are *Acacia catechu* (Khair), *Anogeissus latifolia* (Safed Dhok), *Disopyros melanoxylon* (Tendu), *Flacourtia indica* (Kakan), *Lannea coromandelica* (Gurjan), *Sterculia urens* (Kadayo), etc. as in Borawas and Kolipura area of Darrah range.

2.3.2.3 *Acacia catechu* Forest:

Acacia catechu (Khair) is scattered on hill slopes mixed with *Anogeissus pendula* and *Boswellia serrata.* The other common species are *Bauhinia racemosa* (Jhinjha), *Capparis sepiaria* (Kanther), *Wrightia tinctoria* (Dudhia), *Aegle marmelos* (Bel) and *Diospyros melanoxylon* (Tendu). Among climber's mention may be made of *Abrus precatorius (*Ratli), *Cissam pelospareira* (Pahod Bel), *Cocculush irsutus* (Vevdi) and

Mucuna prurita (Kavach). As the regeneration from seed is usually deficient, the khair forests are in depleted condition.

2.3.2.4 Miscellaneous Forests:

2.3.2.4.1 *Butea monosperma* Forest:

Butea monosperma (Palash) is the dominant tree species found at the foot of the hills and plains throughout the forest. *Acacia senegal* (Kumta), *Acacia leucopholea* (Raunj), *Capparis decidua* (Ker), *Vitex negundo* (Nagod), *Tecomella undulata* (Rohida) and *Moringa oleifera* (sahjana) arethe other notable species of this forest.

2.3.2.4.2 Forests along nallahs:

Dendrocalamus strictus (Bamboo) is found along the nallahs in the forest with *Anogeissus pendula* (Dhok) and *Boswellia serrata* (Salar). Along the nallahs and in the cooler parts of the forest, *Annona squamosa* (Sitaphal), *Disopyros melanoxylon* (Tendu), *Ficus racemosa* (Umara), *Ficus religiosa* (Piplo), *Lannea coromandelica* (Godla or Gurjan), *Mitragyna parvifolia* (Kalam), *Azadirachta indica* (Neem), *Phoenix sylvestris* (Khajur), *Tamarindus indica* (Khati Imli), *Woodfordia fillitcosa* (Dhavadi) etc are also found.

2.3.2.4.3 Scrub Forest:

There are some low, rocky areas with very little topsoil in the Reserve. The vegetation here is sparse and scattered with the trees assuming stunted, bushy habit. The common species encountered in this type of forest are *Aegle marmelos* (Bel), *Butea monosperma* (Palash), *Balanitesa egyptiaca* (Hingot), *Capparis decidua* (ker), *Capparis sepiaria* (Kanther), *Dichrostachys cinerea* (Goyakhair), *Grewia tenax* (Gangeti), *Nyctanthes arbortristis* (Harsinghar), *Ziziphus globarate* and *Ziziphus nummularia* (Jharberi) with climbers like *Cocculus hirsutus* (Jaljamini), *Maerua arenaria* (Orapa), *Mucuna prurita* (Karench), *Riveahypo crateriforomis* (Faug), and herbs like *Achyranthes aspera*, *Indigofera cordifolia* (Bokario), *Indigofera tinctoria* (Neel), *Lepidagathis trinervis, Tridax procumbens* (Ghavpatta), *Urginea indica* (Junglipiyaj), etc.

2.3.3 Ground Flora:

Since the forests of this tract come mainly under the category of dry deciduous type, the ground flora is fairly dense only during the rainy season. The common herbs and under shrubs present are *Abelmoschus manihot* (Jungle Bhindi), *Achyranthes aspera*

(Chirchira), *Commelina benghalensis* (Bokhna), *Hibiscus spp*., *Indigoferacordifolia* (Bokario), *Ipomea pestigridis*, *Justicia repens*, *Lantana indica*, *Bacopa bipinnata* (Brahmi), *Euphorbia geniculata*, etc, along with common grasses like *Cynodon dactylon* (Dub), *Echinochloa colonum* (Sarno), *Ergrostis ciliaris*, *Heteropogon controtus* (Surawala), *Melanocenchrus jacquemontii* (Phulsi), etc. The flora is listed in **Annexure-5.**

2.3.4 Parasites:

The parasites *Dendro phoethafulcata* (Vahi-Hankal), *Cuscuta teflexa* (Amarbel) and *Cuscuta hyalina* (Amarbel) are common in the Reserve.

2.4 Wild fauna, habitat and trophic niches:

Mukandra Hills Tiger Reserve Core has good vegetation cover. Different types of habitats are available in this reserve, which meet ecological, biological and ethnological requirement of the different life forms. Different animals prefer different type of habitat for food and shelter.

2.4.1 Mammals:

A large number of mammalian species are found namely Leopard, Sloth Bear, Small Indian Civet, Asian Palm Civet, Golden Jackal, Striped Hyena, Indian Grey Wolf, Jungle Cat, Caracal, Hanuman Langur, Indian Grey Mongoose, Ruddy Mongoose, Indian Hare, Five Striped Palm Squirrel, Indian Pangolin, Porcupine, Smooth Coated Otter, Sambar, Nilgai, Cheetal, Blackbuck, Chinkara, Four horned antelope, Rhesus Monkey, etc.

Mukandra Hills Tiger Reserve Core was once famous all over the country for tigers. Tigers were distributed throughout the area from Naulav to Kheda. Selzar, Ambrani,

Jhamra, Laxmipura, Karoundi Kanjar forest areas were important for tiger sighting point. While the last record of tiger presence dates to 1978, since then this famous home of tiger is devoid of this magnificent species. In the year 2003 in the month of April, a tiger ‘Broken tail’ suddenly appeared in the area and stayed in Selzar, Kadap ki Khaal, Karoundi, Kanjar, Ambapani etc. areas but sadly lost its life in a fatal train accident on 15th July 2003. Tigers were reintroduced in MHTR during 2018-19 from Ranthambhore Tiger Reserve. The current prey levels and habitat conditions are well for the recovery of the tiger. Forest and prey species even today provide sufficient food and cover for tigers.

After the reintroduction of two tigers in an 82 sq. km enclosure in 2018, one male tiger RBT98 dispersed from Ranthambhore Tiger Reserve and settled in the Mashalpura grasslands. Another tigress RBT83 was later translocated to provide a mate for this male.

Until the reintroduction of tigers in the Reserve, leopard was at the peak of the ecological pyramid. Leopard prefers wooded and shrubby areas, and the reserve supports a good population of leopards. They quite often kill the domestic livestock as well. Due to very low density of tiger, leopard is at the apex of food pyramid and is present in the whole of the tiger reserve and in surrounding forest areas of Ambarani, Gudarajpura, Kolipura, Rawatha, Ghati Mashalpura, Bevda talai, Koylakui, Jhamra, Laxmipura, Ambapani, Karoundi, Kanjar etc. Its population is more or less static because prey population is just sufficient to support this population, the biotic interference is high and therefore the predators must live under stress condition adversely affecting the reproduction and survival of the species.

Sloth bear is another important species, which is present in good numbers in MHTR, especially in Jhamra - Borkui areas. Sloth Bear feeds on wild fruits, honey, flowers and underground vegetation of several species. The fruits of Tendu (*Diospyros melanoxylon*), *Lantana camara, Ficus glomerata, Phoenix sylvestris, Aegel marmelos* etc. are also consumed by sloth bear. Sloth bear prefers wooded and inaccessible habitat. The forest areas of Junapani, Jhamra, Koylakui, Ambapani, Laxmipura, Borkui, Karoundi, Kanjar etc. form an ideal habitat for sloth bear.

Golden Jackal and Striped hyenas are also found living together in similar habitat conditions. Striped hyena is a nocturnal scavenger species. It feeds on dead cattle, wild animals and remains of the Leopard kills. Common and Ruddy mongoose is also present in the reserve.

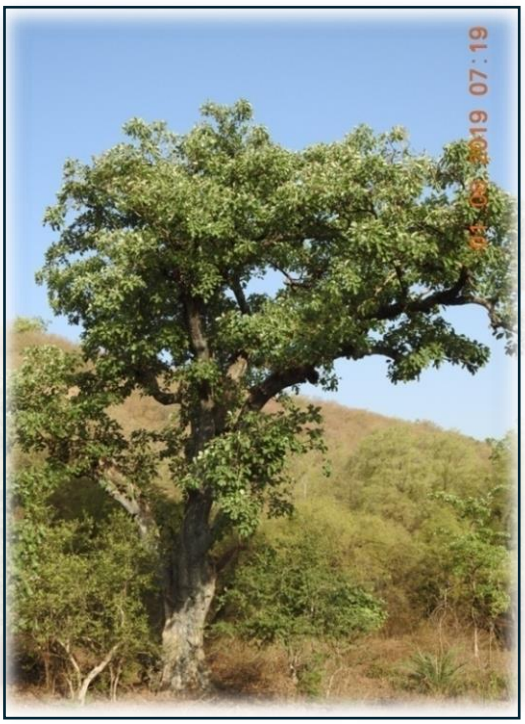
Four- Horned Antelope is a shy herbivorous animal which prefers to live in dense cover. It is locally called Bhedal. A small population of Bhedal is present here.

2.4.2 Birds:

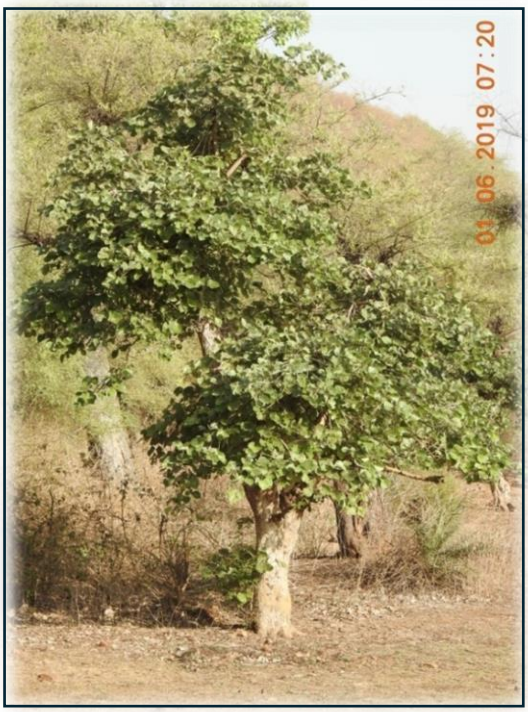
All the three types of birds namely terrestrial, arboreal and aquatic are present. Rivers on the boundaries and streams flowing within and outside the reserve along with other large water bodies like Girdharpura, Mandargarh, Ramsagar, Laxmipura and Nolav provide a variety of habitat to the avifauna. Certainly, out of all the wild species, they are the least affected by the biotic pressure but for the illicit cutting of tree.

Grey jungle fowl is confined to interior areas with bushy thickets. A good number of migratory and local waterfowls, Painted sandgrouse, Grey hornbill, Alexandrine parakeet, Spotted dove, Yellow footed green pigeon, White–browed fantail, Little Egret, Cattle Egret, Little cormorant, White Throated Kingfisher, Pied Kingfisher, Rose-ringed parakeet, Sarus Crane, Indian Peafowl etc. are seen quite frequently here.

Plate 2.1: Important Trees of MHTR



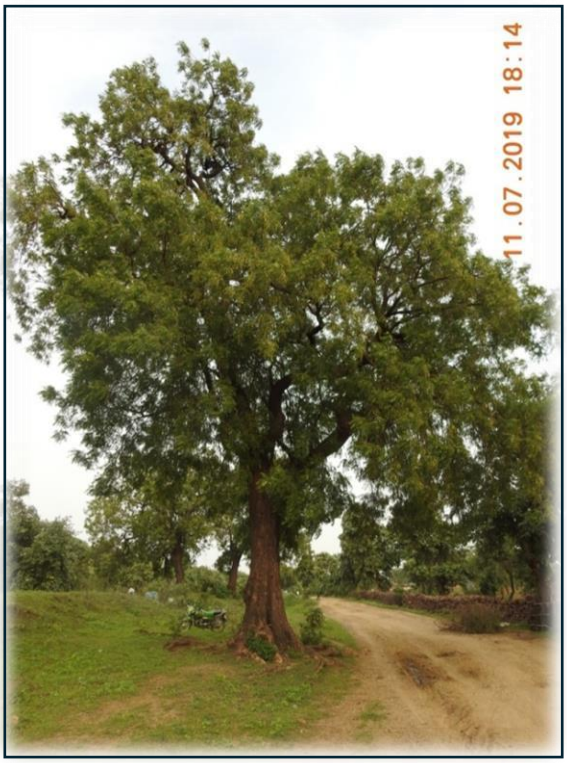
Terminalia bellirica



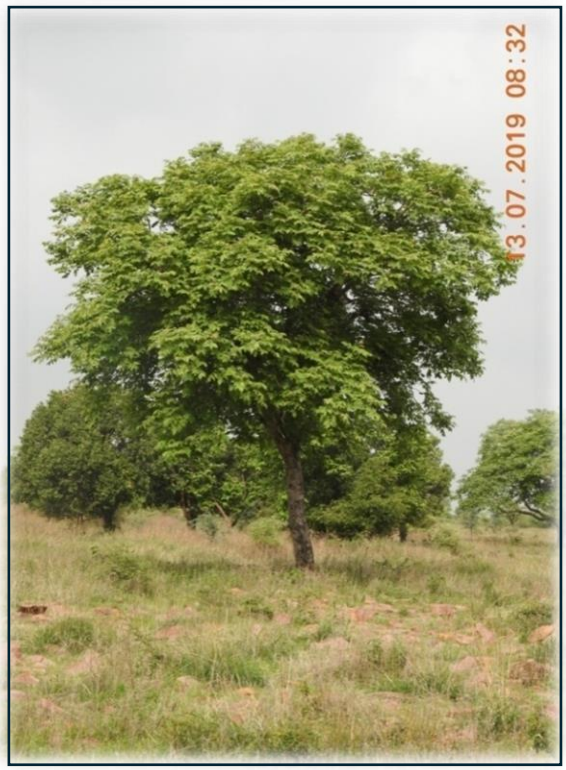
Butea monosperma

Anogeissus pendula

Acacia catechu

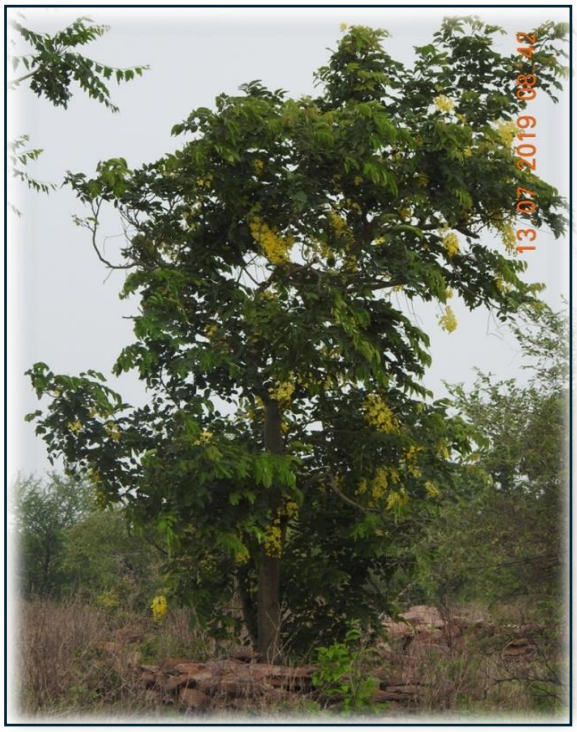


Azadirachta indica



Lannea coromandelica

Plate 2.2: Important trees of MHTR



Cassia fistula

Chambal River, Selzar, Girdharpura talav, Gaddeka mala, Bewdatalai, Gagron fort, Naulav, Laxmipura talao, Jhamra and Karoundi forest are important areas where winter bird congregation happens on a large scale where Asian waterhole census are carried out every year.

Many bird species found in the area are listed in the IUCN Red data book and ZSI Red data Book as follows:

Table-2.2: Avifauna with IUCN status

S.No.	Common Name	Latin Name	Category
1.	White bellied Minivet	*Pericrocotus erythropygius*	Least concern
2.	Bar headed Goose	*Anser indicus*	Least concern
3.	Painted Stork	*Mycteria leucocephala*	Least concern
4.	Asian Openbill	*Anastomus oscitans*	Least concern
5.	White-rumped Vulture	*Gyps bengalensis*	Critically endangered
6.	Red-headed Vulture	*Sarcogyps calvus*	Critically endangered
7.	Red–headed Falcon	*Falco chicquera*	Near threatened
8.	Eurasian Spoonbill	*Platalea leucorodia*	Least concern
9.	Osprey	*Pandion haliaetus*	Least concern
10.	Indian Peafowl	*Pavo cristatus*	Least concern

2.4.3 Reptiles:

Herpetofauna is also rich here. Rock python, Indian rat snake, Buff-striped keelback, Green keel back, Red sand boa, Trinket snake, Brahminy blind snake etc. are common non–venomous snakes of this reserve. Spectacled cobras, saw- scaled viper, Russell's viper, common Krait are the four venomous snakes. Chameleon, Indian monitor lizard, Garden lizard, Indian bull frog, Indian balloon frog, Indian skipper frog etc. are present everywhere in the reserve. Large numbers of species of non-chordates are also present here.

Mugger and Gharial are also present in Chambal River. Starred Tortoise, Indian Flap shell etc. are quite commonly observed.

2.4.4 Amphibians:

Hoplobatrachus tigerinus, Sphaerotheca breviceps, Euphlyctis cyanophlyctis, Bufo andersoni, Bufo melanostictus, Microhyla ornata, Uperodon systoma etc are the important amphibians here. List of major fauna found in MHTR is available at **Annexure-6.**

2.5 Conspicuous changes in the habitat since inception and Limiting Factors

2.5.1 Climatic Factors:

2.5.1.1 Drought:

During drought conditions, natural regeneration is adversely affected. Due to heat in summers brought by hot westerly winds which blow from the mid of April to the mid of June, extreme dryness is caused throughout the forest and as the vegetation grows on rocky grounds, it gets almost baked during summer. So a large percentage of trees are stag headed, stunted in growth and miserable in appearance.

The rivers Amjhar, Ahu, Kali Sindh and Chambal mark the periphery of the tiger reserve but do not provide water and there are limited waterholes. Hence during severe drought conditions, wild animals stray out of forest area to the agriculture fields, village ponds etc. in search of water. Drought also reduces the availability of grasses and other palatable species to wild animals thus making their survival more difficult. They become weak and prone to diseases also.

2.5.1.2 Frost:

In the month of January and February, pool frost destroys young tree crop growing between the two parallel ridges of Mukandra.

2.5.1.3 Winds:

The dry hot winds sweep the area before the rains and the cyclonic gales accompanied by thunder and rain during the monsoon, cause damage, especially to the shallow rooted species like salar (*Boswellia serrata*).

2.5.2.4 Fires:

Fire is a great hazard to the forest. In this forest, mostly limited ground fires occur which destroy grasses, young regeneration etc. The repeated fires, year after year, have done incalculable damage to flora and fauna (especially reptile and birds). Main reasons for fire are:

1. Local hostility against the forest department.
2. Negligence of the labourers working inside the forest.
3. Graziers also set fire to obtain a fresh flush of grasses in rains.

2.5.2 Invasive plants and insects:

There are some plants which adversely affect the forest crop in the core area. Some of these are:

2.5.2.1 Vilayati Babool (*Prosopis julliflora)*

It is Invasive Alien Species which affects the local flora by suppressing their growth and competing heavily for nutrients and moisture present in soil resulting in total dominance of land by this species.

2.5.2.2 Harsingar (*Nyctanthes arbor tristis*):

It can be seen that in earlier felled coupes, this species has invaded the felled area like a weed by their gregarious habit and dense rapid growth. It checks natural regeneration of valuable species and thus reduces carrying capacity of the area.

2.5.2.3 *Lantana camara*:

It can be seen in the reserve where moisture conditions are favourable. It is a serious weed in the area and does not allow growth of the valuable species of grasses.

2.5.2.4 Parthenium:

Parthenium weed is known to reduce natural biodiversity and agricultural productivity and has negative effects on human and animal health

2.5.2.5 *Cassia Tora*

Gregariously grows in the areas with soil depth and completely covers the ground thereby preventing other palatable grasses from growing

2.5.2.6 Van Tulasi

Mostly found in rocky areas with heavy infestation on sloppy surfaces. Prolific seed producer and dominates all other palatable grass species in competition.

2.5.2.7 Insects and fungi:

Although the presence of fungi on dead refuge cannot fail to catch the eye of even a casual observer, no study seems to have been done to identify them, assess their

occurrence and damage caused by them to the forest. Khair seems to suffer most from the attack of fungi.

2.5.3 Anthropogenic factors:

Man is the worst enemy of the forest. Various kinds of damage that man is causing to the flora and fauna are:

1. Illicit felling of trees.
2. Encroachment
3. Setting of fire
4. Illegal removal of the forest produces
5. Hunting etc.

Habitat destruction in this fashion reduces the carrying capacity of the area by way of reduced supply of fodder and reduced shelter and cover for wildlife.

2.5.4 Animals:

The animals domesticated by man especially buffalo, cattle, goat, sheep, camel etc. are also enemies of the forests. Their grazing destroys young shoots and regeneration. The narrow belt of forest faces acute grazing pressure as it is surrounded by a series of villages and camps of Gurjar community.

Plate 2.3: Major fauna of MHTR

Leopard

Sloth Bear

Black Buck

Chinkara

Sambar

Nilgai

Plate 2.4: Major avifauna of MHTR

Painted stork

Sarus crane

Thick knee

Painted Sandgrouse

Red headed vulture

Indian roller

CHAPTER 3

STATUS OF TIGER AND CO-PREDATORS

Introduction:

A recent global analysis (Walston et al., 2010) showed that 70% of wild tigers now survive in 42 “source populations” that occupy a mere 6% of the remaining habitat. Scientific studies (Karanth et al., 2006) show that even though such source populations may suffer annual losses of 20% or more, if there is sufficient prey and adequate protection, the high fecundity of tigers can ensure their viability. Therefore, future efforts to reverse tiger declines must focus on reliably monitoring tiger numbers as well as survival and recruitment rates, in these threatened source populations.

Increasingly, it is being realized that the decline of large carnivores is a global conservation concern (Weber and Rabinnowitz., 1996). The tiger *Panthera tigris* L. is revered as a cultural icon over much of its range and yet has been continually threatened by hunting, habitat loss, fragmentation of populations and most importantly, the depletion of its prey base (Karanth and Stith., 1999). Factors affecting prey choice in tigers differ across its distributional range and need to be understood as it occupies diverse habitats (Sunquist and Sunquist, 1989). Such an understanding would reflect the ability of tigers to adapt to landscapes modified by human and prove important for effective conservation planning (Bagchi et al., 2003).

3.1 Distribution:

The MHTR core has a good vegetation cover. Different types of habitats are available, that comes up with the biological, ecological and ethological requirements of the different life forms. The area was once famous all over the country known for tigers. Tigers were distributed throughout the area. The last roar of tiger was heard here in 2003.

Forest and prey species even today can provide sufficient food and cover for tigers (Sultana 2007). After the extinction of tigers from this area, Leopard (*Panthera pardus*) became the apex species, and it prefers wooded and shrubby area.

3.1.1 Re-introduction of Tiger in MHTR:

Two tigers and three tigresses have been re-introduced in MHTR. Male tiger T-91 had strayed out from Ranthambhore Tiger Reserve and reached Ramgarh Vishdhari

Wildlife Sanctuary (RWLS) in Bundi. Looking to the safety of this tiger, it was rescued from RWLS and shifted to the 82 sq. km enclosure in MHTR on 3rd April 2018 and given the name MT1. Tigress T-106 was translocated from Ranthambhore Tiger Reserve on 19th December 2018 and released in MHTR and was known as MT2. T-98 male tiger had dispersed from Ranthambhore reaching Mashalpura area of MHTR, through the natural corridor along Chambal and Kali Sindh River via Sultanpur. Confirmed by camera trap images on 9th February 2019, the tiger was given the name MT3. Tigress T-83 from Ranthambhore Tiger Reserve was translocated to MHTR and released in the Mashalpura area of MHTR outside the 82 sq. km enclosure and was known as MT4. Tiger T-110 was brought from RTR and named as MT-5 and subsequently tigress T-2301 was also brought from RTR and named as MT-6.

Table-3.1 Re-introduction of Tigers in MHTR

S. No.	Tiger	Date	Place from	Remarks
1	Male MT 1 / T-91	03/04/2018	Translocated from Ramgarh Vishdhari Sanctuary	Missing since 20/08/2020
2	Female MT 2 / T-106	19/12/2018	Translocated from Ranthambhore Tiger Reserve	Died on 03/08/2020
3	Male MT 3 / T-98	09/02/2019	Reached MHTR through natural corridor from Ranthambhore Tiger Reserve	Died on 23/07/2020
4	Female MT-4/ T-83	12/04/2019	Translocated from Ranthambhore Tiger Reserve	Died on 04/05/2023
5	Male MT 5 / T-110	03/11/2022	Translocated from Ranthambhore Tiger Reserve	Currently roaming in MHTR territory
6	Female MT 6/ T-2301	09/08/2023	Translocated from Ranthambhore Tiger Reserve	Currently roaming in MHTR territory
7	Female MT 7/T114 cub	11.12.2024	Translocated from Abheda Biological Park	Rewilding enclosure 5 ha

8	Female MT 8/RBT2507	19.06.2025	Translocated from Ranthambore Tiger Reserve	Currently roaming in MHTR territory

3.1.2 Reproductive Capabilities:

Reproductive successive a key to survival and continued existence for any species, and understanding species' reproductive parameters (e.g., age at first reproduction, reproductive rate, litter size, interbirth interval, and breeding period) is critical to developing effective conservation strategies (Carter et al., 1999). Reproductive parameters are important to determine population turnover, potential growth rates, and are important indicators to detect the lineage persistence in a population (i.e., lineage loss, individual fitness, population viability (Kelly 2001; Holt et al., 2003), population viability (Kelly 2001; Balme et al., 2012), and to examine meta-population dynamics (e.g., determining the reproductive output of source populations; Smith and McDougal 1991; Chapron et al., 2008).

Reproductive data are available for some long-lived carnivores (i.e., lions *Panthera leo*; Packer et al., 1988), leopard (*Panthera pardus*); (Balme et al., 2012), yet reproductive parameters of wild tiger (*Panthera tigris*) populations are sparsely available and may vary over global range (Singh et al., 2014). Tiger populations can grow rapidly if the habitat provides adequate protection, an adequate population of prey, and minimal to no poaching (Singh et al., 2014).

Karanth et al 2001 reports that there is no peak in births taking place in wild tigers in India. In a study by (Singh et al., 2014) in RTR, most parturition (93%) occurred in post monsoon and winter (October - February). During the monsoon, grass biomass productivity is higher than other seasons, and prey species have maximum parturition during post-monsoon and winter (Schaller, 1967; Sankar, 1994). The availability of young prey species and cubs born within these periods has a higher chance of survival (Logan and Sweanor 2001).

Singh et al., 2014 suggest that there should be minimum disturbance to tigers during mating (monsoon and post-monsoon) and parturition (post monsoon and winter) and recommend the identification of dispersal corridors and restoration of connectivity that may help the long-term persistence of tigers in RTR.

Female tigers are philopatric and likely to remain in the same areas for their entire life, while males often disperse from their natal ranges (Smith et al., 1987). Considering

the gestation period of 108 days, it is assumed that females come into oestrus at about 36 months (Singh et al., 2013).

3.2 Abundance Status:

Apart from the tigers, the area supports good population of leopards. The latest All India Leopard Estimation report -2023 estimates population of leopards in MHTR to be at 99. Sloth Bear (*Melursus ursinus*) is another important species inhabiting the inaccessible habitat. The forest areas of Jawahar Sagar, Junapani, Jhamra, Koyla kui, Ambapani, Laxmipura, Borkui, Karoundi, Kanjar, etc form an ideal habitat for Sloth bear. Jhamra and Borkui are well known areas for Sloth bears.

In the herbivores mainly Sambar (*Rusa unicolor*), Cheetal (*Axis axis*) and three species of antelopes namely Nilgai (*Boselphus tragocamelus*), Chinkara (*Gazella gazella*), four horned antelope (*Tetracerus quadricornis*) are found in core. Langur (*Presbytis entellus*) is common throughout the core. Rhesus monkey, Hare, Porcupine, Indian grey mongoose, Ruddy mongoose Indian monitor lizard are distributed throughout the reserve. Caracal (*Felis caracal*), Jungle cat (*Felis chaus*), Golden jackal (*Canis aureus*), Striped hyaena (*Hyaena hyaena*), Indian grey wolf (*Canis lupus*), Small indian civet (*Viverricula indica*) and Ratel (*Mellivora capensis*) are found in core. Mugger Crocodile, Gharial, smooth coated Otters, turtle and other aquatic animals are commonly found in Chambal area of core.

3.3 Prey-Predator Relationships

3.3.1 Density and Biomass of prey species

Studies revealed that large mammalian terrestrial herbivores tend to show peak densities in grassland, grass scrub and savannah biomes, with the lowest densities found in severely arid conditions or at the other extreme in tropical evergreen forests. As a generalization, considering a rainfall gradient from low to high, e.g. from dry thorn forest to moist deciduous forests, and further to tropical evergreen forests; the mammalian biomass increases along this gradient. After a point as the forest cover becomes continuous and the forest only supports little ground cover in terms of shrubs and grass, the ungulate biomass again falls (Eisenberg and Seidensticker., 1976).

For instance, the dry deciduous and scrub forest of Gir supported 383 kg/sq. km of wild mammalian herbivore biomass (Berwick 1974). Later after the formation of the National Park and under protection from grazing, (Khan et al., 1996) from the same area reported a wild herbivore biomass of 2746 kg/sq. km. In comparison, the moist

semi-deciduous forests and meadows of Kanha support 1780 kg/sq. km of wild herbivore biomass (Schaller 1967). The highest wild herbivore biomass of 2858 kg/sq. km has been reported from the gallery forests and alluvial flood plains of Kaziranga (Spillet 1967a). In comparison the tropical rain forest of Udjung Kulon in Java supports only about 492 kg/sq. km of ungulate biomass (Hoogerwerf 1970).

These differences are drastic enough to reflect the intrinsic differences in quality of the habitats in relation to ungulates. These differences indicate that though moisture availability is an essential factor, large herbivorous mammals in India and South-Asia attain peak densities in secondary succession forests that have an interspersion of grass, shrubs, low stature trees but not moist enough to support closed canopy woody vegetation seen in tropical evergreen forests, where most of the biomass is locked up in the trees making it inaccessible to terrestrial herbivorous mammalian forms (Eisenberg and Lockhart 1972).

Similarly, density and biomass study of Ranthambhore National Park reveals that the number of prey species had increased after the formation of Tiger Reserve (Management Plan). With reference to the above study, open and dry deciduous nature of the forest with many trees being of low height, make the conditions more favourable for herbivorous ungulates in core. The seasonal nature of food supply also favours larger ungulate species that can build up the area to tide them over the long lean months. The area, therefore, has the potential of supporting a high ungulate biomass, but with condition that core area is made completely inviolate by human interference and all other biotic pressures. Open areas with water and relocated village sites can be used by ungulates.

Vast tracts of forested landscape formerly inhabited by the tiger *Panthera tigris* have now been lost to human habitation, causing a sharp decline in ungulate populations and confining many of the remaining tiger populations to small, isolated patches of forests (Smith et al., 1998). In India, despite 30 years of conservation efforts, an expanding human population has caused considerable reduction in the tiger's habitat and a decline in prey and tiger numbers (Seidensticker et al., 1999). With the illegal hunting of tigers for body parts accelerating the rate of local extinctions (Project Tiger, 2005), long term conservation of the tiger requires the identification, protection and management of habitats to secure breeding populations as source pools and provide dispersal opportunities by linking habitat patches across the landscape (Johnsingh et al., 2004; Wikramanayake et al., 2004).

It has been reported by (Karanth and Sunquist 1992) from Nagar hole that biomass has increased from 6,846 to 19,092 Kg/ sq. km. This is because of the vast improvement in habitat quality since the inception of Project Tiger in India in 1973, and the consequent protection that these National Parks and Sanctuaries have from grazing and other related forms of biomass extraction. Hence despite the lower diversification of the grazers, these areas appear to be able to support equally high ungulate biomass as has been observed from the savanna of Central and East Africa.

The core area is dominated by open canopy, mixed forest with considerable shrub cover interspersed with small open grassy patches. Although the climatic and vegetation conditions are favourable for ungulates and other wildlife, the low number of ungulates reveals that the area is over exploited by human interference and high biotic pressure. The area is over grazed by cattle and trees are heavily lopped and pollard. In such condition food or the competition for food with livestock becomes a limiting factor. The forest is highly degraded and do not provide shelter to wildlife. The lower breeding rates in core is due to the biotic interference that has caused serious degradation of the ecosystem, and constant presence of human and livestock has rendered areas unsuitable for herbivores and large predators.

According to (Basnett 2013) in his study to estimate the population density of ungulates by using distance sampling method in Mukandra Hills National Park Core, Rajasthan, the ungulates study not only gives the result of population, biomass or prey but it also provides the types of habitats, landscape and environment. The density estimation gains added importance when viewed as a part of a long-term monitoring of ungulate populations, especially in the context of the tiger reintroduction (Jathanna 2002). The result will serve as baseline for forthcoming Tiger project, and it also provide the distribution pattern of ungulates in the park. It will not only show the densities but will also show the present status or domination of domestic animals and human pressure on Core as well as on the ungulates. Compared to the animal densities in other protected areas (tiger reserves) with similar habitat conditions the animal density is much less, except for Nilgai.

Plate 3.1: Re-introduction of Tigers in MHTR

MT-1 (03-04-2018)

MT-2 (19-12-2018)

MT-3 (09-02-2019)

MT-4 (12-04-2019)

MT-5 (03.11.2022)

MT-6 (09.08.2023)

MT-7 (11.12.2024)	**MT-8 (19.06.2025)**

If the area must flourish as a tiger reserve, there is great need to increase the population of key herbivores. This can be done through strict improvement of protection, habitat manipulation, providing water during pinch period etc.

The terrain of MHTR is highly undulating - it has hills, cliffs, rivers, grasslands and dense forest all in one landscape. The number of animals and their distribution varies as per their habitat preference and food availability. In some ranges it has been observed that animal density is very high for one species and negligible for the rest. However, missing observations on the line transects can lead to misjudged population of animals. Line transect surveys might fail to record 100% population of animals (Bukland et al., 2001), (Karanth et al., 2004).

In a study done by Nayak, 2013 on food habits and prey selection of leopard (*Panthera pardus fusca*) in Mukandra Hills National Park, Kota, Rajasthan, India, the frequency of the percentage occurrence of prey observed in the scats of leopard through the scat analysis was 76.92% of common langur, 23.08% of jackal, 15.38% of nilgai, 7.69% of fox, 15.38% of domestic dog and 15.38% of unidentified species.

Growth of Prey Base is mainly due to following factors:

1. Notification of National Park and abolition of grazing rights,
2. Additional protection and improved manpower availability in the form of home guards.
3. Complete ban on sheep migration.
4. Translocation of herbivores from various zoos and national parks.

5. Identification of critical area like Selzar, Kharli Bavdi, Laximpura, and making them free from illegal grazing.
6. Notification of Tiger Reserve and improved awareness about the area

Limited success has been achieved however if good check posts, wireless system, barracks are constructed at critical points, considerable progress can be achieved.

Under the country wide protocol for assessment of tigers, co-predators, prey and their habitat, mandated by National Tiger Conservation Authority, New Delhi and Wildlife institute of India, Dehradun, the survey protocols including Phase- I: Spatial mapping and monitoring of tigers, prey and habitat, Phase-II: Assimilation of spatial and attribute data; and Phase-III: Estimating the population of tigers and its prey; are conducted once in every four year, in the tiger bearing forested areas, across the country.

The Phase- IV protocol, includes Intensive monitoring of tiger source populations in tiger reserves and protected areas in each tiger landscape complex, and maintenance of a centralized photo-database of tigers at NTCA obtained from camera traps deployed across all tiger reserves. This routine encompasses both scientific and management-oriented monitoring, comprises of regular monitoring of tiger signs at beat level, assessment of habitat status, prey base population and distribution status and population and distribution of tigers and their co-predators, so as to regularly and intensively monitor and check on the trends which can potentially be integrated with monitoring of law enforcement and patrolling.

The Phase IV Monitoring is carried out across the designated tiger reserves, either annually or biannually, and essentially encompasses the following objectives:

(I) Monitoring of Tigers & Co-Predators Using Camera Traps

(II) Monitoring of Ungulates & Habitats using Line transect based distance sampling exercise covering all major habitat types to estimate the prey population of tigers and co-predators. And also monitor the status of the habitat to assess the vegetation profile and anthropogenic disturbance by surveying fixed plots (n = 25) spaced randomly across all representative habitats.

(III) Capacity building workshops and Training for the Frontline Staff focusing on proper use and implementation of M-STrIPES (Patrol

and Ecological modules) mobile application, data collection and archiving, tiger monitoring protocols, sign survey, line transect distance sampling survey and camera trapping.

STUDY AREA AND METHODOLOGY

Mukandra Hills Tiger Reserve spreads across the districts of Kota, Bundi, Chittorgarh and Jhalawar in Rajasthan covering an area of 1135.78 km^2 (core 690.71 km^2, buffer 445.07 km^2). The forest type of Mukandra is of northern tropical dry deciduous forest (Champion and Seth 1968), and is dominated by *Anogeissus pendula*, *Anogeissus latifolia, Acacia catechu, Zizyphus mauratiana, Flacouritia indica, and Acacia leucofloea*. The carnivore guild comprises of tiger (*Panthera tigris*), leopard (*Panthera pardus*), grey wolf (*Canis lupus*), honey badger (*Mellivera capensis*), golden jackal (*Canis aureus*), Indian fox (*Vulpes bengalensis*),sloth bear (*Melursus ursinus*), striped hyena (*Hyena hyena*), jungle cat (*Felis chaus*), desert cat (*Felis silvestris*), rustyspotted cat (*Prionailurus rubiginosus*), common palm civet (*Paradoxurus hermaphroditus*), small Indian civet (*Viverricula indica*), ruddy mongoose (*Herpestes smithii*), and Indian grey mongoose (*Herpestes edwarsi*). The ungulate prey base is mostly comprised of nilgai (*Boselephus tragocamelus*) and chinkara (*Gazella bennettii*) while chital (*Axis axis*) and sambar (*Rusa unicolor*) populations are found in pockets. Many domestic livestock (from the nearby villages) compete with wild ungulates in much of the Tiger Reserve.

Mukandra was declared a tiger reserve in the year 2013. Mukandra Hills Tiger Reserve, along with Ramgarh Visdhari Tiger Reserve, Bhainsrodgarh WLS, Kailadevi, Dholpur and Kuno National Park forms an integrate habitat of the Ranthambore semi-arid tiger metapopulation. All these habitats once harboured sizeable tiger populations, however due to unprecedented hunting, prey base depletion, habitat loss and fragmentation and other anthropogenic disturbances, local extinction events in the last five decades were observed and rendered this semi-arid region of western India, vulnerable (Chundawat et al., 2016). Dispersing tigers from Ranthambore occasionally entered these regions, as has been recorded in the past two decades. However, tiger recolonization was not successful due to lack of inviolate space, infrequent and rare dispersal events, and lack of secured and developed corridors and dispersal routes. Due to the linear nature of Mukandra, there is a large interface with human-dominated landscape creating conditions of human-wildlife conflict as well as livestock grazing. Natural dispersals of tigers have been recorded from Ranthambore

to MHTR, in the past two decades, in 2003 a sub adult male tiger popularly known as *Broken trail* has dispersed from, Ranthambore, to MHTR and in 2019 another dispersal was recorded when the male tiger "T-98 " and subsequently known as "MT-3" had dispersed from Ranthambore and was photo captured in a camera trap in the Darrah region of Mukandra Hills Tiger Reserves. From 2018 to 2020 three tigers (on male and two females) were reintroduced into MHTR in the Darrah region. However citing the availability of better and more viable suitable areas, the introduction efforts and focus were shifted towards the hills and valley region of MHTR, that harboured better suitable habitat and more prey base as required by tigers. Again, in November 2022, a male tiger (T-110) was reintroduced and in August 2023 a female tiger (T-2301) was reintroduced to MHTR from Ranthambore. Currently three tigers are roaming freely in the forested habitats of Mukandra, which include the male tiger MT-5 (or T-110) , the female tiger MT-6 (T-2301) and female tiger MT-8 (RBT2507). Further there is one Female tiger in the process of rewilding MT-7(T114 cub).

Methodology:

The phase IV survey for the year 2023 was carried out during the summer session, from the months of April 2023 to August 2023.

a. Monitoring of Ungulates & Habitats with line transect survey and distance sampling

Line transect based distance sampling exercise is being implemented covering all major habitat types to estimate the prey population of tigers and co-predators. Line transects, ideally 2 km in length, has already been layed and designated by the NTCA WII Tiger Cell and the same are walked thrice by two trained personnel in the morning hours. Each team carries a laser range finder, a see-through compass and binoculars while walking the transect, and a fully charged android phone with the latest version of the M-STrIPES app (Ecological module) to record necessary details. The details of the line transect are extracted using the M-STrIPES desktop application and using them densities of prey species are estimated using

Habitat assessment is carried out using the random habitat plots on the transect lines. The status of the habitat is assessed by surveying fixed plots (n = 25) spaced randomly across all representative habitats. In the plots, the team records vegetation structure and composition, i.e., the number of tree species and their abundance, shrub species and cover, weed infestation, and ground cover. The same habitat plots will be used to

record human impacts (tree cutting, lopping, human and livestock trail, and other direct/indirect evidence). All the permanent plots will be further surveyed again in different seasons to capture the seasonal variation, and over the years to capture changes over the years. The data from the plots will be used to identify the pattern of habitat and vegetation features and catch their seasonal variability while conducting the surveys in different seasons.

b. Monitoring of Tigers & Co-Predators Using Camera Traps, Relative abundance calculations

To estimate the minimum population of tigers and co-predators, systematic grid-based camera trapping method is being implemented, covering all major habitat types of the study area. To identify the survey sites, reconnaissance surveys had been carried out in prior and one double-sided camera trap was placed on the most suitable site in the grid. Teams monitored the cameras on regular basis to check the battery status and download the data. The camera trap data were processed and segregated using the CaTRAT software for further analysis. Individual tigers and leopards will be identified using their unique stripe and rosette patterns (Extract Compare software, Hiby et al., 2009). For the Phase IV summer session 2023, however double-sided cameras could not be deployed due to unavailability of required resources, and hence only single sided camera were deployed in each systematic 2 km^2 grid. After archiving, the camera trap data were checked and corrected for any mismatches or errors, and after verification, the resultant images were geotagged with the camera locations, using the CaTRAT software. Further the images were segregated into species specific folders and exif data were extracted for further data analysis.

Relative Abundance Indices:

When absolute/ estimated abundances or densities cannot be calculated due to resource scarcity, or unavailability of adequate data, relative abundance indices can be useful as a surrogate. These indices can help in visualise the trends in species populations and characterizing their spatial distribution with the assumption that these indices scale monotonically with actual abundance (Güthlin et al., 2014).

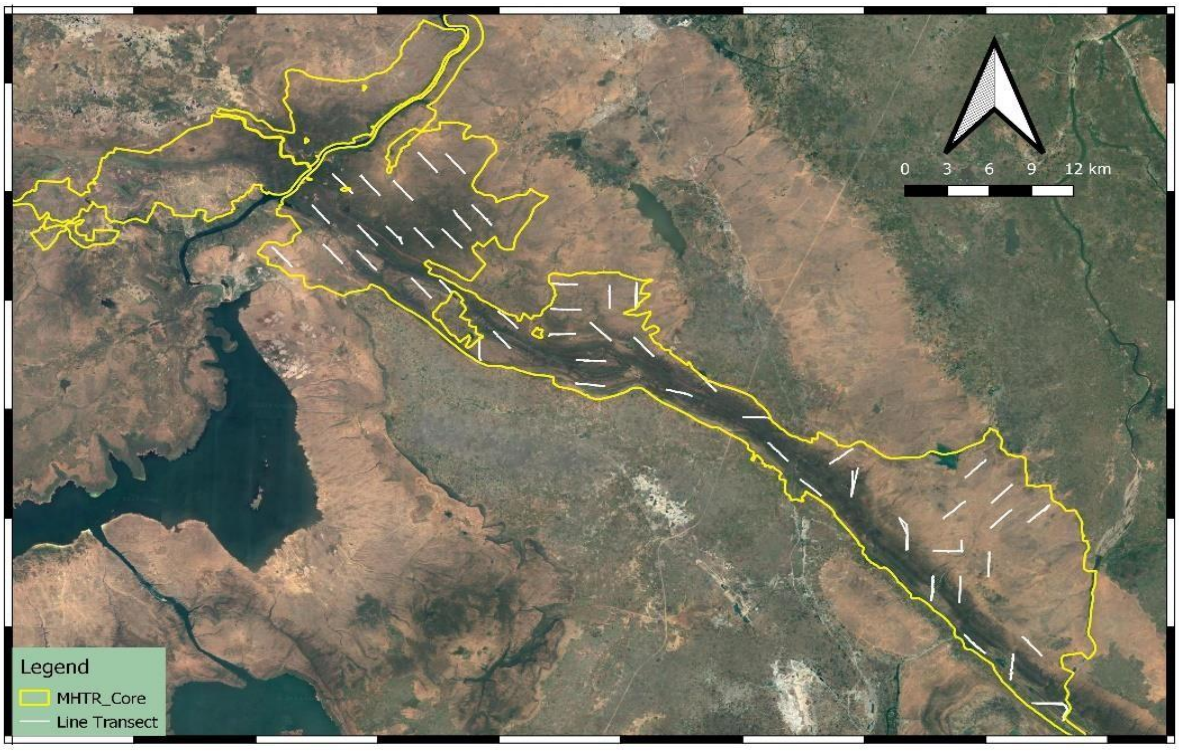
Each photograph captured in camera traps were detailed with date time and location. Further the functional hours/ nights were noted down for each camera trap. we defined independent events as consecutive photographs of the same species (or individual when identification was possible) taken more than 30 minutes apart at the same camera trap. The number of independent photo-captures of a species was used to calculate two

relative abundance indices (RAI) for terrestrial mammals. RAI is defined as the number of independent photo-captures of species in 100 trap nights (Carbone et al., 2001, O'Brien et al., 2003). We computed the RAI as: RAI = 100 x (A/N), where A is independent photo 1 1 captures and N is trap nights. We computed the RAI for each of the species of interest, compared them and generated distribution maps based on relative capture rates across the spatial extent of the tiger reserve.

Results:

Previous phase IV survey at MHTR was conducted for the year 2023 and was carried out during the summer season, from the months of April 2023 to August 2023. The survey included line transect survey for assessment of prey density and camera trapping for assessment of relative abundance indices of the apex carnivores, co-predators, and their prey.

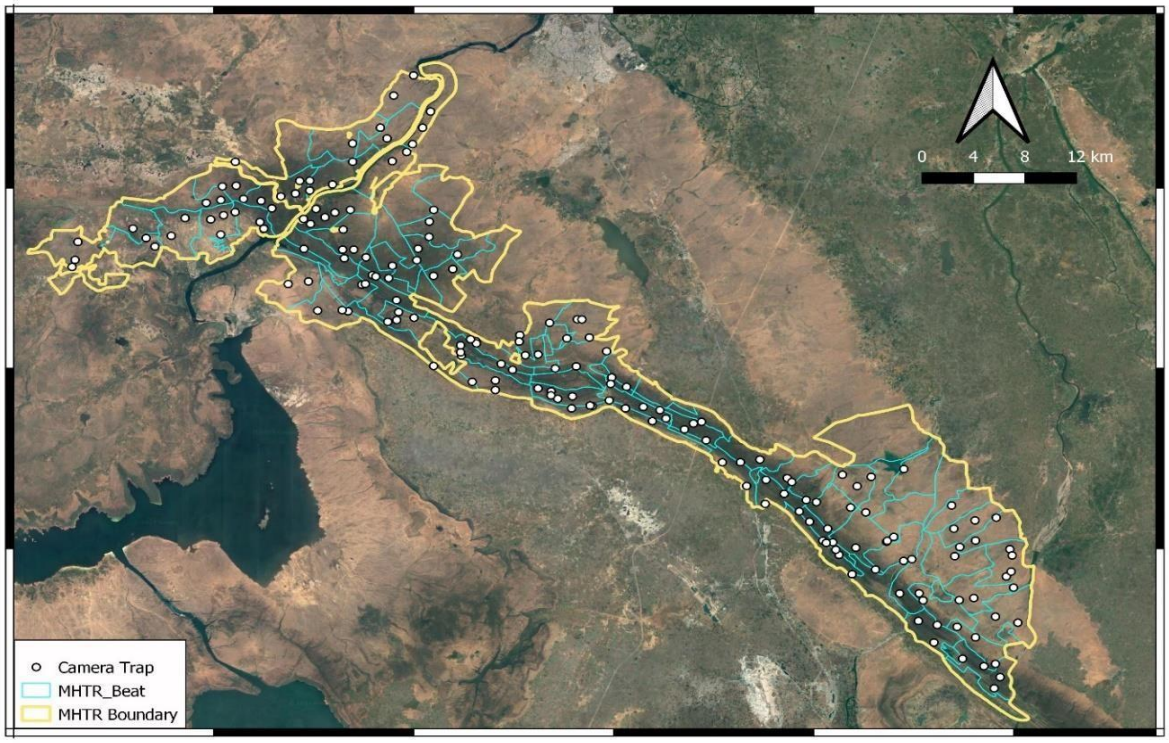
a. Line Transect and distance sampling: A total of 50 transect lines were walked with 3 temporal replicates in Mukandra Hills Tiger Reserve, with a total effort of 293.5 kms. During the survey 265 observations of wild prey, cattle and livestock were recorded.
b. Camera trapping efforts and calculation of Relative Abundance Indices



Map. 3.1: Line transect efforts in MHTR during Phase IV 2023

Table 3.2: Density estimates of prey species (all prey including wild prey, cattle and livestock) Phase IV 2023:

AREA	*Effective Strip Width*	*Mean Group Size (SE)*	*Detection probability*	*Encounter Rate`*	*Group Density/sq.km (SE)*	*Individual Density /sq.km (SE)*	*Effort*	*No. of Observations*
MHTR	45.08	5.694(0.43)	0.15	0.95	10.618(1.07)	55.06(6.86)	293.5	281



Map 3.2: Camera trapping efforts in MHTR during Phase IV 2023

The camera trapping for Phase IV 2023, summer session was conducted in two blocks, Block I consisted of Range- Kolipura, Rawatha, Darrah and Gagron and Block II consisted of Range- Borawas and Jawahar Sagar. In total 185 camera traps (single sided) were deployed in designated camera trapping grids, across the two blocks with a combined effort of ~5408 trap nights. The camera trap survey generated 82,628 images of animals. Twenty-six wild species were captures in 20,390 images and five domestic species were captured in 62,238 images.

When absolute/ estimated abundances or densities cannot be calculated due to resource scarcity, or unavailability of adequate data, relative abundance indices can be useful as

a surrogate. These indices can help in visualise the trends in species populations and characterizing their spatial distribution with the assumption that these indices scale monotonically with actual abundance (Güthlin et al., 2014).

Figure 3.1: Field staff during line transects survey

Figure 3.2: Wild animal direct sighting in Mashalpura Grassland area, MHTR

Predator estimation:

There is an overall correlation between body mass of a carnivore and the mass of their most common prey. In general, carnivores weighing 21.5 kg or less feed mostly on prey that is less than 45% of their own body mass and carnivores above this size feed mostly on prey that is more than 45% of their own body mass.

This dichotomy is a consequence of mass related energy requirements. As carnivores' mass increases, the total energy expenditure increases, and thus require more hunting time to obtain prey to balance the energy budget (Carbone et al., 1999). The medium sized cats such as leopards (40–60 kg) feed on large prey-2 kg above their own mass and even larger.

Prey depletion lowers the tiger's encounter rates with prey. It is expected to result in lower hunting success, greater energy expenditure per kill, and increases foraging movements. These ecological consequences result in poorer nutrition, increased intraspecific competition at kills and reduced attention towards cubs. Therefore, prey depletion is likely to affect survival rates of tigers at all demographic stages. In Kaziranga this process is almost nullified owing to the absence of the factor of prey depletion and poaching. It is important to mention here that a hunt in Chitwan (Nepal) in 1935 - 36 produced 77 tigers; 3 years later 10 tigers were killed when the same area was hunted. Even in Sikhote- Alin State Biosphere Reserve (Russia) between 19631965 there were no tigers in the area and the first tiger appeared in 1966 and during the colonization phase, that followed (1966- 1993), records show tigers increased to 24-31 individuals.

The major prey species for tigers in Sariska are cheetal (*Axis axis*), sambar (*Rusa unicolor*), nilgai (*Bosephalus tragocamalus*), domestic buffalo (*Bubalis bubalis*) and common langur (*Presbytis entellus*) (Sankar, 1994; Sankar and Johnsingh 2002). (Sankar and Johnsingh 2002) reported that cheetal, sambar and common langur contributed to more than 90% of the biomass of tiger diet in Sariska. MHTR core has a good population of cheetal, sambar, nilgai and langur but the future of this population is highly insecure due to the immense biotic pressure caused by large human and livestock population.

Causes for decline and decimation of tiger and its prey populations are numerous. (Schaller, 1967) described two factors that have brought the large mammalian fauna to its present predicament, a predicament hauntingly reflected in the current state of

our tiger population. Our despicable history of hunting for recreation and the indirect and less avoidable course of "habitat destruction", both of which are key elements in the declining population paradigm. Trophy hunting of large animals like in the old days has been brought under check following a series of wildlife protection laws. Nevertheless, poaching of both prey and predator continues, be it for food, oriental medicines or other illegal trade in wildlife parts (Siedensticker, 1997). Habitat degradation, on the other hand, which is largely a function of human influence, continues to work at its own steady pace affecting both the predator and the prey. Poaching combined with degradation and fragmentation of habitats of already depressed populations is likely to have disastrous effects on their viability and future survival (Seidensitcker et al., 1999).

Though tigers have been known to feed on a wide variety of animals (Schaller 1976) a marked preference for medium (31-175 Kg) to large (>176 Kg) sized ungulates has been documented by studies in different habitats. (Schaller, 1967), (Johnsingh, 1983) and (Karanth and Sunquist 1995) have all found that medium to large sized ungulates comprise the bulk of the tiger's diet, of which cheetal and sambar between them constitute approximately 55% – 65% of the diet.

The tiger is the largest obligate terrestrial carnivore in any of the mammalian assemblages where it occurs and as such, preys on the largest ungulates found in these assemblages (Seidensticker, 1997). (Karanth and Sunquist 1992), (Eisenberg and Seidensitcker 1976) and (Schaller, 1967) have all observed a positive correlation between tiger densities and prey biomass densities. The prey in turn depends entirely on the availability of suitable and productive habitats to maintain such viable and abundant populations.

According to (Gupta, 2002) the ecological role of primates as primary consumers is important for the maintenance of homeostasis (a state of equilibrium) and critical for forest regeneration and survival. A predominantly vegetarian diet allows primates to make use of the most abundant food source in their environment, justifying their higher population density (almost nine times) as compared to carnivore species (leopard, hyena, etc.) that inhabit the same geographical areas. India has 15 primates in addition to man and their role in the country's diverse ecosystems, especially tropical forests, is of great importance (Choudhary, 1988). Well adapted for both terrestrial and arboreal life, the primates can exploit a wide variety of foods from ground to canopy. Flexibility in their diet and adaptability are keys to their survival in both pristine and

heavily disturbed habitats. Primates are often referred to as 'wasteful feeders' as they pluck more leaves, flowers and fruits than they eat. But even this seemingly wasteful behaviour plays a discreet ecological role through trimming twigs, branches and roots, as well as pollination and seed dissemination. In the present study the population of Langurs (*Presbytis entellus*) shows an increase in census figures, and this may be attributed to the high adaptability of the primates. The Core supports a good population of langurs. Feeding studies on tiger food has showed that langur is also preferred as prey species.

According to (Negi, 2002), leopard is the second important species after tiger amongst the carnivores of Indian forests. It is found throughout India and has adapted to all types of forests and scrub jungles, from cool Himalayas to arid tract of Central India. In common parlance, panther is also called leopard. (Sankar and Johnsingh 2002) have studied food habits of tiger *(Panthera Tigris)* in Sariska Tiger Reserve, Rajasthan. In core of MHTR after extinction of tigers (in seventies) from the area, leopard was at the apex of food pyramid. They are present in the whole area and in surrounding forest area of Jawahar Sagar, Ghati, Mashalpura, Bebra talai, Koyla kui, Jhamra, Laxmipura, Ambapani, Karoundi, Kanjar, etc. Its population is static because of prey population, which is just sufficient to support this population, but the biotic interference is immense therefore the predators must live under stress condition adversely affecting the reproduction and survival of the species. The reserve has the potential of rendering protection to tiger and other wildlife but in the absence of human disturbance and other anthropogenic activities. After re-introduction of tigers in MHTR, leopard is the main co-predator along with wolf, jackal, fox and jungle cat.

Leopard can be individually identified from their unique rosette pattern on body like flanks, limbs *etc*. Therefore, estimation of leopard density is possible by using traditional closed capture recapture models as well as likelihood based Spatially Explicit Capture Recapture (SECR) models.

Each photograph captured in camera traps were detailed with date time and location. Further the functional hours/ nights were noted down for each camera trap. we defined independent events as consecutive photographs of the same species (or individual when identification was possible) taken more than 30 minutes apart at the same camera trap. The number of independent photo-captures of a species was used to calculate two relative abundance indices (RAI) for terrestrial mammals. RAI is defined as the number of independent photo-captures of species in 100 trap nights (Carbone et al.,

2001; O'Brien et al., 2003). We computed the RAI as: RAI = 100 x (A/N), where A is independent photo 1 1 captures and N is trap nights.

Table 3.3: Relative Abundance Indices of wild and domestic species, captured during Phase IV survey, 2023.

Species	***Total captures***	***Independent Events***	***RAI***
Carnivores			
Tiger	9	7	0.13
Leopard	294	180	3.33
Striped hyena	298	230	4.25
Indian grey wolf	22	11	0.20
Golden jackal	161	115	2.13
Indian fox	59	31	0.57
Sloth bear	87	52	0.96
Ratel	9	9	0.17
Jungle cat	39	33	0.61
Desert cat	7	5	0.09
Grey mongoose	64	28	0.52
Ruddy mongoose	44	30	0.55
Small Indian mongoose	3	2	0.04
Prey species			
Blackbuck	430	11	0.20
Nilgai	6997	1412	26.11
Chinkara	2281	493	9.12
Chital	34	3	0.06
Sambar	977	286	5.29
Wild pig	1804	600	11.09
Langur	4344	350	6.47
Indian Hare	787	442	8.17
Others			
Pangolin	2	2	0.04
Porcupine	401	326	6.03
Small Indian civet	37	34	0.63
Asian palm civet	21	20	0.37
Domesticated / Feral			
Camel	1179	120	2.22
Cattle (Cow and Buffalo)	57309	3834	70.89
Dog domestic	514	147	2.72
Livestock (Goat and Sheep)	4415	302	5.58

During the Phase IV camera trapping survey, 13 species of carnivores were photo captured. During the survey period, only one tiger (Adult male MT5) was roaming around in wild forested habitats of MHTR, the same tiger was captured at five different occasions in seven events. Other than tigers, among the large carnivore guild, was relatively dominated by striped hyena followed by leopards.

Among the major wild prey guild, nilgai was estimated to have the highest relative abundance, followed by wild pig, chinkara, sand sambar. Blackbuck and spotted deer had very low relative abundance and was captured only in isolated clusters. Spotted deer were captured in the denser valley region of the park and blackbuck were captures in open savannah or scrubland habitats.

The relative abundance index of cattle was the highest, compared to any other species showing prominent presence across the stretch of the reserve. Detailed comparison of relative abundance indices across the different guilds are represented below.

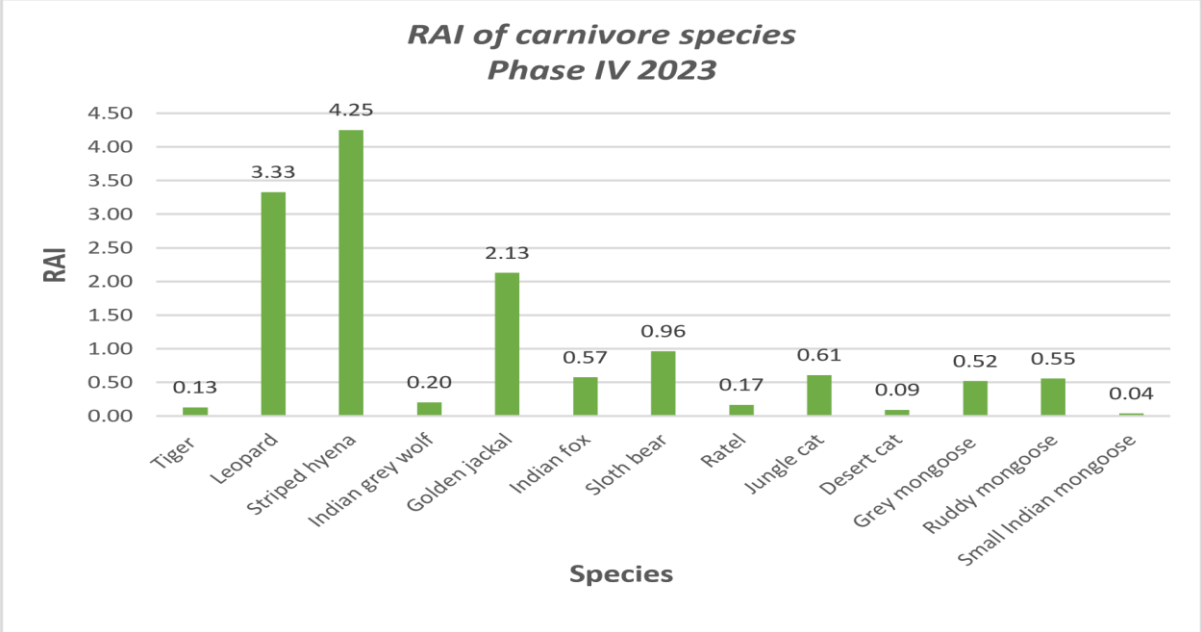


Figure 3.3: Comparative Relative Abundance Indices of Carnivore species

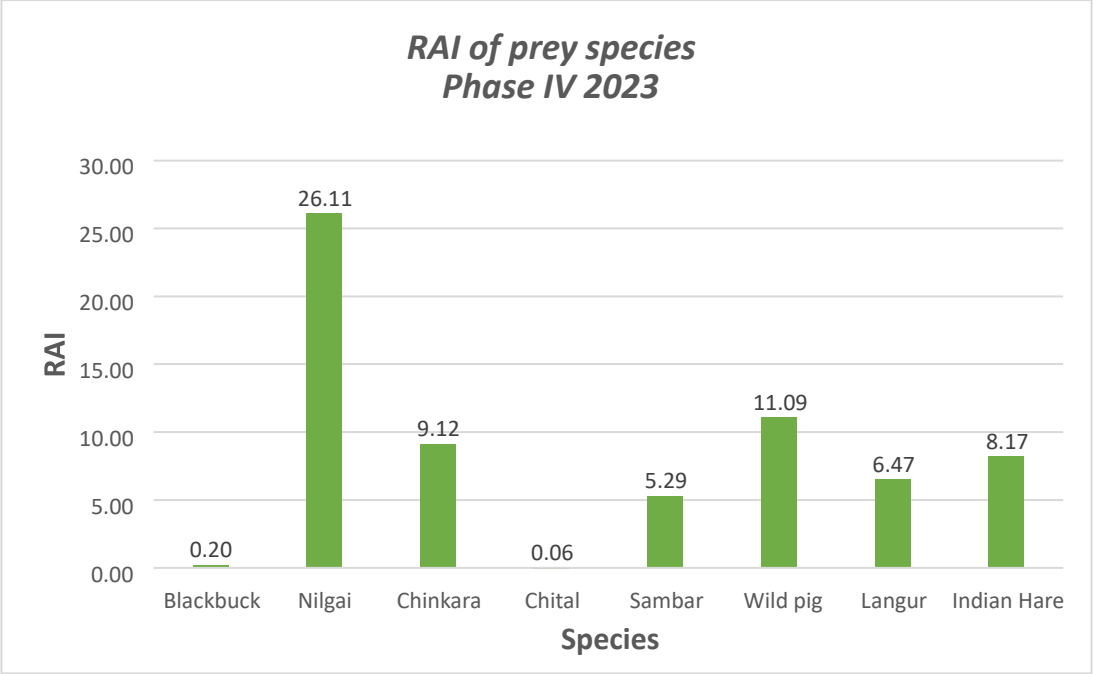


Figure 3.4: Comparative Relative Abundance Indices of prey species

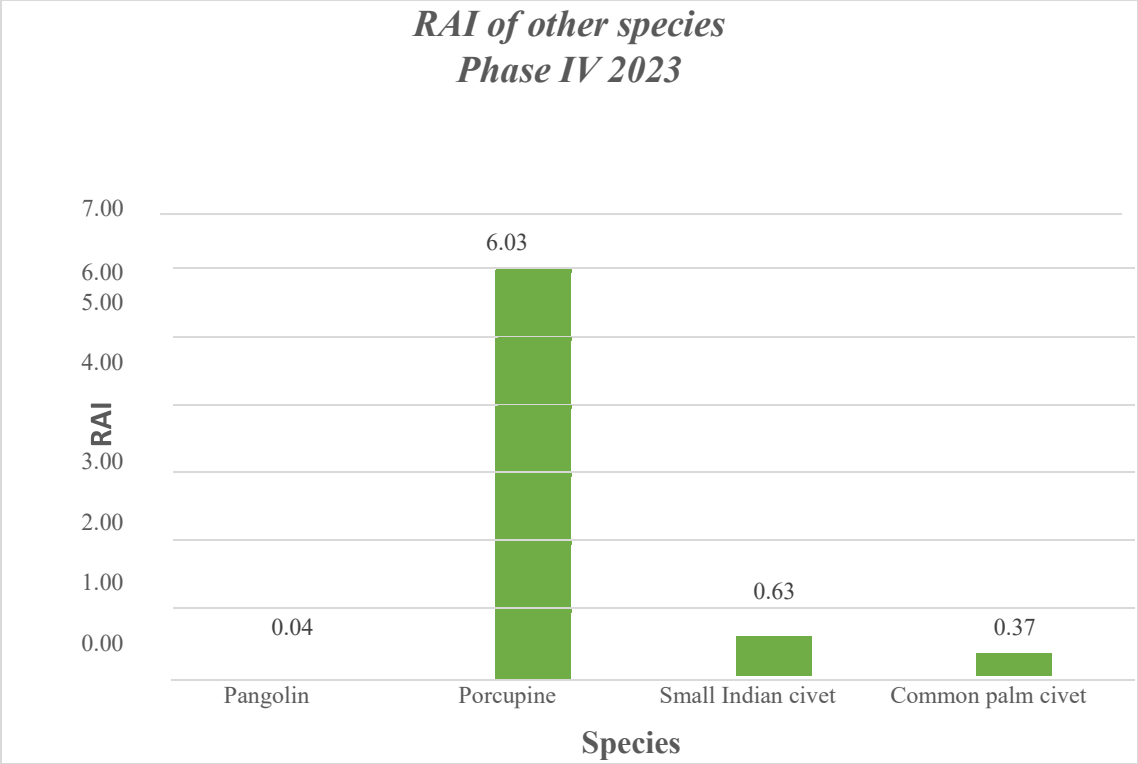


Figure 3.5: Comparative Relative Abundance Indices of other wild species

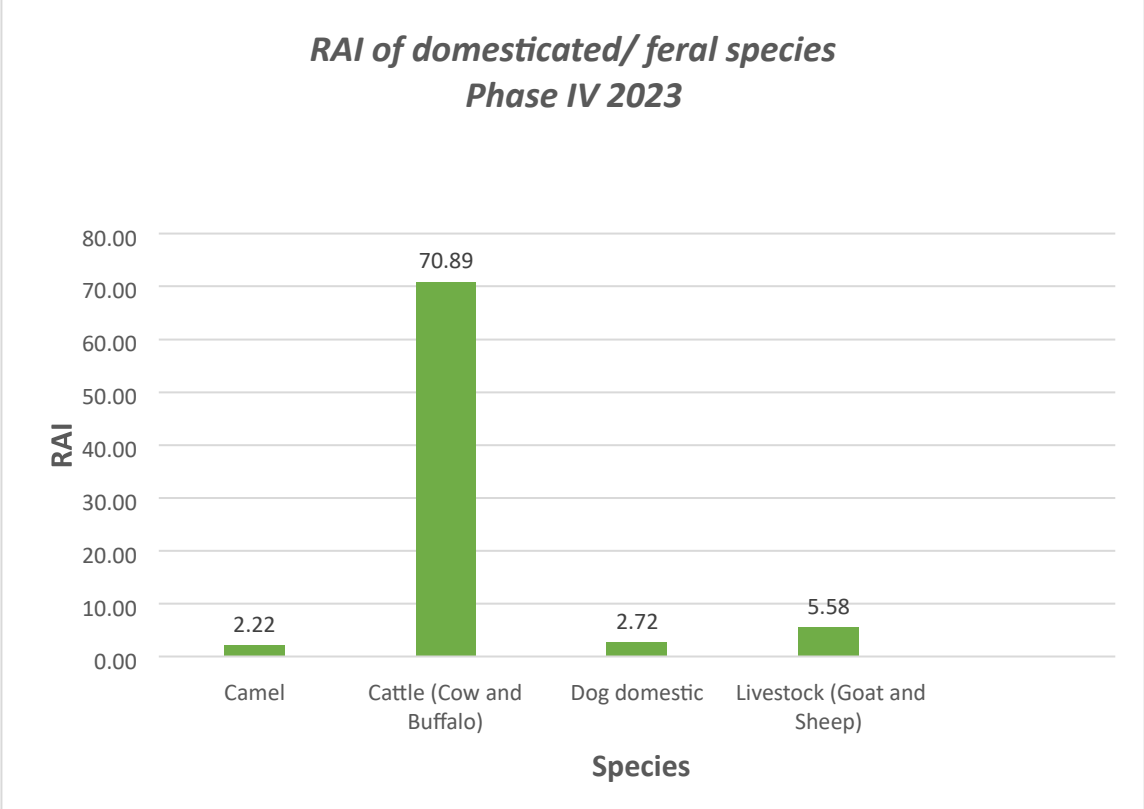


Figure 3.6: Comparative Relative Abundance Indices of feral/domesticated species

DISCUSSION

The prey population in a semi-arid landscape is crucial for the survival of all predators. The prey population is dominated by domestic cattle, followed by Nilgai which is also represented in the kills made by tigers. MHTR also harbour Indian gazelle, Blackbucks, Chital, Sambar, and wild pig, however preliminary studies show their isolated and clustered distributions.

The preliminary results of distance sampling analysis of line transect are only indicative and seeks substantial added efforts in terms of field survey efforts and technical soundness, so that reliable species wise densities can be generated. The Individual prey density of MHTR came out to be 55.06 (SE 6.86) animals per sq.km, however this estimate might be overpowered with dominant cattle presence. Detailed wild prey densities could not be estimated species wise, because of lack of adequate survey efforts and low observation records of the species. This might be critical for estimating the carrying capacity of the reserve for tigers and aid in planning future reintroduction and establishing a viable population.

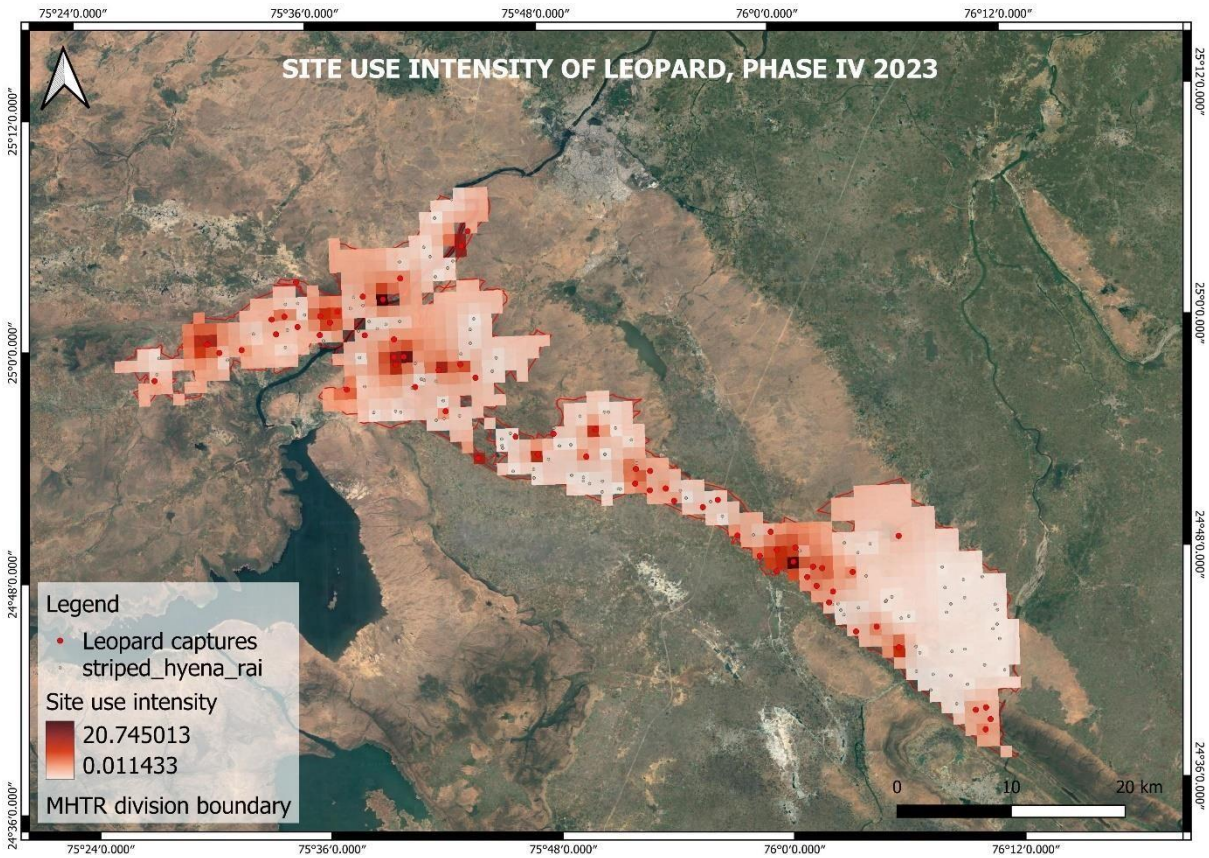
Currently the existing prey density estimates are not robust and requires a dedicated and considerable finer scale approach based on habitat covariates and employing new techniques such as camera trap distance sampling for a more precise result. Estimation of available prey base abundance, understanding their spatial distribution and availability is the a priori basic requirement before planning and implementing reintroduction programmes.

There is also a need for augmenting wild prey such as sambar and chital from other sanctuaries. This along with water source management will allow the wild prey to flourish.

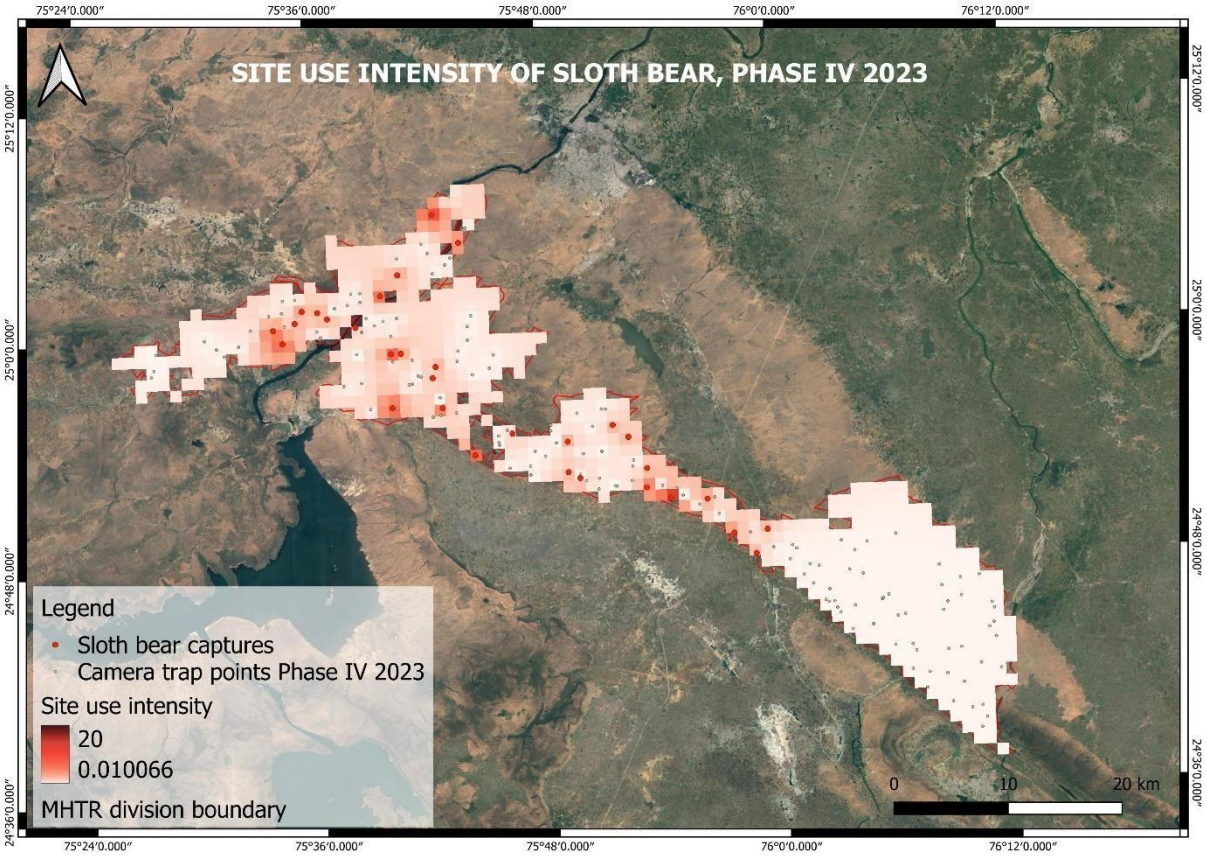
SPATIAL DISTRIBUTION AND SITE USE INTENSITY MAPS OF MAJOR CARNIVORES AND PREY SPECIES GENERATED FROM PHASE IV 2023, MHTR.

Distribution map of carnivore species in MHTR:

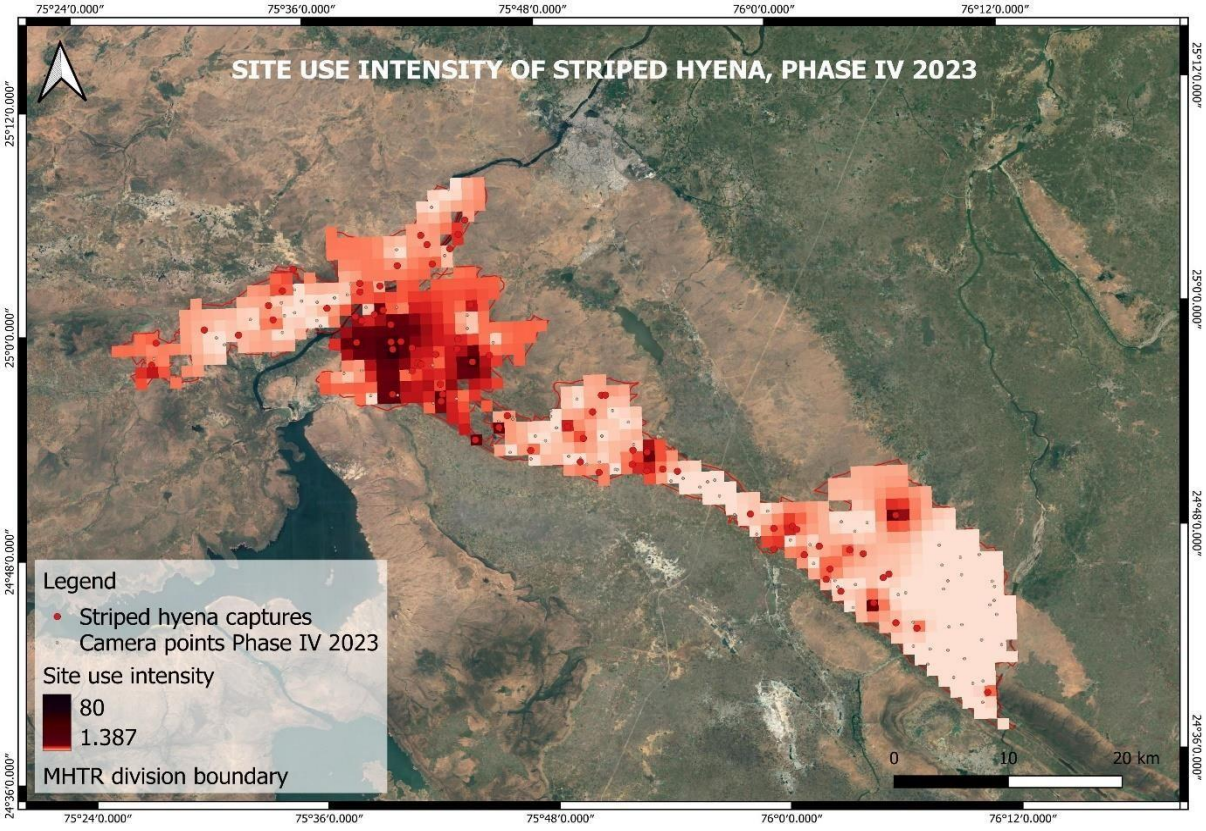
Based on the survey, the location maps of following predator and prey species were prepared



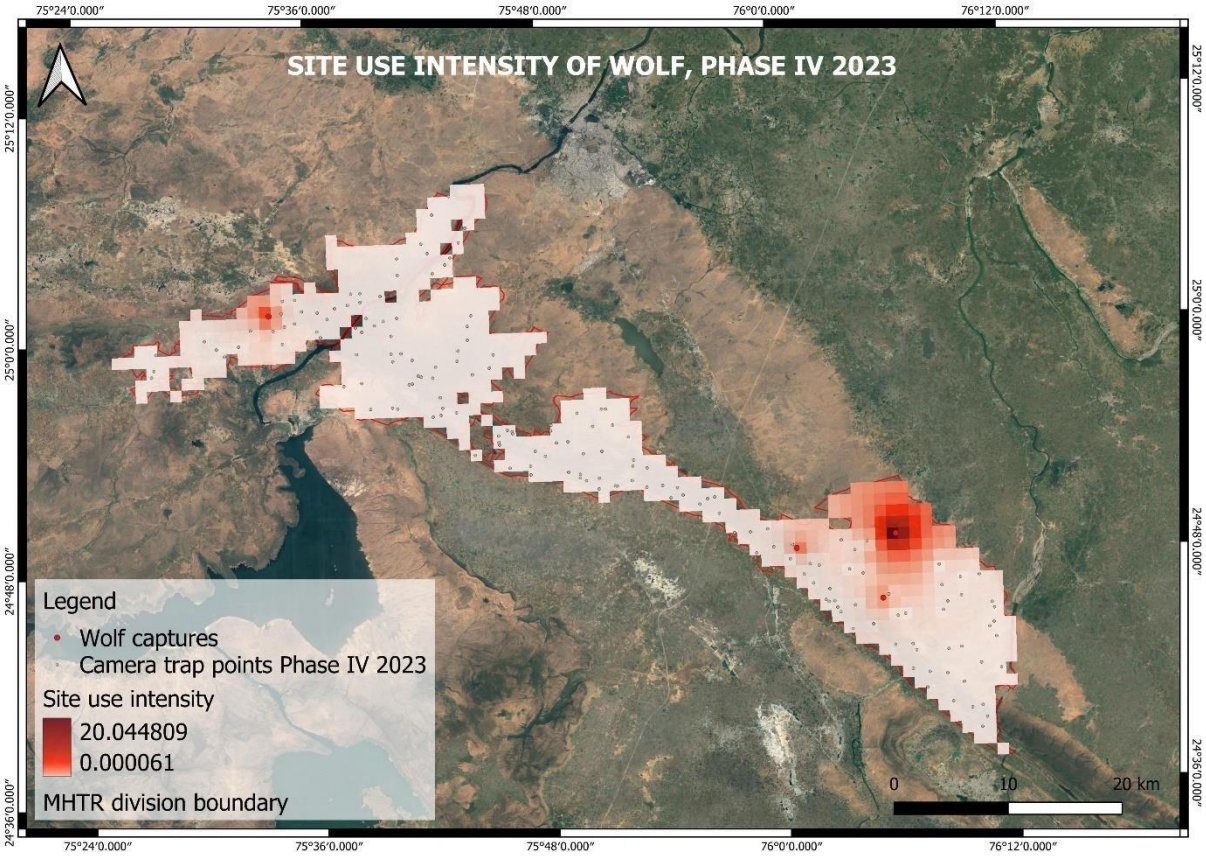
Map-3.3: Site use Intensity of Leopard Phase IV 2023



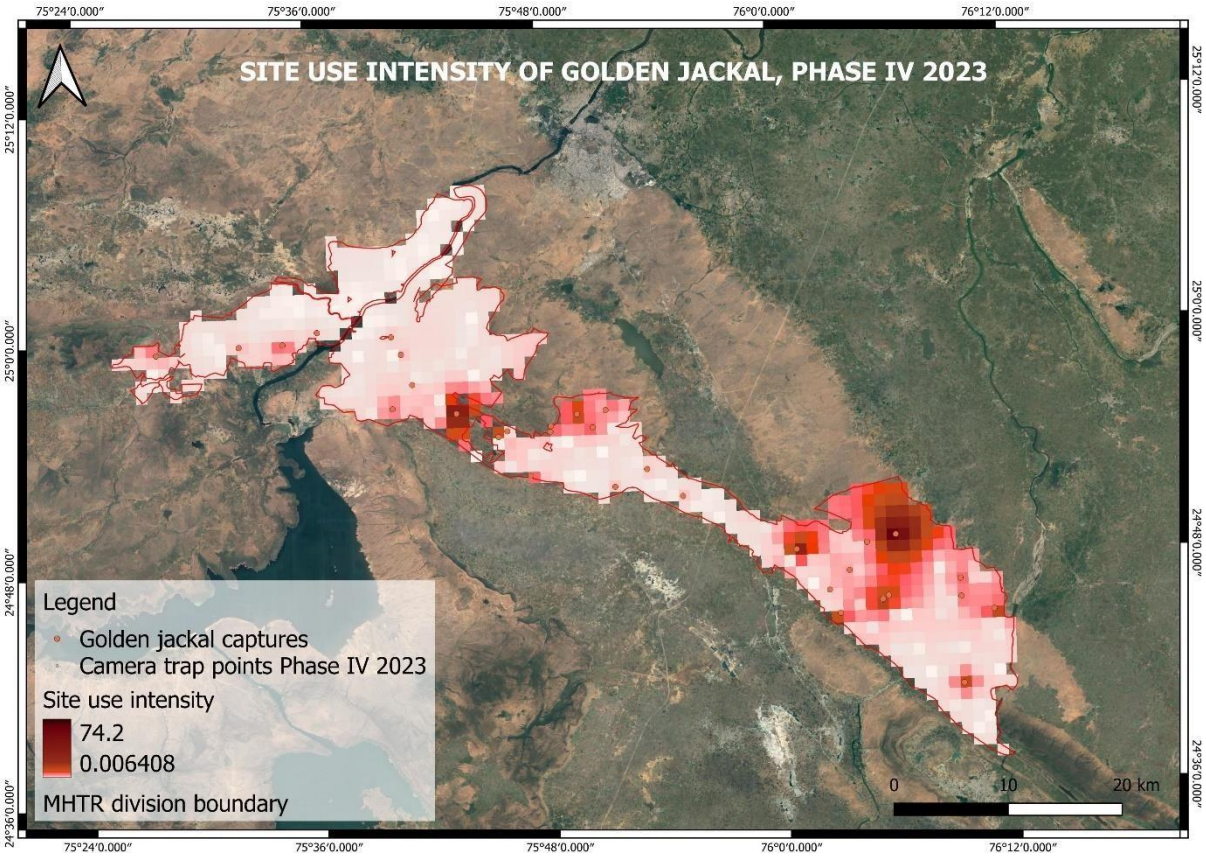
Map-3.4: Site use Intensity of Sloth Bear Phase IV 2023



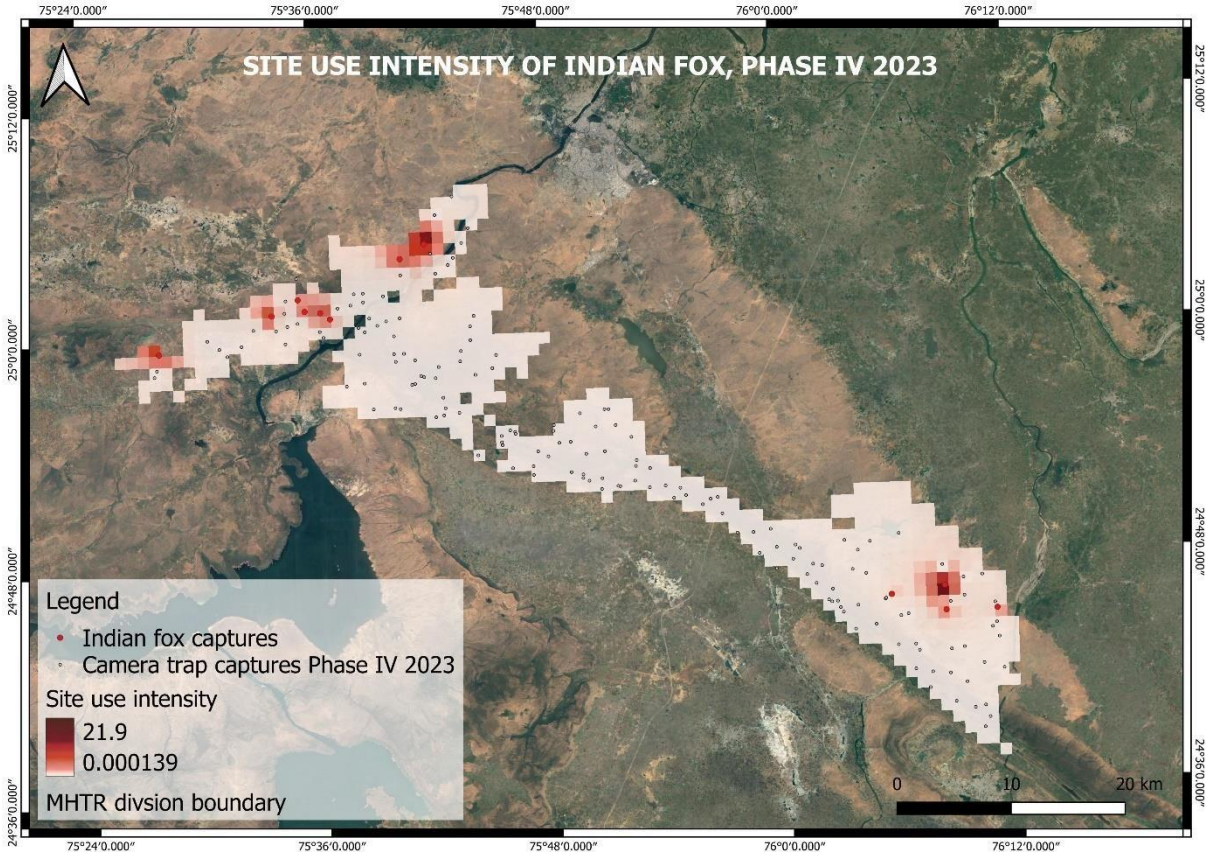
Map-3.5: Site use Intensity of Hyena Phase IV 2023



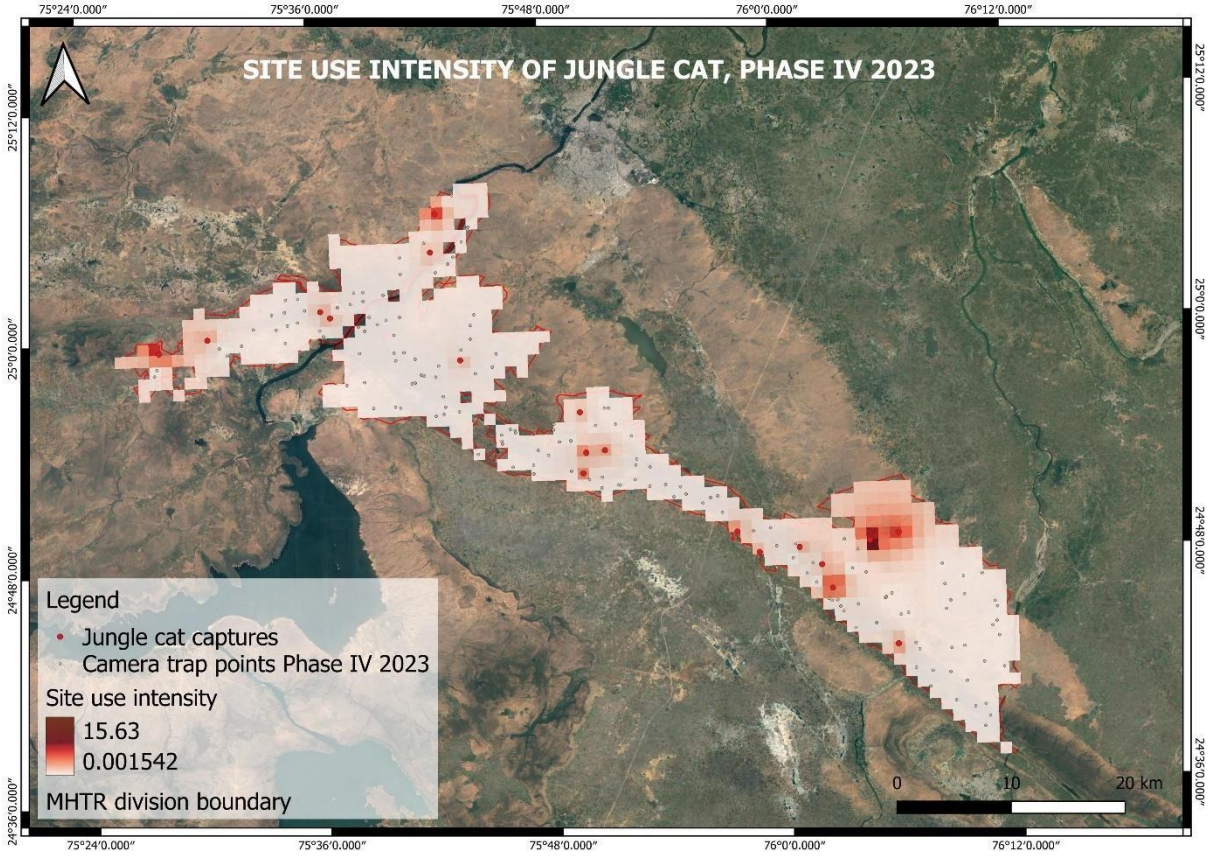
Map-3.6: Site use Intensity of Wolf Phase IV 2023



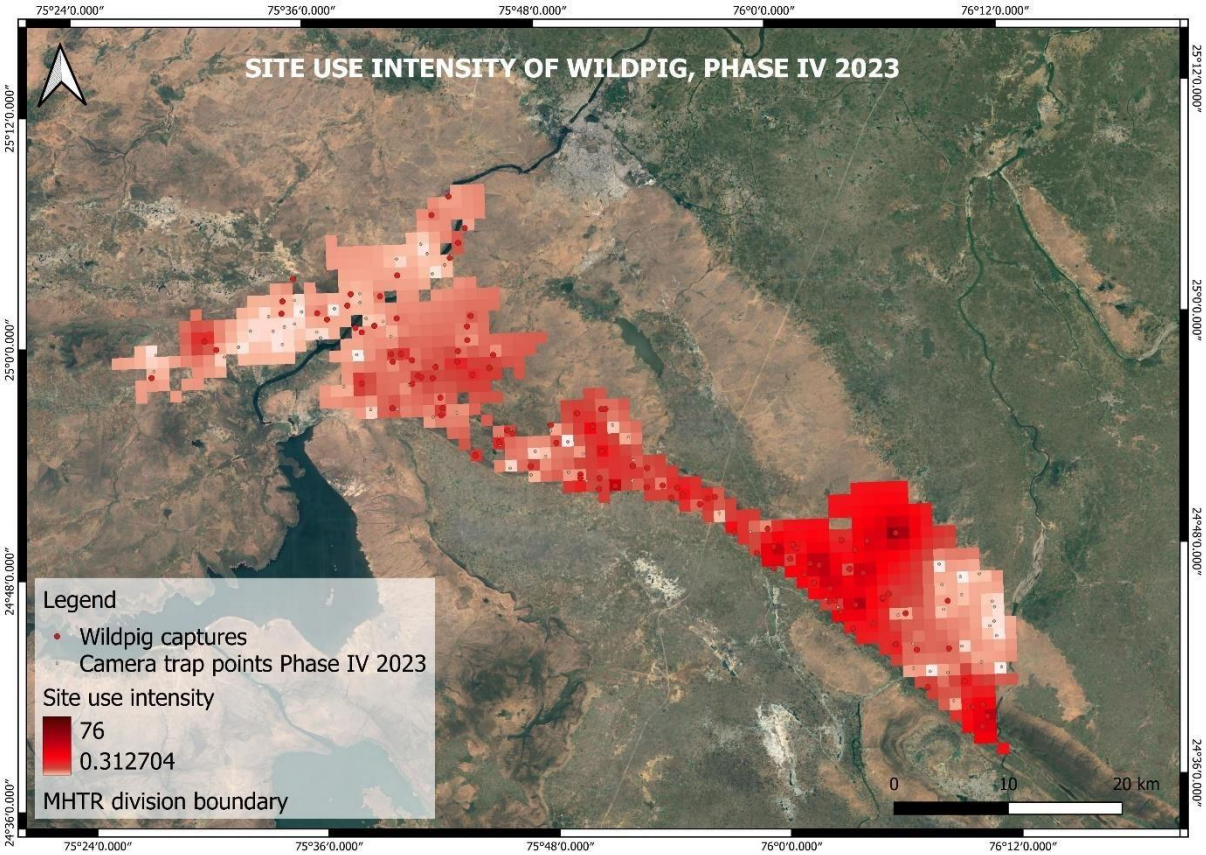
Map-3.7: Site use Intensity of Golden Jackal Phase IV 2023



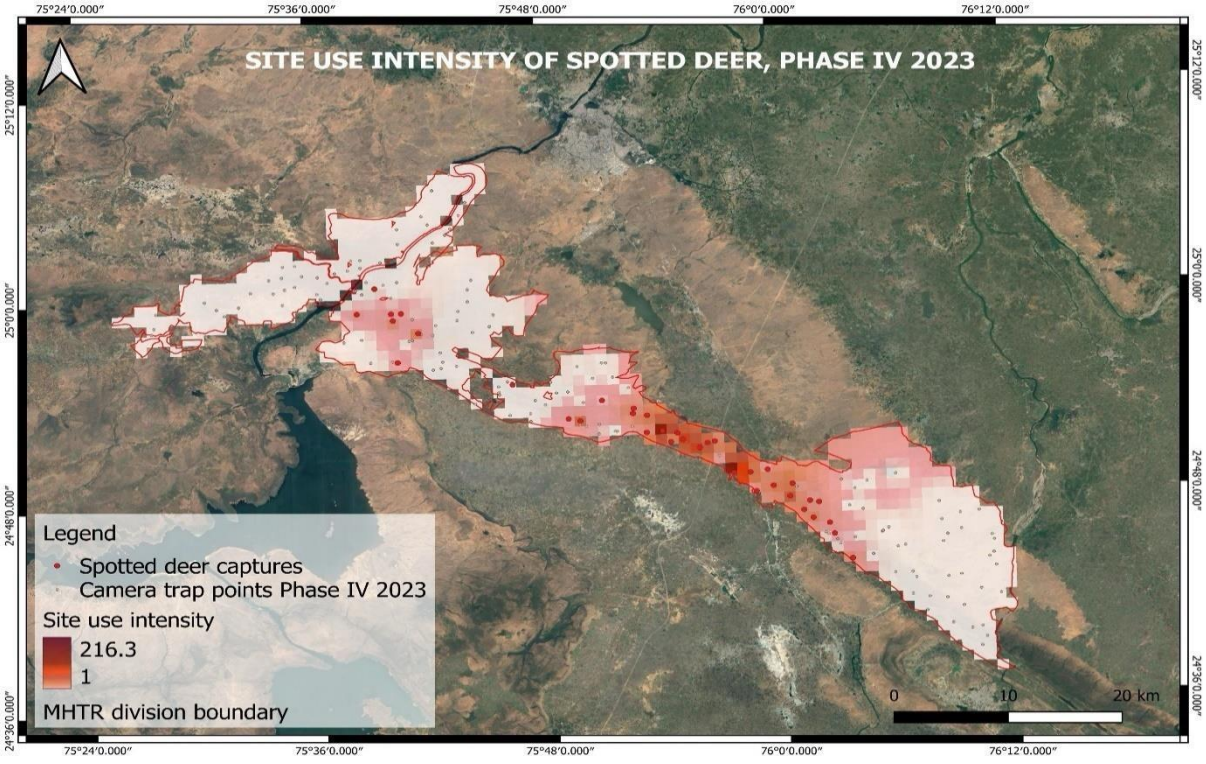
Map-3.8: Site use Intensity of Indian Fox Phase IV 2023



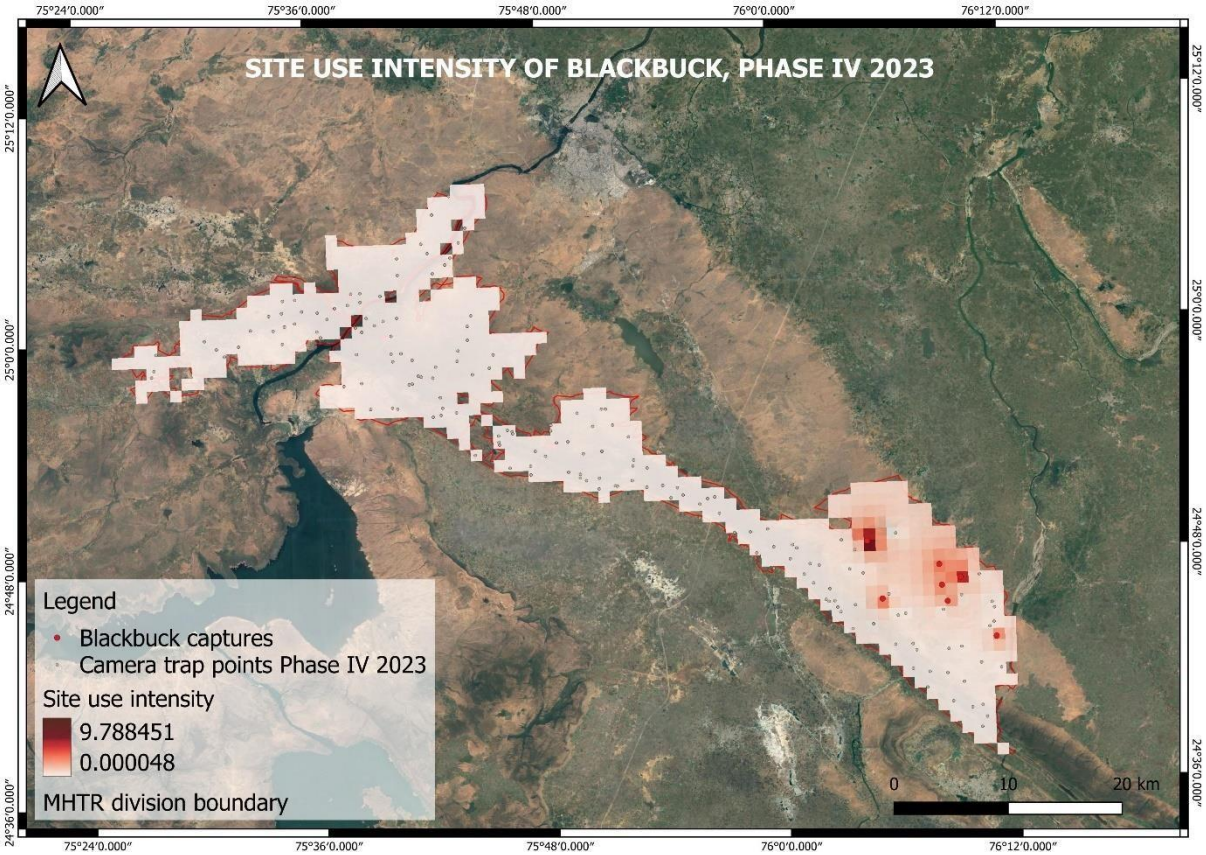
Map-3.9: Site use Intensity of Jungle Cat Phase IV 2023



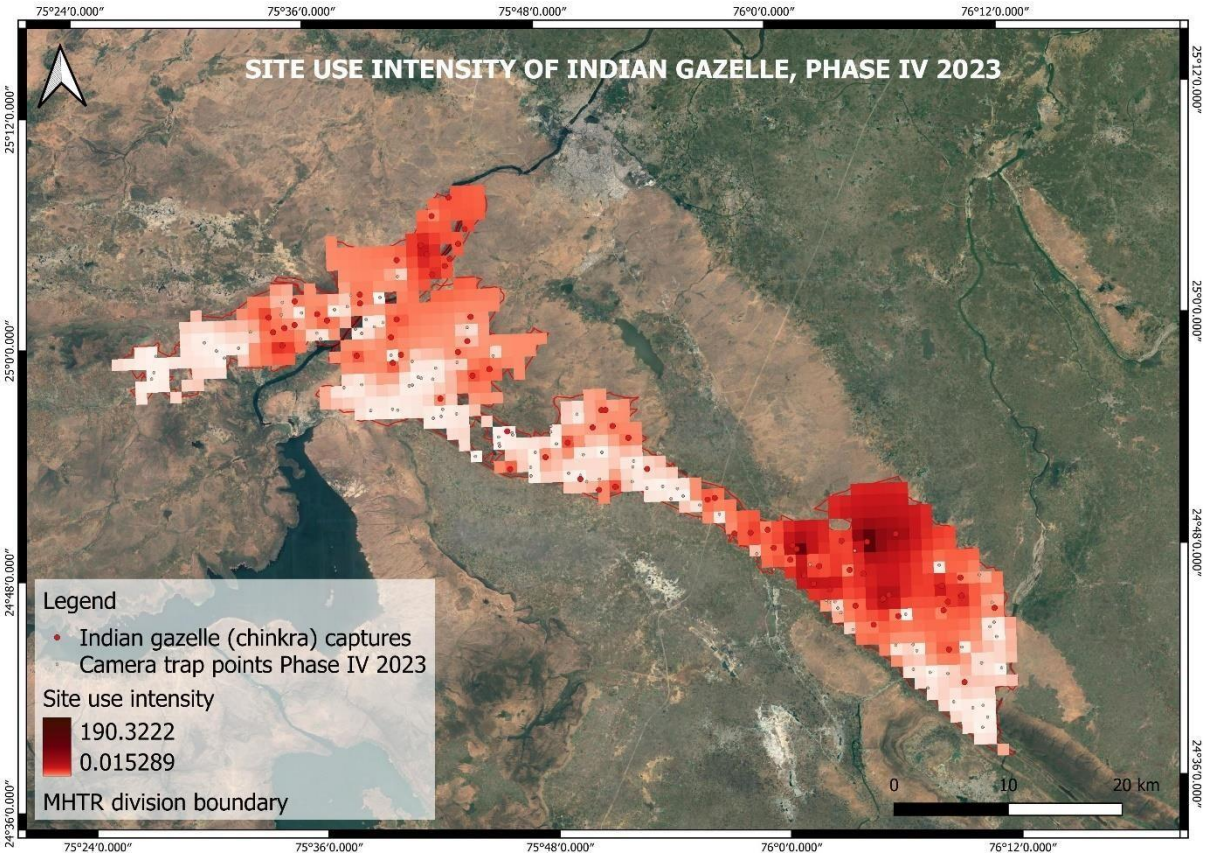
Map-3.10: Site use Intensity of Wild Pig Phase IV 2023



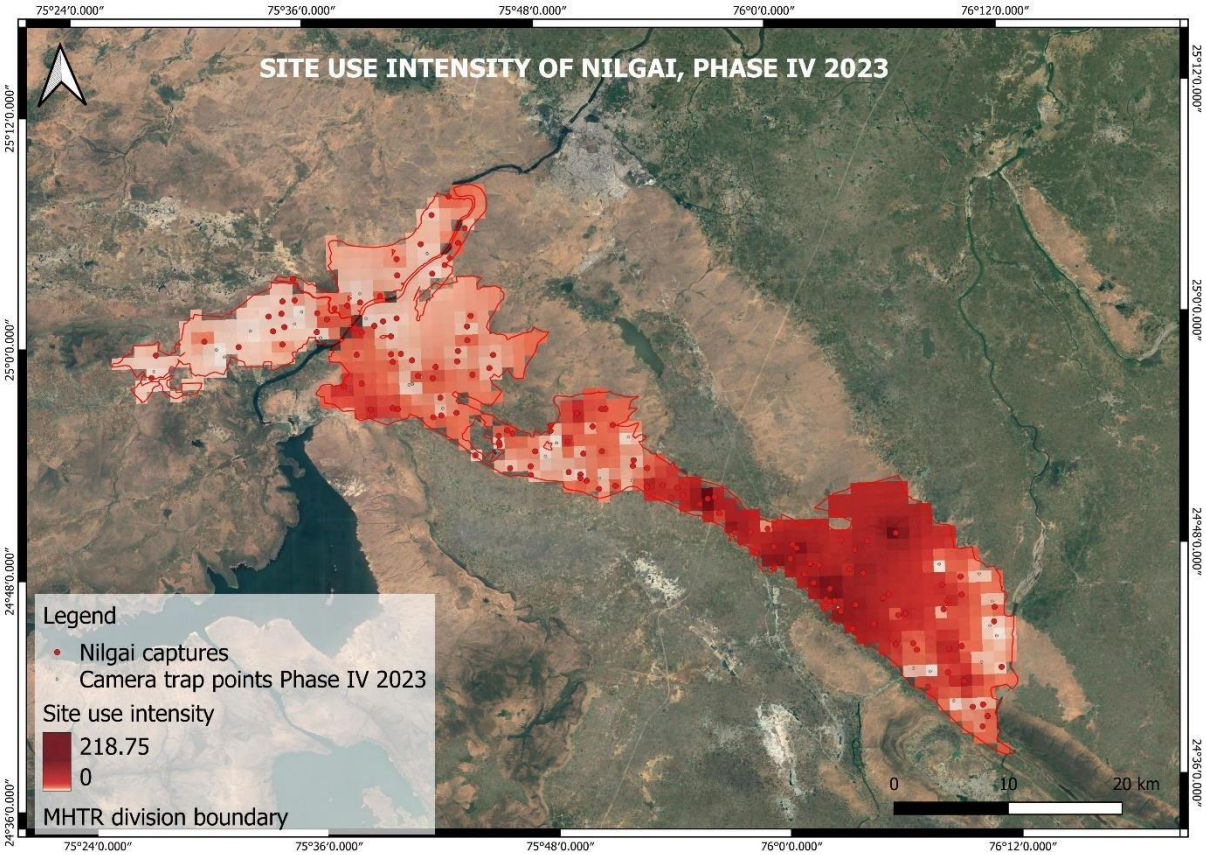
Map-3.11: Site use Intensity of Spotted Deer Phase IV 2023



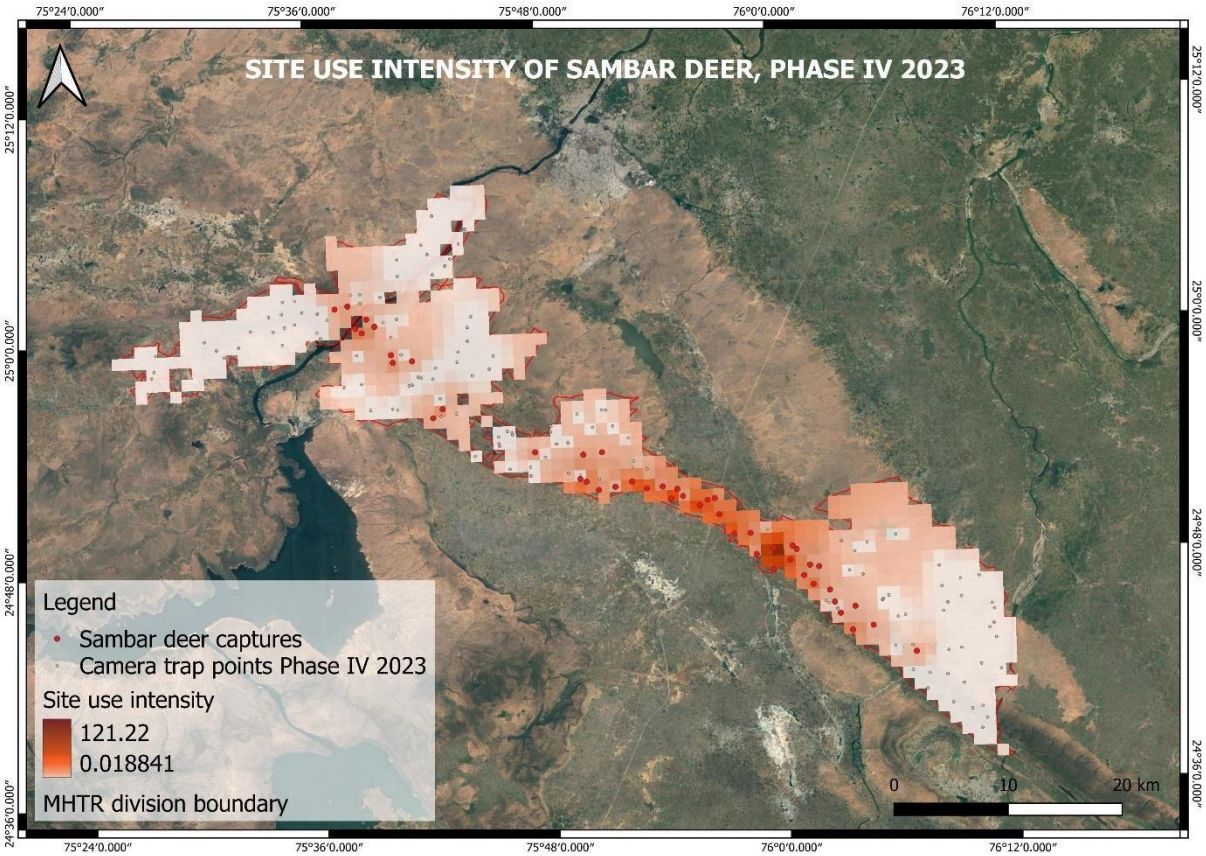
Map-3.12: Site use Intensity of Blackbuck Phase IV 2023



Map-3.13: Site use Intensity of Indian Gazelle Phase IV 2023



Map-3.14: Site use Intensity of Nilgai Phase IV 2023



Map-3.15: Site use Intensity of Sambar Deer Phase IV 2023

Leopard Density Estimation:

In 2018, leopard density was estimated in MHTR using Camera Trap Method, total number of leopard photo captures in the camera trapping session was 74 and out of all these images 16 (14 both flanks capture, and 2 only left flanks) individual leopards were identified. Using the capture history, leopard density was estimated to be 11.22 (SE 3.14) leopards per 100 sq. km. Status of Leopard Report -2022 by NTCA projects leopard population at 99 in MHTR whereas the same was estimated to be at 49 in 2018 report.

Leopard images were trapped in good number, proving the presence and occupancy in MHTR. Other carnivore species captured in the camera trap were wolf, sloth bear, striped hyena, golden jackal, Indian fox, jungle cat, desert cat, honey badger, common palm, civet, small Indian civet, and ruddy mongoose.

3.4 Assessment of Threats

Large carnivores are among the most threatened mammals in the world (Ceballos et al., 2005). The decline of the tiger *Panthera tigris* L. 1758, typifies the challenges of recovering large carnivore populations.

3.4.1 Habitat Fragmentation:

Driven by synergistic impacts of habitat fragmentation, prey depletion and direct hunting (Karanth et al., 2004; Walston et al., 2010), tigers have suffered a range contraction of c. 93% in the past two centuries (Dinerstein et al., 2006). Global species recovery now depends on effective management of the remaining 42 ‘tiger source population (Walston et al., 2010) that occur as interconnected clusters within larger landscapes (Dinerstein et al., 2006; Ranganathan et al., 2008). Therefore, rigorous assessments of tiger populations are required at two spatial scales: protected reserves of a few hundred square kilometres each and wider landscapes of several thousand square kilometres (Karanth et al., 2011).

3.4.2 Anthropogenic Pressure:

However, habitat destruction or “elimination of habitat “(Schaller 1967) is an ongoing process and it is here, in the cycle of events, that anthropogenic influences play a key role in modifying and often degrading the habitat by diverting a substantial quantum of the biomass towards human and livestock needs. Anthropogenic disturbances take the form of cattle grazing, lopping and cutting for fodder, fuelwood and other biomass

requirements, fires, large-scale extraction of non-timber forest products (NTFPs) and drastic alterations in the physio-chemical quality of the terrain.

3.4.3 Climate Change:

The direct effects of such disturbances include loss of cover, change in vegetation communities, species composition, forage abundance and quality (Dinerstein, 1987); all of which have a direct effect on the ungulate habitat use (Dinerstein, 1979a). The tiger, due to the obligate nature of its phylogenetic (Sunquist et al., 1999) and trophic position is most vulnerable to such alterations and deterioration of habitat, which affects the health of the prey populations (Karanth and Stith 1999).

3.4.4 Prey Depletion:

(Karanth and Stith 1999), from modelling studies of tiger populations, have speculated that prey depletion is a major factor driving the current decline of wild tiger populations and hence a significant constraint on their recovery. Tiger also tries to occupy the areas with abundant ungulate population to save utilise energy efficiently.

3.4.5 Poaching:

Huge international demand further puts pressure on the already dwindled carnivore population whose parts are used in traditional medicine in East Asia. Also demand for skins and other parts for exhibition is constant threat to population of tigers.

Prey-Augmentation Efforts:

Translocation of cheetal from four different sources was taken up during the reintroduction of tiger program in MHTR. A total of 1075 cheetal were translocated (Table) to maintain the prey population for the sustainability of re-introduction tigers.

The information of Cheetal translocation is given in **Annexure-7.**

In MHTR the pressure of various anthropogenic factors is immense. Evidence of cheetal was more near a ness while sambar maintained 1-2 km. The reason for the proximity of cheetal to presence of water, open areas used by cheetal for yarding and the tolerance of cheetal for human settlements. Hence relocation of villages will be favourable for cheetal if the evacuated sites continue to have open areas and water.

When disturbance caused by the human is removed by resettling them more sambar, a preferred prey of tiger and a disturbance sensitive species, would start using the evacuated sites which are often in prime wildlife areas. Villages like Giridharpura and

Damodarpura have agriculture land across the valley between Mukandra hills and hence block the movement of animals leaving the option to animals to stay on hilly slopes. Hilly slopes are not the suitable habitat preferred by ungulates. Relocation of these villages will provide open spaces which are preferred by ungulates. Abundance of large ungulate prey species and protection from human disturbance would be the key determinants of local tiger presence (Karanth et al., 2004). An 'average tiger' requires about 50 ungulate prey animals per year. In combination with an ecological model that predicts that tigers annually crop about 10% of available prey numbers in an area, tiger numbers can be related to prey numbers using the simple assumption of one tiger for every 500 preys.

CHAPTER 4

HISTORY OF PAST MANAGEMENT AND PRESENT PRACTICES

4.1 Conservation History:

The history of past management of forest area falling within the tiger reserve comprises of the management by two princely states namely, Kota and Jhalawar district. So, the management of the forest is divided in the following parts:

1. The period prior to 1948
2. The period of control by the forest department Rajasthan from 1948 to date
3. Future Management

4.1.1 The period prior to 1948:

Kota State:

The ruler of Kota region obtained the services of Rai Bahadur Sunder Das in the twentieth century for preserving the forest by systematic management. Lack of proper means of communication, lack of demand of fuel wood and non-availability of ready market helped considerably in preserving the forest.

In 1938, Rai Bahadur Sita Ram Puri wrote a tentative working plan for the forest of Kota State but did not mention compartments, blocks, and coupes for felling of trees.

In 1940, S.R. Puri and Nandan Bhargava tried to lay down the coupes and Handy System for extraction of Kattha.

For hunting purpose, there was a Shikar Khana department, looked after by a Shikar Khana officer. The forests other than Shikargah were under custom department. It allowed the people to remove the forest produce for their domestic and agriculture use and for sale on the scheduled royalty from all over the forest.

Jhalawar State:

There was no separate forest department in this state, and one officer was in-charge of Forest, Mining, and Customs, Fisheries and Shikar Khana department. The forests were mainly preserved for shikar. Local people enjoyed forest concessions liberally.

There was no record whether any royalty was charged from them.

Forest area of the Jawahar Sagar Sanctuary had been Shikargah (area reserved for hunting) while states of Kota and Bundi were in existence. Hunting used to take place before independence by the heads of these states. This area was rich in wildlife during that time. Tiger was reported in the area till late seventies, after enactment of Wildlife (Protection) Act. 1972, hunting has been completely banned. But with the loss of habitat, increasing biotic pressure and poaching in the past, population of wild animals has dwindled.

4.1.2 The period of control by the forest department Rajasthan from 1948 to date

In 1948, Kota and Jhalawar state merged into the united state of Rajasthan. Soon after the merger, they issued two notifications granting liberal concessions to the local inhabitants. This resulted in an unregulated and unsystematic exploitation of forest. Large areas of the forest were released for grow more food campaign and for settlement of landless people.

The Forest Concession Rules 1955 gave liberal concessions on a large scale. No working plan or scheme was laid down, only local Range Officer and Divisional Forest Officer laid down annual firewood charcoal and kattha coupes. The Coppice with Standard Silviculture System was adopted but due to non-protection against fire and grazing, the coppice regeneration failed.

The area was exploited for Bamboo, Tendu leaves, firewood, charcoal and Kattha not only by contractors but also by State Trading Wing of Forest Department till the management of Sanctuaries came into the hands of Wildlife wing. The NTFPs were also collected through contractors during this period.

Rajasthan Animals and Birds (Protection) Act was promulgated in 1951. Under the provisions of this Act in 1955, five areas were notified as Reserved Areas - Darrah was one of them which became a Sanctuary as per the provision 2(a) of Rajasthan Entrance to Game Sanctuaries Rules 1958.

From 1962-63 to 1978, forest blocks and compartment history were marked on topographical sheets. Their boundaries were laid on the ground and compartment histories were prepared. Seven working circles were constituted, and management was prescribed on scientific lines.

With the progressive degradation of the forest cover under mounting pressure of an increasing population and uncontrolled grazing, and destruction of wildlife due to the modern weapons in the hands of the hunters; many of the species were driven to the

verge of extinction. In 1972, Wildlife (Protection) Act came into force in the state of Rajasthan vide Government of India notification F.1014/3/FIR/WLF/Dated 1stSeptember 1973. This provided more effective legal means for the protection of flora and fauna of Darrah sanctuary also.

Jawahar Sagar Wildlife Sanctuary was declared on 9th October 1975 while National Chambal Gharial Sanctuary was declared on 3rd September 1983.

In 1978, an attempt was made to constitute an integrated management system of wildlife reserves, under the control of Chief Wildlife Warden, Rajasthan. The practice of dual control i.e. forest cover by territorial forest officer and wildlife by wildlife officer was stopped and the entire flora and fauna of the area was put under the control of a wildlife warden. Darrah Sanctuary was administered by a wildlife warden under Division Kota. In 1986, a new wildlife division was established at Kota administered by Deputy Conservator of Forests (Wildlife) Kota.

In 1984-85 Darrah was included in the list of selected sanctuaries for development under Centrally Sponsored Scheme. There has been regular financial assistance from the Central Government for the development of Darrah Sanctuary since then.

In 1988, a division level conference was held to know the views of the freedom fighters, senior citizens, politicians, renowned persons and Government officials at Kota, Bundi, Jhalawar, Sawai madhopur, Chittorgarh under the chairmanship of Divisional Commissioner, Kota. It was decided unanimously that National Park should be declared to preserve the rich flora and fauna of Hadoti region covering the area of 286 sq. km of Kota, 84 sq. km of Bundi, 54 sq. km of Jhalawar and 45 sq. km of Chittorgarh. Based on these recommendations, a portion of Darrah Sanctuary was notified as Mukandra National Park in the year 2012 and subsequently Mukandra Hills

Tiger Reserve (MHTR) was notified in the year 2013 which includes Mukandra National Park, Darrah, Jawahar Sagar and part of National Gharial Sanctuary.

In the year 2012, a new division in the name of DCF (Wildlife) Mukandra National Park was created with it headquarter at Kota. Areas administered by erstwhile Deputy Conservator of Forests (Wildlife) Kota namely Darrah, Jawahar Sagar, and part of National Gharial sanctuary from Kota Barrage to Rana Pratap Sagar dam was transferred to DCF (Wildlife) Mukandra National Park.

No felling is being permitted after the park came into existence. The right holders are allowed to take dead and dried firewood and grass free or cost. Grazing is also

permitted in the open forests. But with the Hon'ble Supreme Court's order dated 1402-2010 and 28-02-2000 no forest produce is allowed to be removed out of the Protected Area. No Non-Timber Forest Produces (NTFPs) are auctioned in the Protected Areas.

4.2 Habitat Management:

The Mukandra Hills Tiger Reserve has an inbuilt potential to develop into one of the important tiger reserves in Rajasthan due to natural surroundings & sufficient forest cover to provide food and shelter to different species of wildlife. The Reserve has many rare and threatened species in sufficient numbers. If these species are provided with a complete human interference free habitat they can multiply and rebuild good population in the Reserve. This can also help in extension of these species to adjacent wildlife areas like Bhainsrodgarh Sanctuary which have been assimilated into MHTR.

For proper management of the tiger reserve certain objectives are laid down and to meet them, planning is necessary. This planning deals with biological as well as management aspects. The management aspect deals with preservation of ecosystem by effective protection and minimizing the biotic pressure. Creation of ideal conditions for food, water and shelter for wild animals is the other aspect.

Some of the current practices where MHTR administration is focusing for habitat management in MHTR core are:

1. Creating water storage structures and renovating the old state time structures improving the hydrology of the Tiger reserve while providing water for the animals even in lean season.
2. Maintaining grasslands and arresting ecological succession into woodland of grassland areas to ensure the food supply to the herbivores and sustaining the food web.
3. Eradicating exotic weeds like Lantana camara, Prosopis juliflora etc. on war-footing allowing the endemic species to flourish.
4. Creating biodiversity enclosures to regulate and control grazing simultaneously naturally allowing endemic vegetation an opportunity to grow and disperse its seeds.
5. Creating and maintaining fire lines to control spread of wildfires which could destroy natural vegetation and affect their seeds.

6. Collecting palatable grasses seeds and planting/dispersing them mechanically in rainy season to extend grasslands as well as provide fodder for wild herbivores.

Conditions which would facilitate wildlife populations to survive and reproduce should be created mainly on the principles of "Let the nature take its own course with minimum biotic interferences". Of course, the degraded area will be developed through eco-restoration plantation programmes by planting indigenous fruit and fodder plant species. Water conservation measures will be taken up to improve habitat & surface water availability to wild animals during pinch period. The prerequisites for wildlife inhabiting any area are the year-round availability of food and water as well as suitable living and breeding environment. Following considerations are to be considered during the management review:

(a) *Lantana camara* is invading the reserve gradually throughout the valley area, especially in Laxmipura and Nolav area. Its invasion has dangerous impact on the habitat suitability for the floral and faunal component of the ecosystem. *Lantana camara* needs phased eradication and replacement with the local suitable species. It is necessary to check its further penetration in the core.

(b) The degraded area inside the Core needs to be rehabilitated with suitable indigenous species.

(c) Habitat improvement works for the food availability for the flagship species i.e. Sloth Bear, Leopard, Otters, Chinkara and Four Horned Antelope need to be carried out intensively.

(d) Khajur groves, riverine strips, wet-nullah groves and other special habitats need special protection.

(e) Moisture conditions need to be improved for amelioration of vegetation growth and establishment of natural regeneration.

(f) Establishment of relocation centre with intensive planting of fodder trees and grass cover improvement.

(g) Grass cover improvement works in the plain areas are required for the sustenance of herbivore population. Phased removal of *Xanthium indicum* is needed to regenerate the grass cover especially in the valleys.

(h) Water availability during pinch period is scarce. Repeated droughts further make the situation worse. Fresh water points with assured water supply need to be developed in various parts of the tiger reserve.

(i) Grazing needs to be regulated.

(j) Some threatened species of flora and fauna need protection and rehabilitation measures.

(k) *Prosopis juliflora* to be removed in phased manner and replaced with fruit yielding trees.

4.3 Protection and Intelligence gathering

4.3.1 Protection related issues:

There are many threats to tiger reserve such as degradation of habitat, disturbed food chain, frequent droughts, decreasing availability of water, heavy grazing pressure, lopping and cutting of trees, encroachments on forest lands. Lack of family planning, socio-economic backwardness, poverty, illiteracy etc has increased dependence of local population on the Reserve. All these factors are significant from the protection point of view.

4.3.1.1 Hunting:

Forest areas of the Reserve had been Shikargah (area reserve for hunting) of erstwhile states of Kota, Bundi and Jhalawar when they were in existence. Hunting used to take place before independence by the rulers of these states. The area was rich in wildlife during that time. Tigers were reported in the area till seventies. After enactment of Wildlife (Protection) Act 1972, hunting has been completely stopped. But due to loss of habitat, increasing biotic pressure and poaching, the population of wild animals has dwindled.

4.3.1.2 Poaching:

There is no serious problem as far as poaching is concerned. Stray cases of killing of Hare and Monitor Lizards, by Bhil and Bavariya (Tribal Communities) takes place.

Illegal fishing in the waterbodies of the Reserve is also reported occasionally.

4.3.1.3 Illegal cutting of trees:

This forest area is predominantly inhabited by the tribals like Bhil, Bavariya, etc. They largely depend on forest resources for their livelihood and subsistence. Although they

have rights of extraction of fallen dry woods on their head for their domestic use, but sometimes illegal cutting of trees is also done by the tribal and local villagers to sell the fuel wood in the markets of nearby towns. Villagers of peripheral zone also don't have firewood hence all the pressure is borne by the forest of the Core. Normally they use head loads and cycle loads to carry firewood to nearby areas in Jhalawar, Ramganj mandi, Kota, Guda, Bhunjar, Sripura, Rawatbhata, Bhainsroadgarh, etc. The main points where pressure of illicit felling is very high are Guda, Bhunjar, Sripura, Rawatbhata, Bhainsrodgarh, Naulav, Mashalpura, Darrah gaon, Padampura, Mandergarh, Kolipura, Borabas etc. The illicit felling not only causes damage to the forest but also disturbs the ecosystem.

4.3.1.4 Encroachment and other illegal activities:

Encroachment on forest land poses a serious threat to the tiger reserve. Every person residing in and around the tiger reserve has greed for illicit cultivation. This problem is further aggravated by involvement of some pressure groups encouraging the local people and advocating illicit cultivation as basic right of these people. The increase in population is also an important factor contributing to encroachments. These people largely depend upon illicit cutting of trees as a source of livelihood since the encroached land is mostly non-productive and unfit for agriculture. These people have large cattle population with them, which directly compete with wild animals and chances of spreading cattle borne diseases are high. Borabas, Sripura, Kolipura, Girdharpura Damodarpura, Laxmipura, Darrah gaon, Nolav, Mashalpura, areas are sensitive to encroachment.

4.3.1.5 Domestic livestock grazing:

There are many cows, buffaloes, sheep, goats and camels in and around the Core area who graze free of cost. As there is no system of stall feeding of cattle, almost all the cattle go for grazing inside the Core throughout the year. Maximum pressure is felt during the rainy season when the cattle are taken to upper slopes where the grazers resort to lopping and branch cutting. Incidentally this is also the time for regeneration of tree species and growth of grasses.

4.3.1.6 Forest Fire:

As summer approaches, the fallen leaves and dry grasses along with dry wood form an ideal material for outbreak of fire incidences. Such incidences in the tiger reserve are further aggravated by the false belief of tribal people that burning of hills (Magra)

will please their "God and Goddess". Normally local people resist helping the staff in combating fire incidents.

The tribals set the fire for ground clearance which sometimes becomes uncontrolled. Negligence by illicit graziers, collectors of honey and timber also result in fire incidences. Forest fire in the Core is of ground nature causing little harm to vegetation.

4.3.1.7 Insect attacks and Pathological problems:

During rains, breeding of butterflies and moth take a very heavy toll from the green foliage. *Ganoderma* and other fungi generally appear on dead and rotting wood material lying on the floor of the tiger reserve.

4.3.2 Basic infrastructure development and maintenance for effective protection

4.3.2.1 Roads:

The headquarters of Range Forest Officer Darrah and Kolipura are connected with NH12 (Jaipur to Jabalpur) and Kota – Rawatbhata road respectively. NH 12 bisects the Reserve. Jawahar Sagar Range Forest Officer's headquarters is connected with Kota Rawatbhata (Chittorgarh) and Kota Dabi (Bundi) metalled roads. One road from Borabas and other via Borkui connects Jawahar Sagar.

Darrah is also well connected with Delhi – Bombay broad gauge railway track. Bhainsrodgarh sanctuary head quarter is also connected with metalled road to Kota and Chittorgarh.

Besides metalled roads, some fair-weather roads also exist in the Core which need regular repairs (after every rainy session) to make them motorable, so that effective patrolling by vehicles can be ensured. These roads are the main patrolling paths for effective protection. The distance between Darrah gaon to Kolipura is 38 Km and Darrah gaon to Nolav Gagron is 36 Km.

4.3.2.2 Check Post and Watch Towers:

Two check posts at Darrah gaon and one at Kolipura have been created. Beside these barriers, few more check posts need to be constructed and operated regularly for effective protection of the Reserve. Additional staff is also required to maintain these barriers.

There is some old Malas (watch towers) like Teen Manzil and Borkui inside the Core for viewing fire and wildlife which are however, not maintained. There should be more

watch towers at different places as proposed earlier. In addition, proper maintenance of exiting watch tower is also required.

4.3.2.3 Vehicles:

At present, there are only few serviceable vehicles. List of existing vehicles in the MHTR is enclosed as **Annexure-8.** The following vehicles are required in the MHTR to provide mobility to the protection squads and facilitate the staff in the execution of their duties:

Table 4.1: Requirement of vehicles in MHTR

S.No.	Name of vehicle	Numbers Required
1.	Multi utility vehicle (Scorpio, Bolero, Canter, Camper, Modified four-wheeler)	22
2.	Motorcycles	43
3.	Tractor Trolley with tanker	6
4.	Motorboat	4

Table 4.2: Requirement of Vehicles in Bhainsrodgarh Wildlife Sanctuary

S. No	Name of Vehicle	Number	For Post
1	Thar Jeep/Bolero	1	ACF
2	Camper	1	RO Flying
3	Motorcycles	4	Naka Prabhari
4	Motorboat	2	For patrolling purpose

4.3.2.4.Protection Equipment:

Intensive patrolling with police/home guard/RAC assistance will help in curbing offences. In the border areas, help of Rajasthan Forest Department needs to be sought to check pilferage of forest produce in that state. The MHTR staff need to be provided with protection shields, jackets, helmets and clubs.

4.3.2.4 Wireless Network & Telecommunication:

In the fast-changing scenario, the forest offenders are well equipped with modern modes of transport. To apprehend such offenders and to have fast communication between different nakas and patrolling parties, wireless network must be developed. Fixed wireless and handsets will be installed at each Range, nakas, chowki and

vehicles. Handsets will be provided to each field staff. This will facilitate a better communication with the office at Kota and field staff. Main wireless control room is to be set up at Kota which can be operated round the clock and connections are to be established through fixed wireless sets at Sripura, Borabas, Khera, Jawahar Sagar, Teen Manzil, Kolipura Range Headquarter, Girdharpura, Chandbaori, Ranwtha, Damodarpura, Ghati, Laxmipura, Darrah Range HQ, Darrah gaon, Mashalpura, Naulav and Gagron. Mobile wireless sets need to be also provided in all the vehicles. Apart from these, handsets must be provided to the field staff for quick communication at short distances. At present, Bhainsrodgarh sanctuary is not connected with Wireless systems.

The details of existing installed fixed wireless sets, mobile wireless sets and handsets available in the Reserve are enclosed as **Annexure-9.**

From the protection point of view in the Core area, new barriers/ check posts and watch towers are proposed to be constructed. For these barriers also, communication system is essential for which more fixed wireless sets may be required. Some more handsets will be also required for better communication system in the area. So, the provision for purchase of new wireless sets and maintenance of existing sets needs to be kept in the plan.

Table 4.3: Requirement of Wireless Sets in Bhainsrodgarh Wildlife Sanctuary

S. No	Place	Fixed Sets	Handsets
1	Naka Saddle Dam	1	2
2	Naka Agra	1	2
3	Naka Ganeshpura Chowki Bheem Choraha	1	2
4	Naka Luhariya	1	2
5	Naka Luhariya, Chowki Bridge Side	1	2
	Total	**5**	**10**

4.4 Tourism and Interpretation:

4.4.1 Tourism:

The forests of the Core area are dense (density 0.6 to 0.7*)* and along the hill slopes, they provide an ideal attraction for tourism. The rivers Chambal, Ahu, Amjhar and Kali Sindh are either at the boundary or inside the Core. At some places, there are pockets which have abundant water of good depth round the year. Such spots are ideal

places for crocodile viewing. Several rare and endangered species are present here which can attract the tourists. An old forest rest house of British time, built on foothills is situated at Darrah Gaon. There are two important places in core area of MHTR known for tourism purposes. These two places opened for tourism before notifying the Tiger Reserve. The visiting tourist position of last 5 years of Mukandra Hills Tiger Reserve is enclosed as **Annexure-10**.

Garadia Mahadev Temple:

Garadia Mahadev Temple is a noted shrine of Kota, located near the Chambal River. It is located near the NH-76 that leads to Dabi and Chittorgarh. It provides one of the most mesmerising views of Chambal River, gorge and the plains. The shrine can be reached by descending a few steps where you can pay your respects to Lord Shiva. The place is remote and isolated from regular tourist hotspots but is worth the journey to make. Most people recount being stunned by the sheer beauty and memorable view. Nature lovers can sit here for hours, absorbing its tranquillity and pristine beauty. Budding poets, writers and artists can count on being inspired by the still, blue waters and surrounding wilderness.

Padajhar Mahadev Temple, Water Fall and Ancient Caves:

Padajhar Mahadeo temple is situated in Bhainsrodgarh Sanctuary. It is only 10 kilometres away from Rawatbhata city which is well connected with mettled road to Chittorgarh and Kota District Head Quarters. It gives a scenic and mesmerising look with flowing water from a height of 35 metres. There are ancient caves namely Parvati caves and Shiv temple which has a tunnel of around 20 meters in length. On Shiv Ratri, a fair is celebrated here in which villagers and tourists take part.

Kota Dam Boating:

It is situated on the banks of river Chambal. This idyllic setting provides tourists with many opportunities to engage, in an array of adventurous activities. Sail on a boat is one of the many adventures that you can engross yourself on the river. This is around 25 km boat safari takes you within the Mukandra Hills Tiger Reserve. The safari will provide you with glimpses of turtles, crocodiles, otters, sloth bear, leopard, vultures, owls and also, many species of unique flora. This is soon turning into an exciting, adventurous destination, owing to its unpolluted habitat, amazing landscapes, abundant wildlife, magnificent ancient ruins and medieval temples that engulf the river. The tourism in the core area will be based on the broad guidelines issued by

Government of India vide letter dated 15.10.2012, Government of Rajasthan ecotourism policy 2010 as well as the NTCA advisory on tourism in and around Tiger reserves.

The following guidelines shall be enforced:

- Tourism in the core area will remain at the current level if it is within 20% of the total geographical area of the tiger reserve.
- In a phased manner the tourism in core area should be shifted on to the periphery, so that there is enhanced protection in the buffer zone by increasing departmental presence.
- Tiger reserve entry and exit timings should be regulated strictly so that there are no fatal accidents during odd hours, at the same time there is less disturbance to wildlife.
- Tourism to be promoted as an activity to promote awareness.

Hadoti is having rich heritage and biodiversity, yet it is almost neglected on the tourism map except for Bundi. The river Chambal, which is lifeline of this area with its stiff cliffs, variety of flora and fauna which includes rare and endangered species like Smooth Coated Otter and Crocodile, Turtles and Tortoises, not only provides value but it also provides shelter and breeding places for the above species along with most endangered species of Vultures, Storks, Owls etc. It is a great advantage to see all these while boating in this river. Similarly, the Dhok, Kair Forest and big Cats of Hadoti have been attracting tourists since centuries till independence. MHTR had been the forest recluse of the royalties and was well managed by erstwhile rulers.

Classification of Tourists:

- Visitors with tour groups
- Unescorted day-use visitors
- Amateur photographers
- Religious groups/Cultural travellers from local area and outside
- School children/coaching institute students and families
- Media

4.4.2 Interpretation:

The broad array of principles set forth by Freeman Tilden laid the groundwork for the eclectic nature of Interpretation. His directives (listed below) offer fuel to the range of interpretative leaders promoting outcomes from simple awareness to visitor action regarding environmental issues:

i) Interpretation should relate to the visitor
ii) Interpretation should include information
iii) Interpretation is an art
iv) Interpretation's chief aim is to provoke
v) Interpretation should be holistic
vi) Interpretation for children should be different than for adults

4.4.2.1 Present status of Interpretation in the Tiger Reserve:

An interpretation centre was constructed near Garadiya Mahadev where maximum tourist footfall is received in 2020. A leaflet cum marker, to educate the visitors about the biodiversity of Mukandra with the basic concept of promoting 'biodiversity centric tourism' rather than 'tiger centric tourism', is being circulated to the visitors. Dos and Don'ts and a visitor experience sharing form is also being circulated for obtaining feedback of the people.

4.5 Research and Monitoring:

Monitoring of wild animal population is done by periodic population estimation, but no scientific research activities have been carried out. No database has been created and not much information is available about various parameters of habitat, habitat changes, movement of the wild animals, and ethological aspect of the wild animals of the area.

A monitoring protocol is required to be activated and in-depth analysis of evidence collected [direct & indirect] is to be undertaken by the Reserve Management as under:

- A monitoring format will be designed and followed for recording of important data related to prey, predator and habitat
- The data will be received by the Research Section and in-depth analysis will be reported to Reserve management

- Data of number of pugmarks evidences every fortnight will be compiled for 6 – 12 months and based on the trends, analysis will be done to detect ***early warning signals***, if any, and appropriate measures will be undertaken
- The data received at the divisional headquarter will be compared as per seasons. Summer/ winter of previous year and based on population estimation of previous year vis a vis current year population estimation
- Field checking will be done and comments recorded in the form of directions in the tracking register
- During the monsoon season, more emphasis will be laid on to collect evidence like scats, kills, roar calls, scratches and scrapes, etc as pugmark evidence will be reduced in number. List of past/current research activities in Tiger Reserve is enclosed as **Annexure-11.**

4.5.1 Beat Habitat Occupancy Maps:

- Beat maps to be distributed to beat guards.
- Photocopies of beat maps will be provided in a booklet form to each beat guard termed as Beat Habitat Occupancy Map [BHOM] for predators.
- Beat guard will mark evidence of pugmarks, kills and scats on the tracks, on the photocopied beat maps.
- GPS location of the pugmark will be written with the help of the GPS.
- Range officers and Foresters will verify evidence in the field and mention it on the BHOM.
- Foresters shall compile the maps every fortnightly and send the information to research section through Range Officer.

4.6 Relocation of Villages:

Most of the villages falling inside the boundary of the MHTR are revenue villages. The presence of large number of villages has created a honey combed situation in the Reserve. Cattle and human population of these villages exert tremendous biotic pressure on the adjoining forest area. Mukandra Hills Tiger Reserve is a proper site for the rehabilitation of the tiger in the wild provided villages inside the Reserve are relocated and grazing is controlled. The list of villages to get re-located on priority basis in core is enclosed as **Annexure-12.**

4.7 Administration and Organization:

Currently, the staff position in the Reserve is as under:

Table-4.4 MHTR Personnel

S. No.	Name of the Post	Sanctioned	Filled	Vacant
Office of the CCF Wildlife Kota & Field Director MHTR				
1	CCF Wildlife Kota & Field Director (ex officio) MHTR	1	1	0
2	DCF & TA to CCF Wildlife Kota & Field Director MHTR	1	1	0
3	Assistant Conservator of Forest 1. Administration, 2. Development 3. Flying Squad	3	0	3
4	Range Forest Officer – II Grade	2	0	2
5	Assistant Account Officer	1	1	0
6	Junior Accountant	1	0	1
7	Office Superintendent	1	0	1
8	Office Assistant	2	1	1
9	PA	1	1	0
10	Clerk Grade I	2	2	0
11	Clerk Grade – II	2	1	1
12	Surveyor	1	0	1
13	Driver	1	1	0
14	IV class	3	3	0
15	Chowkidar	1	1	0
	Total	**23**	**13**	**10**

Table 4.5: Administrative setup of Wildlife Sanctuary Bhainsrodgarh

Office of Deputy Conservator of Forest, MNP Kota				
1	Deputy Conservator of Forests Mukandra National Park	1	1	0

2	Assistant Conservator of Forests	4	3	1
3	Range Officer Grade I	2	0	2
4	Range Officer Grade II	6	6	0
5	Forester	17	15	2
6	Assistant Forester	18	18	0
7	Forest Guard	111	74	37
8	Assistant Accounts Officer	1	0	1
9	Office Assistant	1	0	1
10	Clerk grade I	2	1	1
11	Clerk Grade II	4	3	1
12	Driver	5	3	2
13	Surveyor	1	1	0
14	Veterinary Doctor	1	1	0
15	Assistant Veterinary Doctor	1	0	1
16	Class IV	2	2	0
17	STPF*	108	0	108
	Total	285	128	157

S. No	**Name of Post**	**H. Q**	**Post sanctioned**
1	Deputy Conservator of forests, Wildlife Kota	KOTA	1
2	Assistant Conservator of forests, Wildlife Sanctuary Bhainsrodgarh	Saddle Dam	
3	Ranger Grade-I, Wildlife Sanctuary Bhainsrodgarh	Saddle Dam	1
4	Forester	Bheem Choraha	1
		Agra	1
		Luhariya	1
		Saddle Dam	1
5	Assistant Forester & Forest Guard	All 25 Beats	25

Special Tiger Protection Force (STPF) –Memorandum of Understanding has been signed with National Tiger Conservation Authority. However, creation of posts and filling up of vacancies is pending. Meanwhile, as per the directions of Hon'ble High Court Rajasthan, 108 Border Home Guards have been deployed in lieu of STPF.

Table-4.6: Administration MHTR

S.No.	Range	Naka	Chowki
1	Rawatha	Rawatha	Laxmipura
		Madergarh	Mandergarh
		Damodarpura	Ghatoli
		Chandbawdi	
2	Darra	Sawanbhado	Simliya
		Darra Station	Kothla
		Darragaon	Gadde ka mala
			Manoharpura
			Kukda
			Ghatimata
		Danta	
3	Gagron	Nolav	Laxmipura
		Rajpura	Kanpura
		Mashalpura	Jheer
4	Borabas	Borabas	Nahar singh mataji
		Rathkankra	
		Bandha	
		Nayagaon	
5	Jawahar sagar	Jawahar sagar	Garadiya
		Sreepura	
		Kheda	Ambarani
6	Kolipura	Kolipura	Selzar
			Teen manzil
		Kanyatalab	
		Girdharpura	

Table- 4.7: Range Infrastructure of Wildlife Sanctuary Bhainsrodgarh

Sl. no	Range	Wildlife Sanctuary Bhainsrodgarh
1	Naka	1. Naka Saddle Dam
		2. Naka Luhariya
		3. Naka Agra
		4. Naka Ganeshpura
2	Chowki	1. Bridge Side Chowki
		2. Luhariya Chowki
		3. Agra Chowki
		4. Kotla Balaji Chowki
		5. Ganesghpura Chowki
		6. Bheem choraha Chowki
		7. Nalli Chowki
		8. Saddle Dam Chowki
3	Barriers	1. Bridge Side Barrier
		2. Saddle Dam Barrier

The major functions of the Administration and Organization are given below:

- Protection of the forest and wildlife from any kind of damage
- Land management including demarcations and maintenance of boundaries
- Forest development and management
- Habitat improvement, rehabilitation of degraded areas
- Maintenance of Records
- Inter departmental co-ordination
- Implementation of various public welfare schemes
- Conflict management
- Nature education
- Animal resource activities
- Census operation

CHAPTER 5

LAND USE PATTERNS & CONSERVATION-MANAGEMENT ISSUES

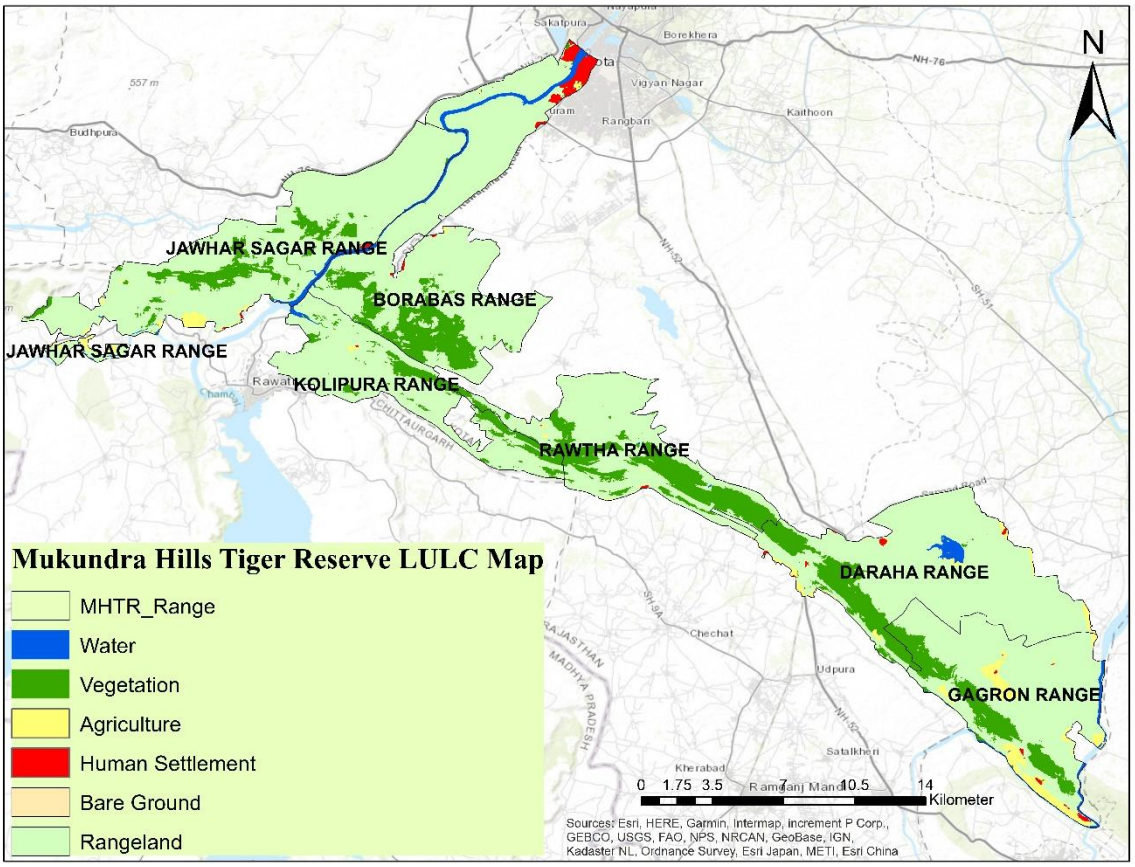
5.1 Land use Classification

The area statement of the revenue villages falling within Darrah sanctuary and within 5 kms from the boundary of Darrah sanctuary (outside sanctuary) and area statement of the revenue villages falling within Jawahar Sagar sanctuary is enclosed as **Annexure-2.**

As depicted in the charts of the revenue villages located within and on the periphery (outside) of the core rights and concessions in the form of grazing, dry fuel wood small timber for house hold and agricultural implements, collection of minor forest produce including Tendu leaves and right of way, burial, worshiping etc. were granted by the forest settlement officer at the time of formation of forest blocks. As per the Supreme Court order complete ban on these activities has been imposed.

The area is rain fed with meager irrigation facilities. Villagers practice primitive agricultural methods. Erratic rains and draughts have shaken their economy. They have smallholding and that too on undulating terrains which are mostly unfit for agricultural practices. The main kharif crops are maize, urad, moong, etc. and where irrigation is possible wheat, gram, mustard etc. are grown as Rabi crops.

The zone of influence extends over the entire core of MHTR. There are revenue areas within the boundary of core occupied by villages. They largely influence the core through their agriculture and associated varied land use practices.



Map 5.1: LULC Classification of Mukundra Hills Tiger Reserve

5.2 Socio-economic Profile of Villages

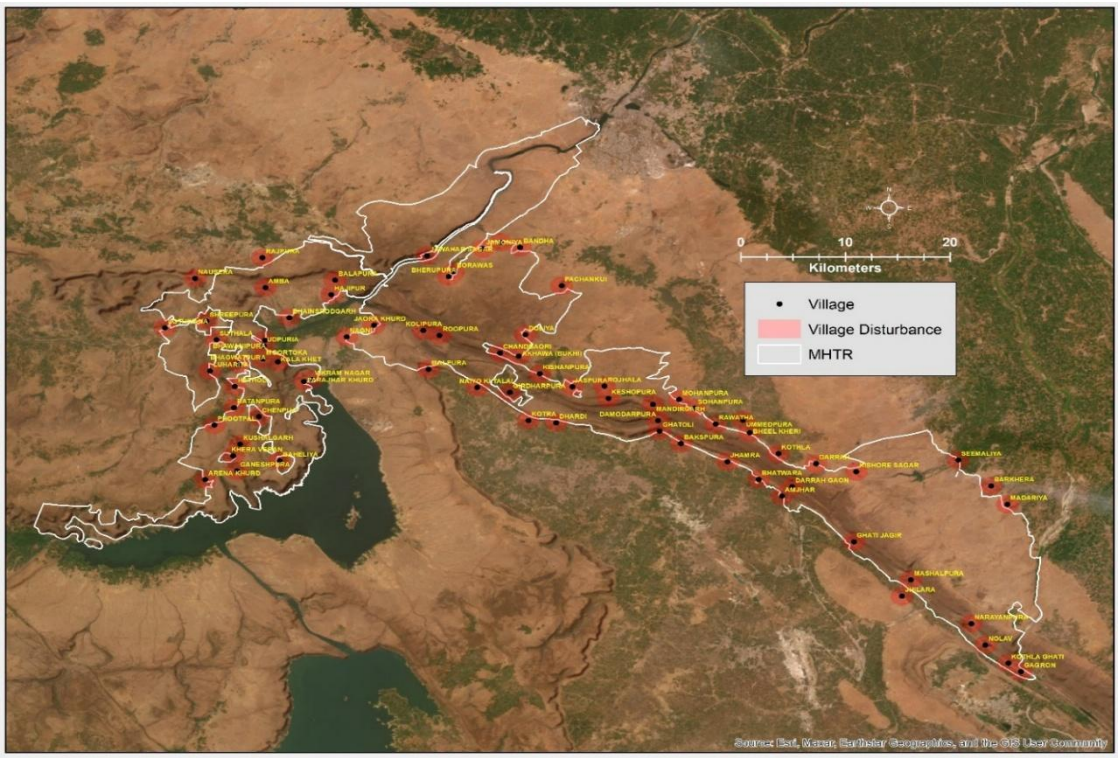
There are many Villages inside and outside the PA, with various Ethnic identities, traditions, customs, having a distinct relationship with the forest. List of villages in the core of MHTR and Bhainsrodgarh Sanctuary are enclosed in **Annexure-13**.

The major land use in these villages is agriculture and grazing. Almost whole of the total area of these villages is rainfed or is irrigated with borewells, wells being the largest sources. As regards the farming community, the largest share is of medium farmers followed by small farmers with 6% of the households being landless. Large farmers constitute of the Rajput community, and another are in the marginal farmer or landless labourers are Gujjar and Bhil category. The major crops are –

- Kharif Season – jawar, bajra followed by some legume crops, most of the people dependent on livestock don't rely on kharif agriculture.
- Rabi season – Wheat, Gram are the two major Rabi crops where two crops are taken.

Relocation of villages is difficult due to constraints like getting voluntary consent, resource mobilization etc. and despite the reserve management's efforts, the process has been time taking. So far MHTR has been successful in voluntary relocation of 1 village completely and 3 in process where next in line. Mashalpura's relocation is currently nearing its end with 90% of families relocated. Until complete relocation is achieved, there is need for ensuring that humans and wildlife can co-exist. Although, co-existence in the true meaning of the word is extremely difficult, the management strives for minimizing the potential adverse impact that either one has on the other.

The economy is driven by seasonal rain fed agriculture. Where some irrigation is available, such as within the proximity of the reservoir, wheat is raised in small plots, as well as some vegetables. Undecomposed cow dung is used as manure. The other major economic activities include rearing and grazing cattle. These really are non milch cattle and provide more dung than milk but the number of cattle being high, the economic benefit from selling milk to nearest towns and villages reaps most benefits to the locals. Unlike the practices in south India where cow dung sale is a significant business, here whatever dung is opportunistically collected is used in the field as a manure. Grazing is free, the animals need very little looking after, and therefore there is no control on the growth of livestock.



Map 5.2: Spatial Distribution and Disturbance Impact of Villages

Livelihood profile:

Approximately 43% of the population of the area is working. Agriculture is the mainstay of the livelihood activities that the people are involved in. Along with this, agriculture related wage labour is another significant activity. The agriculture and allied labour activities are supported by forest-based activities the primary being Non-Timber Forest Produce (NTFP) collection and trade. Almost 90% of the households are involved in cattle rearing and more than half also raise poultry as a livelihood activity. A small share is of other wage employment.

Table 5.1: Livelihood profile of villages

S. No.	***Activity***	***Percentage of households***
Agriculture and allied		
1.	**Farming**	**85**
2.	**Agricultural Labour (in village)**	**55**
3.	**Agricultural Labour (migration)**	**30**
4.	**Trade**	**1**
Forest and allied		
5.	**Forest Labour**	**65**
6.	**NTFP Collection**	**90**
7.	**Forest produce trade**	**2**
Animal Husbandry and allied		
8.	**Milch cattle**	**90**
9.	**Poultry**	**55**
10.	**Goat rearing**	**10**
11.	**Fishing**	**1**
Artisan		**<1**
Other Labour		
12.	**Mining**	**1**
13.	**Civil constructions**	**25**
Services		
14.	**Government services**	**2**

15.	**Petty shop owners/trading**	**<1**
16.	**Others**	**<1**

Tourism is yet to pick up in MHTR i.e. the locals are yet to reap the benefits of tourism. As tourism will expand in core and buffer areas such opportunities will increase giving alternative sources of livelihood to locals.

The various livelihood activities are discussed in detail as follows –

1. Agriculture forms the mainstay of the livelihood activities in the landscape. The share of area under single cropping to that under double cropping is almost equal because of presence of adequate irrigation facilities as discussed earlier. Although, almost half of the agricultural area of the landscape is irrigated by various means, this does not reflect the true picture of agriculture in the area. For a very large proportion of the rain fed area, agriculture is subsistence marked by low agricultural productivity. The rocky terrain with high degree of slopes, soil erosion and consequent low soil fertility, and no investment for soil and water conservation are the main contributing factors.
2. Collection and trade of NTFPs is a non-significant activity but the livestock grazing is at par with a scale almost equal to that of agriculture. This also is true for the share of income where agriculture is small holding and rain fed. Fuelwood head loading and collection, and trade of medicinal plants are also important livelihood activities.
3. Wage employment plays a very important livelihood activity and both agriculture and forest-based wage employment forms the large proportion of the portfolio.
4. Animal Husbandry as an income generation activity is not very significant even though there is a large cattle population because the milk productivity is negligible.

5.3 Resource Dependence of Villages

Large numbers of villages are present in and around the tiger reserve. Local villages depend upon the forest for firewood, grazing, timber for house making and repair, wood for agriculture implements, fencing martial, NTFP like Jamun, Tendu, Ber, Bel, Kainth, Ratanjot, Sitafal, and Mahua fruits (Dolma), fodder, Medicinal plants etc. The major practices which have a negative effect on the resources are grazing, lopping and firewood collection.

Tribals still practice the old agricultural methods. Erratic rains and frequent draughts have shaken their economy. They have small holding and that too undulating which is mostly unfit for good agricultural practices. The main crops are maize, urad, moong etc. and where irrigation is possible, wheat, gram, mustard etc. are also grown as Rabi crop. No NTFPs are auctioned in the core.

Since livelihood of a large population depends on forest resources hence eco development around this P.A will be of a great help in up lifting the economic status of the neighbouring population. The soil and moisture conservation works, rehabilitation of degraded areas, bamboo culture, Tendu culture and eco –development works on the adjacent forest / Panchayat / Revenue / Fallow lands will reduce the dependency of the local tribal population on the forest resources. Soil and moisture conservation will help in augmenting the ground water recharge in the tiger reserve area, which can act as a natural reservoir of water to mitigate the water scarcity of the area.

Eco –development works will reduce the water scarcity of the area and will also help in reduction of the dependency of local public on fuel wood. Pasture development activities can divert inflow of cattle from the core. The resource development will have a direct bearing on the economy of people. It will help in maintaining the fragile ecosystem & ecological equilibrium.

5.4 Human-Wildlife Conflicts

Meagre number of Human Wildlife conflicts are reported because number of wild animal straying outside the core is very less. However once the number of wild animal population increases in the future the incidence of human animal conflict would increase. Based on NTCA's SOP the human wildlife conflict is to be managed. A precaution needs to be taken so that natural balance in prey predator exists so that a check on one species of wild animal increasing abruptly could be curtailed. The detailed list for last 5 years is attached in **Annexure 14.**

5.5 Assessments of Inputs of Line Agencies/ Other Departments

The major department whose positive contribution that helps the department is the revenue department. The entire village relocation programme is solely dependent on revenue department and to be specific the appreciation of district collector on these issues luckily Panna Tiger Reserve is benefitted by the positive attitude of Collectors and Revenue Department and could relocate 14 villages till now. Tourism sector

represented by private tour operators is another important stake holders that adds to the quality of vegetation of the tourists around.

5.5.1 Co-ordination with Line Agencies / Departments

Coordination with many different line agencies and departments is necessary to ensure effective protection of the tiger reserve area. Police, Revenue, Rural development, Agriculture, health, Veterinary, Horticulture, Jila Panchayat, Women and child development, PHED, Education, Tribal welfare, irrigation department, railway authorities, Judiciary; all play a role in supporting the reserve management in various activities like protection, eco-development, conflict resolution etc. Mostly, park authorities have to co-ordinate with two or more agencies and departments. Some of the departments with which it is most crucial to coordinate are given as under-

5.5.1.1 Revenue Department:

For rehabilitation of villages, co-ordination with Revenue Department is required. The Collector being at the helm of all the affairs at district level his help is required for rehabilitation Different Departments like land records P.W.D., Irrigation Department, Z.P. Health, Education, Tribal Development etc. is required during rehabilitation.

5.5.1.2 Jila Panchayat

Co-ordination with Jila Panchayat is very important for eco-development. Many village development activities are taken up by J.P. like provision of biogas, vaccination and provision improved human health care. Employment generation activities like sericulture, horticulture, beekeeping, fisheries etc. are also implemented by J.P. Other activities like construction to facilitate stall-feeding, water-harvesting, soil and moisture conservation also require the co-ordination of Jila Panchayat.

5.5.1.3 Police Department

For protection of the forest and wildlife, coordination with Police Department is must.

There is perfect co-ordination with the Police Department in District.

5.5.1.4 Animal Husbandry Department: -

The co-ordination with Animal Husbandry department is required for vaccination of the cattle of inside and fringe villages. In case of death of animals in offence cases, unknown causes, sickness of animals etc. the postmortem should be done to ascertain

the cause of death. In such cases, the help of local veterinary officer is required to be taken.

5.5.1.5 Forest Department: -

Co-ordination with Forest Department of MP State is required for patrolling in the fringe areas like Rana Pratap Sagar. MHTR has adjoining areas of three districts i.e. Kota, Bundi, Jhalawar and Chittorgarh therefore, coordination with divisions of these districts becomes crucial for effective patrolling and protection. Coordination with forest Department as MP States is very much required for landscape approach and patrolling in fringe areas, sharing information knowledge, experiences and best practices in order to strengthen inter-state co-ordination. A general understanding is required to work towards activities intend to curb criminal activities such as poaching of animals and smuggling of teak wood. Joint efforts will be undertaken for common reasons that affected the bordering areas of the forest.

Better co-ordination will not only ease pressure on limited resources of reserve management but will earn general goodwill among various sectors. The above points are only suggestive and improvisation according to the needs of the reserve is advised.

In practice, good interpersonal relationships with different officials of line departments/agencies at various levels is required to achieve convergence, officers of the reserve should interact with their counterparts in other departments regularly.

5.5.1.6 Co-ordination with Fisheries Department:

Co-ordination with fisheries department is not much needed in MHTR as Chambal River flows through the core area of the park and fishing activities are completely prohibited in core area. Illegal fishing in the Chambal River will always be a problem for the park management. Thus, the higher ups of the park management need to have on watch all the time on this issue.

Tribal population of the area depends upon agriculture, forests, cattle rearing and labour-oriented works. Intricate relationship of tribal with forests is remarkable. They fully depend on forests for housing, fencing material, fodder, wild fruits and agricultural implements.

Agriculture, animal husbandry, collection of NTFP, Labour work etc. are the main occupation. Irrigation facilities are properly not developed. Rabi crops are grown on a small scale along natural water courses. Traditional irrigation system called ‘Haran’ is

practiced by plugging these water courses and by constructing a water channel at contour. Water pumps are being also used for irrigation.

Kota stone in Darrah comes from Ramganjmandi area. But no industry is present in Jhalarapatan and Ladpura Teshil. Unemployment, poverty, illiteracy etc. are main problems. Most of the cattle are either dry or produce very less quantity of milk. 'Desi' poultry is reared by each family. Other vocations of people include labour at various sites of government agencies.

There are some NGOS working for environment like PFA, WWF, NHS etc. Various wings of forest Department itself like Territorial, Wildlife and project wings are functioning here to uplift the socioeconomic profile of the villages.

Employment to local people is generated in the field of agriculture, animal husbandry, collection of non –wood forest produces and labour-oriented works in various, government and private sector. Economic condition of local people is pitiable. Most of the families have small land holdings. Irrigation facilities are meager. Cattle quality is poor and less productive.

Being an agrarian economy, the living standard of the local community can be uplifted by improving agriculture. Since irrigation facilities are not adequate the production of Rabi crop is very poor. Construction of reservoirs may increase irrigation there by raising local economy. Only big dams have been constructed in the vicinity of the area and irrigation facility developed from them has helped the farmers in few villages to take more agricultural production. These dams have improved water table in the surrounding villages. Development of roads and communication network has improved the marketing and access to essential facility like installation of hand pumps to reduce the drinking water problems in the area. Network of Rajiv Pathashalas and other schools have helped in increasing literacy in the area. "SwasthyaPariyojana" has reduced the 'Naru' menace in the area. These developmental activities are helping overall development of the area but the adverse impacts of such activities on the habitat need to be mitigated.

PART – B

PROPOSED MANAGEMENT

CHAPTER- 6

VISIONS, GOALS, OBJECTIVES and PROBLEMS

6.1 Vision:

The MHTR Core is a treasure house of many rare and endangered floral and faunal species. Tiger, Leopard, Sloth Bear, Chinkara etc., are notable among wild animals. A good number of rare plant species like *Ensete superbum*, epiphytic and terrestrial orchids like *Vanda tessilata, Aerides, Nervilia araguna*, tuberous plants like *Puraria tuberilata, Corallocarpus epigeous, Arisema torusum, Curcuma* etc are also found in the Core area.

The area in the past has been managed for short term needs of revenue realization and has been subjected to excessive human interference and biotic pressure. This has resulted in loss of biodiversity, degradation of the resources as regards to the soil cover, soil health, density and number of species, arrest of biogeochemical cycle and productivity of the resources. This has also caused imbalance of hydrological cycle at many sites, successional degeneration, and reduced carrying capacity of the resources resulting in hardship for the ecological components including the floral, faunal and tribal populations. The enormous biotic pressure and human intervention has resulted in the degradation of the productivity potential of the resource. As a result, the resource needs to be managed for enhancing it carrying capacity and reaching a balanced ecosystem to make the habitat increasingly suitable for the flagship species of the area e.g., tiger, leopard, sloth bear, and other faunal associates. Accordingly, the vision is,

"Conservation of Biodiversity in Mukandra Hills Tiger Reserve and adjoining landscape with focus on the ecological & livelihood security and maintaining a viable population of Tiger."

6.2 Management Goals:

a) To develop Mukandra Hills Tiger Reserve for hosting a viable population of tigers, co-predators and prey animals without distorting the natural prey-predator ecological cycle in the habitat.

b) To conserve the ecological integrity and interspersion of various habitats and their associated fauna to maintain the genetic diversity in perpetuity.

c) To reduce the man- animal conflict.

6.3 Management Objectives:

a) Elimination of biotic and abiotic disturbances from the Core area.

b) Habitat development and amelioration to improve the food, cover and water availability for the wildlife.

c) Infrastructure development for effective protection and monitoring.

d) Reduction of dependence of local people on the forests through eco-development.

d) Creation of sufficient awareness to conserve the Nature, Natural Resources and Natural heritage on sustainable basis.

6.4 Problems in Achieving Objectives:

Mukandra Hills Tiger Reserve is one of the most recent tiger reserves facing the problems of modern times and pressures. The biggest of these is the people residing inside the core area of the reserve. Their high dependency on forest resources for their day-to-day needs is putting high pressure on the forest and is bringing changes in the ecology of the area. Invasion of weeds and grazing of cattle in the reserve is putting more pressure on the herbivore population of the reserve. Understaffing and low budget has added to the woes in protecting the park from various pressures. The problems in the Core area in achieving the above-mentioned objectives are:

- Habitat loss: Due to high rate of degradation on the periphery by surrounding villages there is a continuous loss of habitat for wild animals.
- Weed invasion: The Core area due to frequent movement of domestic cattle and grazing has become weed infested. Approximately 40% of the tiger reserve is infested with weeds like *Lantana camara*, *Cassia tora* and *Iprits spp.*
- Forest Fires: Frequent fires occur in parts of the core zone, especially during sub-normal rainfall years (February–June)
- Water scarcity in the pinch period: Water is already scarce in the tiger reserve and during summers it is restricted to very few places with little pools making wild animals easy targets of poachers.

- Exposed core area: The core area is not covered by buffer on all the sides. At many places it is directly exposed to agricultural fields. This increases the threat of wild animals being poisoned for destruction of crop.
- Villages inside the Core: The people residing inside the core area of the tiger reserve have a high dependency on forest resources for their daily needs. This is putting high pressure on limited resources and the area for wildlife to thrive is shrinking because of them. To make this space as inviolate for wildlife and for recovery of tigers, it is paramount that the villages located inside the core area should be removed on priority basis.
- High rate of degradation at periphery: The tiger reserve is surrounded on all the sides by villages which are dependent on the reserve for their day to day needs and they meet these requirements from the nearest possible distance from the reserve. Hence degradation is more on the periphery of the Reserve.
- Encroachment threat is always prevalent in the Mukandra hills tiger reserve by the villages situated inside and on the periphery of the area.
- High dependency of local people on forest resources: The people residing inside the Reserve and on the periphery are highly dependent on the forests for their day-to-day needs.
- Collection of non – timber forest products: Local population residing in the villages go to the tiger reserve to collect non timber forest produce creating a lot of disturbance to wildlife and habitat by their movement and activities.
- Poaching: Although poaching is not much heard of in the tiger reserve, but the threat always remains there especially from nearby areas of Suket and Ramganj Mandi.
- Under staffing: The tiger reserve is under severe shortage of staff to man the area. Strengthening of staff is must for proper protection of the reserve.
- Lack of scientific information and database: Mukandra Hills Tiger Reserve has not been a centre of attraction for research
- Lack of knowledge and skills among staff for protected area management: The staff deployed in MHTR is grossly inadequately trained to handle wildlife issues. Continuous trainings are required to sensitize them to the nature of work.

- Staff amenities: The available staff amenities are short of expectations. Staff needs to be given proper amenities to motivate them to do good work.

6.5 Strengths – Weakness – Opportunities- Threats (SWOT Analysis):

Mukandra Hills Tiger Reserve is one of the most disturbed protected areas owing to several factors. The PA is open from all sides and entry to the sensitive areas is easy option if the forests are not tracked or monitored effectively and systematically.

STRENGTHS	• Mukandra is link between Gandhi Sagar Sanctuary Madhya Pradesh and Ranthambhore Tiger Reserve in Chambal River tiger landscape. • Beautiful stretch of Chambal River and its deep gorges gives it a unique landscape. • The Mukandra Tiger Reserve, nestled in the Vindhayan mountain ranges – is a repository of serene dense forests, wide valleys and sprawling plateaus. Mukandra is natural grandeur housing over 400 plant species, 300+ bird species in an area of 1135.78 sq. kms. • The Tiger Reserve has a unique assemblage of high biodiversity. • The habitat in 200 sq. kms is compact and with good vegetation of Dhok.
WEAKNESSES	• Linear nature of the Tiger reserve with more perimeter to area ratio leading to longer protection perimeter. • Delhi Mumbai Railway track and National Highway 12 passing through the core area act as a barrier to free movement of wildlife. • Mining activities next to core area in Bundi district for sandstone mining and Kota stone mining in Kota. • Biotic disturbance in the PA owing to presence of huge cattle population and many villages in and around MHTR boundary. • Heavy biomass extraction in peripheral areas to the impact zone of villages and zone of influence of villages situated inside the Tiger Reserve. • Open from all sides resulting in illegal entry from all sides. • The temples in the Mukandra are visited by devotees/visitors throughout the year creating lot of polythene and other sorts of pollution. • Road from Kota to Jhalawar (national highways), Kota-Rawatbhata Road and Mumbai Delhi railway line run through the park. A large

	no of vehicles and trains run creating lot of disturbance to wild animals. • No proper infrastructure (vehicles, Range Office staff, telephone facility) to the foresters and Range Officers. • Dhaba's on revenue/non forest lands within the Tiger Reserve creating nexus with the local people for illicit timber for fuel wood. • Poor water retentivity in the Tiger Reserve owing to a smaller number of large water bodies. • Interpretation facility not able to enrich visitor's experience. • Growth of Kota, Rawatbhata and Bhainsrodgarh towns and industrial areas near core area. • Inadequate strength of the foresters and forest guards and limited staff capabilities in a tough terrain.
OPPORTUNITIES	• Corridor connectivity development by inclusion in the Tiger Reserve to serve as potential habitat to host spill over population from the Ranthambore Tiger Reserve. • The tiger reserve has been notified covering area in four districts i. e. Kota Bundi, Jhalawar and Chittorgarh with support of local population. • Readily available research support from Kota University
THREATS	• Owing to many entry points, especially from the peripheral areas, illegal entry of suspected person and poachers is a continuous threat. • Due to high biomass extraction, habitat degradation is a big threat. • Annual sheep migration and local cattle camps.

CHAPTER - 7

MANAGEMENT STRATEGIES

7.1 Delineation of Critical Tiger Habitat and Inviolate Areas:

Bio-geographic approach for conservation of wildlife and biodiversity (significant representation of all ecosystems and bio-geographic regions, biomes etc in the protected area network) is essential. The main cause of decline of the tiger and other endangered fauna in human dominated landscape is competition and conflict with the growing human population, the demand of modern market driven lifestyles as well as the dominance of livestock in the traditional agrarian society of India. The land use pattern is incompatible between man and wildlife, as high densities of both adversely affect each other.

Man is a product of the systematic evolution in nature. Prior to the advent of the agrarian - pastoral and modern industrial societies, he was very much the part of the ecosystem, and his survival was the success of that ecosystem. Man has now modified almost all the eco-systems, and the earth surface is now being used by human beings in a destructive and unsustainable manner. It is our prime duty to protect our life supporting system i.e. entire earth systems. The creation of the protected area is part of our strategy to revive our lost paradise. For the survival of human race, it is becoming essential to increase the area under the protected area network.

The conservation of the flagship species i.e. the top predator of an eco-system ultimately conserves the entire eco-system and biodiversity. Tiger is a territorial animal, which advertises its presence in an area and maintains a territory. It is a well-known fact that partial overlaps of resident male territories in an area do occur. However, the degree of overlap increases lethal internecine combats. Several female territories do occur in an overlapping manner within the territory of a male tiger. The tiger land tenure dynamics ensures presence of prime adults in a habitat, which act as source populations, being periodically replaced during old age by young adults from nearby forest areas.

The on-going study (Tiger, its co-predators, prey base and their habitat by NTCA and WII) and analysis of available research data on tiger ecology indicate that the minimum population of tigresses in breeding age, which are needed to maintain a viable population of 80-100 tigers (in and around core areas) require an inviolate space

of 800 -1200 sq. km (the detail is given in following "Simulation Results for Viable Tiger Population"). Tiger being an “umbrella species”, this will also ensure viable populations of other wild animals (co-predators, prey) and forest, thereby ensuring the ecological viability of the entire area / habitat. Therefore, buffer areas with forest connectivity are imperative for tiger dynamics, since such areas foster sub-adults, young adults, transients and old members of the population. The young adults in an on-going manner replace the resident ageing males and females from the source population area.

The buffer area absorbs the “shock” of poaching pressure and other anthropogenic pressures on population of tiger and other wild animals. In case of severe habitat depletion in buffer areas, the source population would get targeted and eventually decimate.

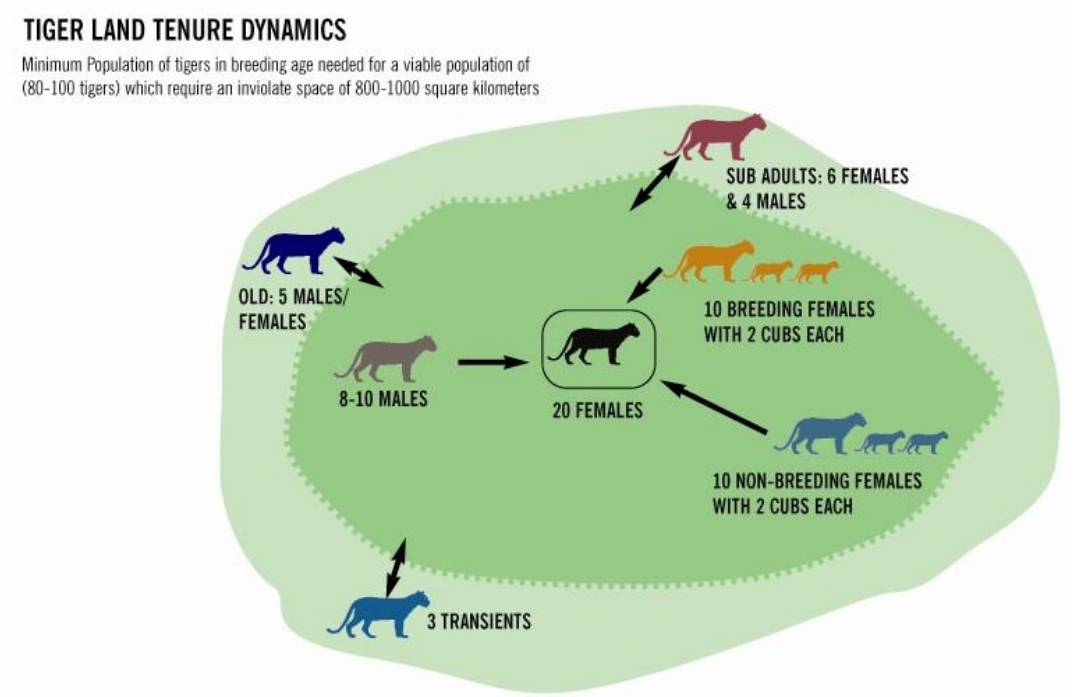


Figure 7.1: Simulation Results for Viable Tiger Population (given by WII)

To decide the size of critical areas needed for achieving the objectives of tiger conservation published data on tiger ecology, demography, and those available to the NTCA were used. Data from the all India tiger status monitoring exercise jointly taken up by NTCA along with State Forest Departments and the Wild Life Institute of India wherein all potential tiger bearing forests were extensively surveyed with a systematic sampling design between November 2006 and March 2006 was used to map tiger

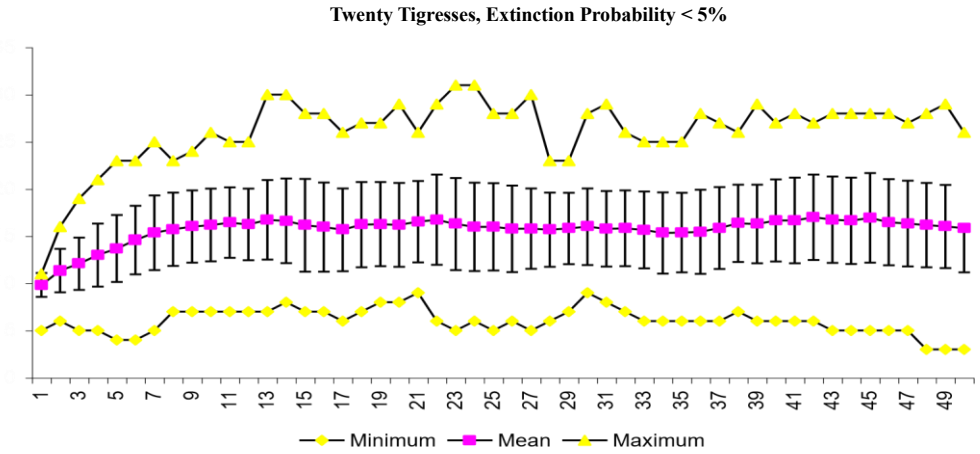
occupancy and relative abundance, prey abundance indices, anthropogenic pressure indices and habitat quality across 17 states known to harbour tiger populations. A team of 50 researcher's simultaneously estimated absolute abundance of tigers and prey by double sampling in a stratified sample of different tiger sign abundance. Relationship between indices and absolute abundance were evaluated and calibrated for predicting tiger densities. This research has demonstrated that tiger occupancy of forests were dependent on availability of wild prey and low human impact on the habitat. Tiger densities declined with increase in human use of the forests. Good source populations of tigers were found in areas devoid of human settlements and least human impact. Thus, to ensure perpetuation of the above goals it is essential to have an inviolate area for a minimum viable source population of tigers. A minimum of two such populations should be ensured in each bioregion to preserve the unique behavioural, ecological and genetic adaptations of the tiger.

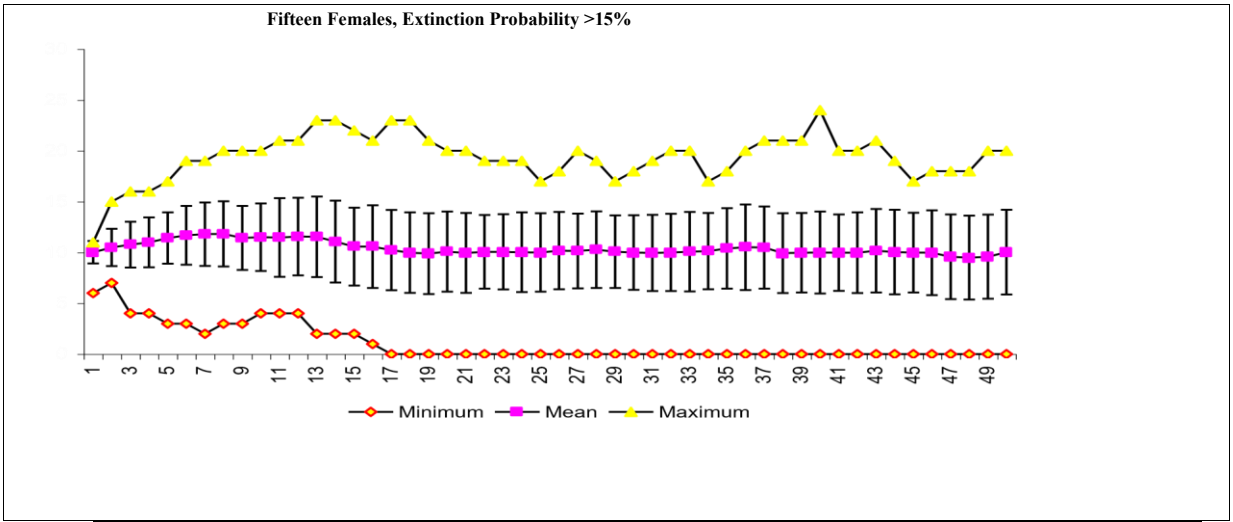
Based on the demographic parameters and life history traits of tiger's population (Box 7.1) simulation models suggest that if a core area having territories of 20 breeding tigresses were made inviolate, the resultant tiger population with an adequate buffer (multiple use area with eco-sensitive land use) has a very low probability of extinction (< 5% in 100 years, See Box 7.1a). Tigress's territories are determined by prey availability which in turn is dependent on the productivity of the area. The size of this inviolate area depends on the average territory size of tigresses. These range between 40 to 60 km^2 within most of the tiger areas in the sub-continent. Thus, for a population of 20 breeding tigresses we need an inviolate area of 800-1200 km^2. An ecological sensitise zone (buffer, co-existence area, multiple use area) around this inviolate space is needed for sustenance of dispersal age tigers, surplus breeding age tigers and old displaced tigers of 1000-3000 km^2. This buffer and the tiger population within it is essential to make the core of 20 breeding females viable for long term, since it sustains the dynamics of source and sink. Such a tiger reserve will sustain a population of 75100 tigers (Box 7.1b).

Box 7.1 Demographic Parameters of Tigers used for Simulation Models

- Adult sex ratio: 2.4 tigresses: 1 male tiger
- Birth Interval: 20 – 28 months
- Sex ratio at birth: 50:50
- Survival of Cubs up to 1 Year: 50%, 40-80% Range
- Survival of 1 Year Old: 70% (CV 15%)
- Survival of 1–2-Year-Old: 85% (CV 15%)
- Survival of >2-Year-Old: 95% (CV 10%)
- Fecundity / litter size: Average 2.4, range 1 to 5

Box 7.1a: Results of the Simulation of female population





Box 7.1b: Expected Tiger Population in an Typical Tiger Reserve

- For 20 breeding Tigresses
- Core Area Required (Inviolate): 800-1000 km^2
- Total Population in the Core (inviolate):
- Male Tigers: 8-10
- Cubs < 1 Year: 10 -15
- Cubs 1-2 Year: 10 -15
- Buffer (Co-Existence Area with eco-sensitive land use):
- Area Required: 1000-3000 km^2
- 2–3-Year-old tigers (recent dispersers): 10 -15
- 3–4-Year-old tigers (older dispersers): 10 -15
- Old tigers & Surplus breeding age tigers: 10-15
- Total Tiger Population in the Tiger reserve: 75 – 100 Tigers

Mukandra National Park, Darrah, Jawahar Sagar, Bhainsrodgarh and National Chambal Sanctuary (part), has been included in the Core of tiger reserve and few forest blocks of Kota, Jhalawar and Chittorgarh division as buffer of the tiger reserve. MHTR consists of 690.71 km^2 as core area and 445.07 km^2 as buffer area with a total area of 1135.78 km^2.

Once a village inside the core is relocated successfully then sufficient inviolate area is created for the wildlife to breed and establish so that their biomass is improved and it can establish as an ideal habitat for tiger.

7.2 Zone and Theme Approach to Management Strategies:

The "Zone" and "Theme" approaches have been adopted in the proposed management strategies of Mukandra Hills Tiger Reserve. Various managerial situations and needs can be taken care of by an effective combination of the "Zone" and "Theme" plans.

Under this approach, several specific objectives and problems relevant to an identified part of the PA can be recognised as a "Management Zone". This management zone would have its own measures and strategies. Furthermore, several objectives and different problems, created by a combination of factors, can be tackled by a "Theme strategy" under which measures can be prescribed for the entire area.

7.2.1 Zone Plans:

The CTH/ Core area shall be divided into the following zones:

a. Zone Plan for Habitat Management

b. Zone Plan for Voluntary Village Relocation

c. Zone plan for ecotourism

d. Zone Plan for protection

e. Zone Plan for Tiger reintroduction

7.2.1.1 Zone plan for Habitat Management:

Mukandra Hills Tiger Reserve displays all the intricacies of natural ecosystem in the form of various ecosystem pyramids of different producer-consumer chains, geological history, river orientation, management of wild habitat and watershed development and management. Besides the highly endangered Indian Tiger, the reserve also harbours a wide range of faunal species some of which figure prominently in the IUCN Red List like *Vulpes benghalensis, Melursus ursinus, lutrogale perspicillata, Panthera pardus, Python molurus, Tetracerus quadricornis,* etc.

Habitat management implies the creation and maintenance of the desired ecological niche in which the area tends towards a climax community of the food web with well distributed food sources for every stage of the food chain. A suitable living and breeding environment for the wildlife is needed for conservation of the ecosystem. The prerequisites of the wildlife of the area are well-dispersed water sources, well distributed food sources and hiding and predating conditions.

The food habits and the living environment of various faunal species are different. The Sloth Bear depends upon the fruits and berries, honey from the beehives and the white ants. Well-distributed food sources and water points are of prime importance for sustenance of Sloth Bear. The Leopard needs herbivore population for predation. The

herbivore population once abundant in the area has become scarce and is bouncing with increased status of protection.

Fruit bats play an important role in pollination and seed dispersal of many forest trees like *Bahera, Butea, Ficus sp*. etc. To maintain the Bat -Tree relationship, it is necessary to protect the trees as well as food suitable for frugivorous bats.

Birds have specific liking for various plant species and different canopy density conditions for feeding, nesting and roosting. Different species of birds prefer different plants for nesting and breeding ranging from small shrubs to tall trees including few snags. The Ficus species are of utmost significance for sustenance of birds. Honeybees also depend on flowering trees, shrubs and herbs. A number of flowers – birds also depend on flower spectrum of the local plants. Vultures being the necessary scavengers need steep cliffs for breeding and roosting; there are lot of cliffs throughout MHTR which harbours several species of vultures throughout the reserve.

Well-distributed availability of water is another factor governing the habitat suitability. River viz. Chambal, Amjhar, Ahu, Kali Sindh, Brahmini, Eru, etc derive water from the tiger reserve but do not feed much of their water to the Reserve. The waterholes in the core spill over during rainy season but repeated droughts have made water a scarce commodity. The area being drought prone, availability of water is not perennial, the pinch periods are quite long, and the wild animals have to travel long distance in search of water.

Keeping above points into consideration the following measures will be taken up with a view to improve overall habitat condition:

(a) Improving availability of food for wild animals by grassland management

(b) Development of watershed for soil & moisture conservation.

(c) Removal of *Lantana, Xanthium* and other undesirable species.

(d) Checking succession of woodlands into grasslands.

A. Improving Availability of Food:

The development of the area with well-dispersed food sources is the first prerequisite for the sustenance of wild animals in the area. The fruit species like Tendu, Jamun, Ber, Akol, Lisoda, Amaltash, Gular, Khajur, Karonda etc. constitute food for sloth bear. Honey is another preferred food of this flagship species. To improve the food

availability for the herbivore population in general and the Sloth Bear in particular, the following measures will be taken.

B. Improvement of grass & bush cover & browsable species:

The area has been traditionally a good deer and sambar habitat. The area once abounding in herbivore population is now reduced of herbivores at different tropic levels. To re-establish them once again in the area we need to establish a proper food chain. In order to sustain and propagate the much-needed grass and bush cover gradual removal of *Lantana camara, Prosopis juliflora, Xanthium, Cassia tora etc* is needed.

C. Development of watershed for soil & moisture conservation

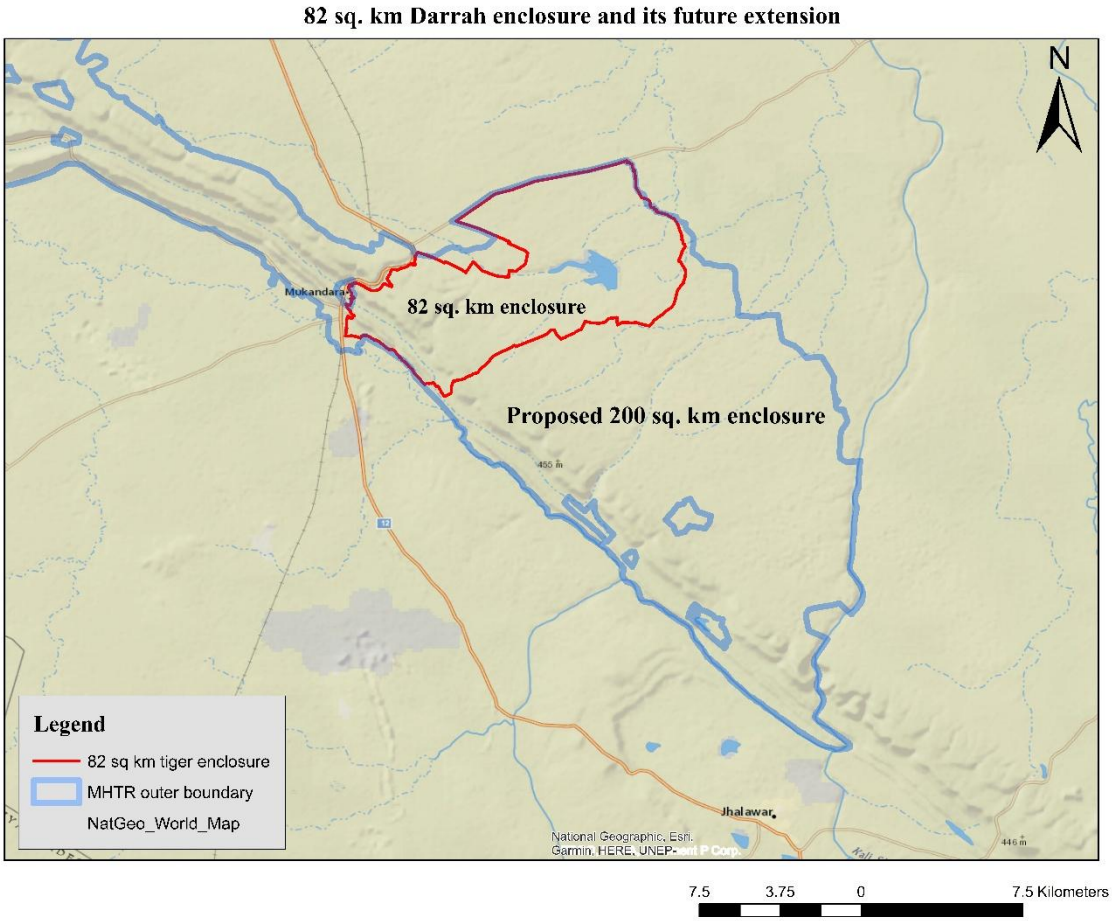
The trough areas in valleys have at places water throughout the year whose quantity can be amplified with water harvesting structures. The plateau areas get devoid of water for almost half the year and are very critical for the survival of animals. Water points on the plateau areas can be created which can cater to needs to animals in summer and would reduce their migration to lower areas. This can be done through lifting water from lower areas with the help of solar power. Chambal with its two dams inside MHTR is also major source of water and can be explored to lift water and supply to these parched plateau areas.

D. Removal of *Lantana, Xanthium* and other undesirable species

The valley areas being high in moisture content are heavily infested with weeds particularly *Lantana camara.* These weeds need to be systematically removed so that native vegetation comes up. The weed eradication will be done during plan period, so that grasses and other browsable species may come up. Uprooting of these weeds needs to be followed for few years continuously as the seed bank created by them in the soil again results in heavy congregation of these weeds repeatedly.

E. Checking succession of woodlands into grasslands.

With increased protection measures the historically heavily grazed areas have turned into wonderful grasslands and as a part of ecological succession these grasslands are being converted into woodlands over the period of time as seen in the Darra 82 sq km enclosure. Grasslands like these should be conserved for biodiversity value and grassland species. For these woods encroaching these pristine grasslands can be systematically kept at bay and only few trees for shelter of species should be kept in the areas.



Map 7.1: 82 sq. km Darrah enclosure and its future extension

Considering the ongoing expansion of cheetah conservation landscapes within India, and pursuant to the findings of the NTCA (Jhala et al., 2021) Assessment of Tiger Supplementation and Cheetah Introduction in Mukundara Hills Tiger Reserve, Rajasthan**,** Wildlife Institute of India, Forest Department of Rajasthan Technical Report Submitted to the National Tiger Conservation Authority, New Delhi. The ecological and managerial value of the existing enclosure has been positively acknowledged. The committee recognized the 82 sq. km enclosed area in the southern part of the Tiger Reserve comprising of three fourth of the area formed of grassland/ savannah on flat terrain is an ideal habitat for cheetah. The enclosure is therefore ideal for establishing a small nucleus population of cheetah as a breeding refuge (currently two females and one male coalition) as well future expansion of the landscape.

Given this assessment, and in alignment with long-term objectives for cheetah recovery and landscape-level carnivore management, a proposal has been advanced to expand the protected enclosure from its current extent of 82 km² to approximately 200 km². This expansion is intended to enhance ecological integrity and facilitate future habitat

development conducive to sustaining a genetically and demographically viable cheetah population.

7.2.1.2 Zonal plan for Voluntary Village Re-location

The Wild Life (Protection) Act, 1972, as well as the Scheduled Tribes and Other traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, require that rights of people (Scheduled Tribes and other traditional forest dwellers) recognized in forest areas within core/critical tiger/wildlife habitats of tiger reserves/protected areas may be modified and resettled for providing inviolate spaces to tiger/wild animals. This requires payment of compensation (rights settlement in addition to the relocation package offered under the CSS at present). Chapter IV of the Wildlife (Protection) Act, 1972 (Section 24) provides for acquisition of rights in or over the land declared by the State Government under Section 18 (for constituting a Sanctuary) or Section 35 (for constituting a National Park). Sub-section 2 of Section 24 of the Wildlife (Protection) Act authorizes the Collector to acquire such land or rights. Therefore, payment of compensation for the immovable property of people forms part of modifying / settling their rights which is a statutory requirement. The Guidelines for village relocation has been issued by NTCA vide the letter No. 3-1/2003-PT Dated 262-08.

Zonal plan for voluntary village re-location in Bhainsrodgarh Wildlife Sanctuary

There are 29 revenue villages situated inside the Sanctuary. Most of the villages got settled here at the time of creation of Rana Pratap Sagar Dam. Most of them were submerged villages that came on the plateau to save their life and settled down according to their will.

It is a big task to relocation of all these villages from the tiger Reserve. On priority basis, few villages should get re-located. Firstly - two villages namely Prempura and Dariba in Bassi Gramn Panchayat, Bhainsrodgarh Panchayat Samiti and Rawatbhata Tehsil are situated at such strategic location that if these villages are shifted / re-located from this area, a big chunk of around 4000 Ha land will be available for wildlife and there is a very good & strategic corridor joining Rajasthan and Madhya Pradesh.

So, these village should get relocated on priority basis. After that, few other villages, like Bhawanipura, Udpuriya in Gram Panchayat Bhainsrodgarh can be shifted.

7.2.1.2.1 Objectives:

1. To conserve the habitat & create inviolate space for the long-term survival of source population of tiger & other wild animals.
2. To create grassland areas on the vacated sites for wild ungulates and cover for other wildlife.
3. To provide good living conditions to the residing villages through relocation.

7.2.1.2.2 Process of Voluntary Re-location

Relocation of villages involves resettlement and rehabilitation of the socio-economic lifestyles of the affected person. It envisages -

1. Identification of village for relocation.
2. To motivate people of selected villages to undertake voluntary relocation.
3. Resettlement of displaced families through support for development of agricultural land, provision for adequate compensation for property.
4. Socio-economic rehabilitation providing necessary infrastructure, e.g. approach road, drinking water facility, cattle ponds, fodder and fuelwood.

It is essential to have a minimum inviolate area (forming the core of the Tiger Reserve) capable of supporting 10 breeding tigers. On an average, a tigress requires 40-60 km2 of territory for successful breeding. Pressure of human habitation is detrimental in sustaining high density breeding tiger populations. Settlements, therefore, need to be re-habilitated from the core area of a tiger reserve. The translocations/ rehabilitation package should be such that people should readily be willing to relocate. The relocation site should be so chosen so as not to compromise the conservation value of the Tiger Reserve i.e. it should be as far away from the core as possible and not located in connecting habitat corridors. Networking with local institutions and NGOs should be established so that post relocation assistance is provided to the relocated population for some time at least. Effort should be made to wean the resettled population away from dependence on forest resources. This would be possible by aiding (both technically and financially) in developing alternative livelihood options.

7.2.1.2.3 Need for Village relocation:

To improve the condition of the park and provide a safe haven for the animals, villages inside the core area of Tiger Reserve are to be relocated because -

1. The cattle belonging to these villages graze in the core area and compete with the ungulates.
2. The core area surrounding the villages is highly degraded.
3. There is threat of diseases spreading from domestic cattle to wild ungulates.
4. Spread of weeds to the degraded areas.
5. Loss of habitat for wild animals.
6. Disturbance to the movement of animals to the adjoining core.

7.2.1.2.4 The villagers are facing problem because of:

- Severe crop degradation by the wild animals.
- Constant cattle lifting by wild animals.
- Because of the existing forest laws particularly Wildlife Protection Act and Forest Conservation Act, very few development activities could be taken up. The villages are deprived of all developmental activities.
- The villages are situated deep inside the forests not properly connected to outside world. There is less scope for the development.

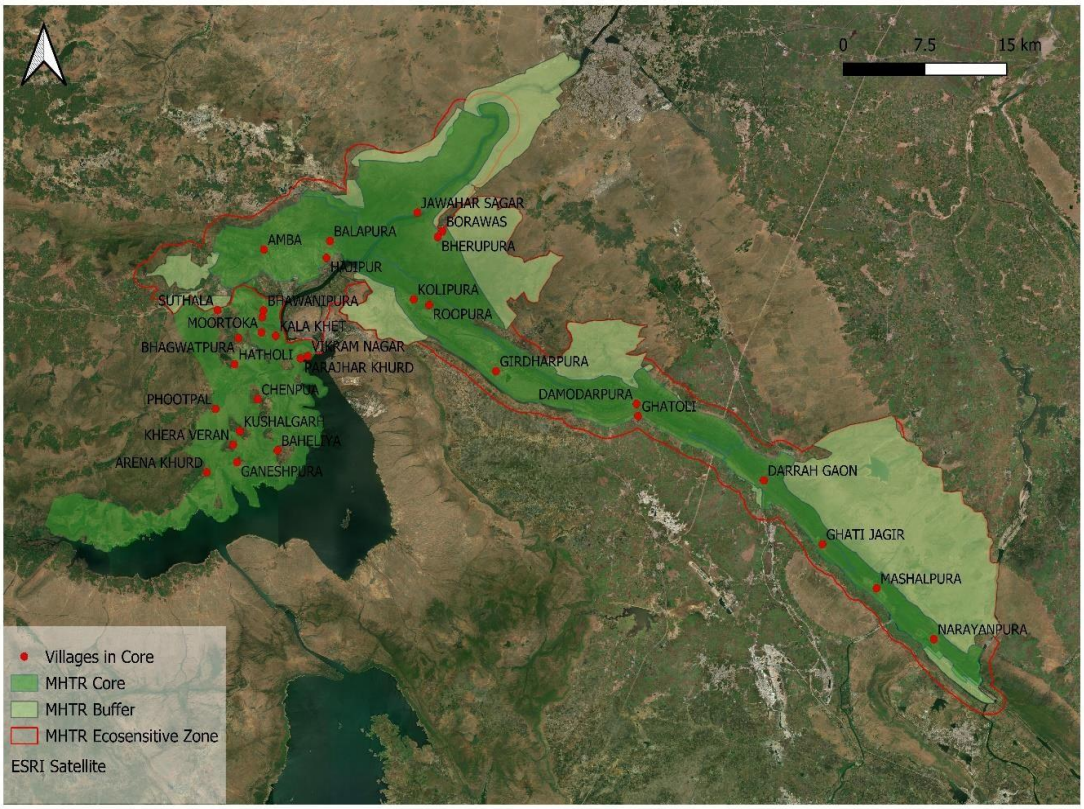
- Because of the poor connectivity, the villagers cannot get immediate medical relief when there is an emergency.
- Because of remoteness, very few teachers are willing to serve in the villages. The educational standards are very poor.
- There is growing social problem because of remoteness. Most of the youth (boys) are bachelors. “Brides” are not available for the boys of the villages.

7.2.1.2.5 Relocation Strategy

The strategy would be:

- To hold series of village level meetings with villagers to discuss about the rehabilitation package and convince them and clarify all the doubts.
- To conduct survey of movable and immovable property.
- Identify proper land for rehabilitation preferably revenue land at one place. If revenue land is not available according by suitable forest land should be identified and get de-reserved as per 1980 forest conservation act.
- Detailed rehabilitation plan should be prepared and get it approved before implementation; people should be involved at every stage of implementation.
- All villagers should be relocated nearer to Kota so that villages get maximum facilities.

There are 16 villages which are located inside the core of tiger reserve. Most of the villages have large cattle, sheep and goat population. These have caused serious grazing problem as they are sharing the entire grass fields as well as water holes. Since the villagers residing in these villages are largely dependent upon cattle rearing therefore no amount of advice can keep them away from core grazing grounds. During the rainy season they even bring the cattle of their relatives living in the core areas. If stopped, they are always ready to fight with the tiger reserve staff. This problem cannot be solved totally but partly it can be tackled by shifting some villages. In the beginning efforts should be made to shift Laxmipura, Kharli Baodi, Kolipura, Rupura, Girdharpura villages. For this proposal is being prepared after documenting the land / Building / wells etc. holdings of the individuals. Forest / revenue area has to be identified for rehabilitation of these villages.



Map 7.2: Village Locations in MHTR

Table-7.1 Progress of Village Relocation (as on 31.03.2024)

S.No.	Name of village	No. of families	Package			Under Process
			Op-I (Cash Package)	Op-II (DLC)	Opt-III (Land Package)	
1	Laxmipura	30	2	27	-	1
2	Kharli Bawari	24	2	16	-	6
3	Ghati Jagir	58	21	-	-	37
4.	Mashalpura	301	156	-	-	145
5.	Damodarpura	153	-	-	-	153

7.2.1.3 Zone plan for eco-tourism

This is an overlapping activity within the core area. Tourism has emerged as a key sector in the National parks and sanctuaries over the past decade. Eco tourism is generally described as tourism associated with protected areas. Eco tourism aims at providing nature tourism opportunities and aims at generating economic returns to strengthen protected areas and augment economic benefits for the local people.

Hadoti is having rich heritage and biodiversity, yet it is neglected on the tourism map except for Bundi. The river Chambal, which is the lifeline of this area with its vertical cliffs, variety of flora and fauna which includes rare and endangered species like Gharial and Crocodile, River Dolphin, Turtles and Tortoises, not only provides value but also provides shelter and breeding places for the above species along with most endangered species of Vultures, Storks, Owls etc. It is a great advantage to see all these while boating in this river. Similarly, Dhok, Kair forest and Big Cats of Hadoti have been attracting tourists since centuries till independence. MHTR had been the forest recluse of the royal families and was well managed by erstwhile rulers. The remains of Shikari Malas, Rawatha Mahal, Bewra talai, Jhamra- Kui etc are its witness which can still cater to wildlife lovers if care is taken towards their maintenance and upkeep with their advertisement. This can be done easily by integrating efforts of forest department, Tourism department, media and the Tour operators. This will display forest, wildlife, Historical places like Gagron fort, Rawatha Mahal, Abli Meeni Mahal, Hunting Malas, water points like RamSagar, Mandargarh Talab remains of Mandargarh temples and rock paintings of stone age as an attraction to tourists.

Main Eco-tourism sites in Bhainsrodgarh Wildlife Sanctuary

1. Padajhar Mahadev Temple caves and Waterfall
2. Nanakiya Kund
3. Chuliya Falls
4. Kalsiya Mahadev Gorge
5. Rewajhar Gorge
6. Indira Gandhi Waterfall
7. Re-located centre and Crocodile point
8. Mordi Mahadev Temple
9. Eco-trail from Bheem Choraha to Bridge Side

7.2.1.4. Objectives

-to create nature awareness in the public.

-to promote conservation and protection awareness in public.

-to provide livelihood to the public so that a positive outlook towards conservation is created.

-to involve locals in protection and conservation by using tourism as a tool.

7.2.1.5.Strategies

Tourism in a controlled and disciplined manner can be used as an effective tool for conservation by creating alternative livelihood to the local people, thereby creating a change in their outlook towards forests and wildlife. The strategies have been made in accordance with the (Normative Standards for Tourism activities and Project Tiger) Guidelines, 2012. Detailed maps and plan are shared in chapter 13.

A. Signages:

(1) Proper signages will be put up inside the reserve to give the details of flora, fauna, historical sites, details of medicinal plants and maps to show track path.

(2) Hoardings will be put up on the highways to publicize camping and trekking facilities available in the area.

(3) Hoardings mentioning Do's and Don'ts will be put up on each camping site and at the starting point of the trekking routes.

B. Publicity:

(1) Colourful information brochures and folders will be brought out focusing on eco-tourism at each specific area, maps and Do's and Don'ts to be put in.

(2) An audio-visual show will be prepared highlighting the features of the area.

(3) Trees and shrubs will be labelled; painting of birds/animals will be put up in the protected area where there is a chance of sighting them.

(4) Integrated approach through various departments like Tourism, Devasthan Archaeology, Railways and Roadways will be carried out for publicity.

The tourism in the core area will be based on the broad guidelines issued by Government of India vide letter dated 15.10.2012, Government of Rajasthan ecotourism policy 2010 as well as the (Normative Standards for Tourism activities and Project Tiger) Guidelines, 2012. The following guidelines shall be enforced:

- Tourism in the core area will remain at the current level if it is within 20% of the total geographical area of the tiger reserve.
- In a phased manner tourism in the core area will be shifted on to the periphery, so that there is enhanced protection of the buffer zone as well trough more presence of department.

- Tiger reserve entry and exit timings will be regulated strictly so that there are no fatal accidents during odd hours, at the same time there is less disturbance to wildlife.
- Tourism will be promoted as an activity to promote awareness.

7.2.1.5 Zone Plan for Protection

Creating a zone plan for protection in the core area of MHTR is crucial for ensuring the conservation and well-being of tiger populations:

7.2.1.5.1. Core Zone Protection:

Strict Protection:

Core area within the reserve where human activities are strictly prohibited to minimize disturbance to tiger habitats with enforcement strict patrolling and surveillance measures to prevent illegal poaching, logging, and encroachment.

These sensitive habitats like breeding areas, and wildlife corridors as no-go zones where access is restricted to authorized personnel only. Also, buffer is also expanded around core to further minimize human intrusion and disturbance. A series of network of Naka-Chowki with wireless transmission and other necessary accessories have been setup to counter any illegal activity in that area. The list of nakas-chowki and antipoaching camps are enclosed in **Annexure-15.**

Heavy surveillance with anti-poaching mock-drills, simulations and capacity building programmes will be conducted in the core area to upscale the vigilantes of the system. Staff will pe provided with vehicles and manpower to check the community specific prevalent illegal grazing in the landscape especially in the monsoon area. Any historical poaching hotspot to be marked and permanent or temporary chowki to be setup there to deal with any emergent situation. Emergency response team will be established equipped with first-aid facilities, veterinary care units, and rapid response teams to address wildlife emergencies and human-wildlife conflicts.

7.2.1.5.2. Community Outreach:

- Engagement of local communities living in and around the core area through community-based conservation initiatives and participatory decision-making processes will be done to involve them in conservation activities such as habitat restoration, wildlife monitoring, and ecotourism development to foster stewardship and ownership.

- Department will conduct educational programs, workshops, and eco-tours for schools, colleges, and community groups to promote conservation values and environmental literacy.

7.2.1.5.3. Buffer Zone Integration:

Enhance connectivity between the core area and surrounding buffer zones to facilitate the movement of tigers and other wildlife with focusing on habitat restoration, wildlife corridor protection, and land-use planning measures to maintain ecological connectivity and minimize habitat fragmentation. This will strengthen the corridors and would allow for natural dispersal of population so that natural evolutionary cycle could smoothly operate. For this collaboration with neighbouring landowners, government agencies, NGOs, and local communities will be required as the landscape is having revenue and private areas also. This will help in integrated conservation strategies across the core-buffer landscape. This could also foster partnerships with stakeholders to engage in addressing shared conservation challenges and promote landscape-scale biodiversity conservation. By implementing this detailed zone plan for protection in the core area of Mukandra Hills Tiger Reserve, it is possible to safeguard tiger habitats, enhance ecological integrity, and ensure the long-term survival of tiger populations in the reserve.

7.2.1.6. Zone Plan for Tiger Reintroduction

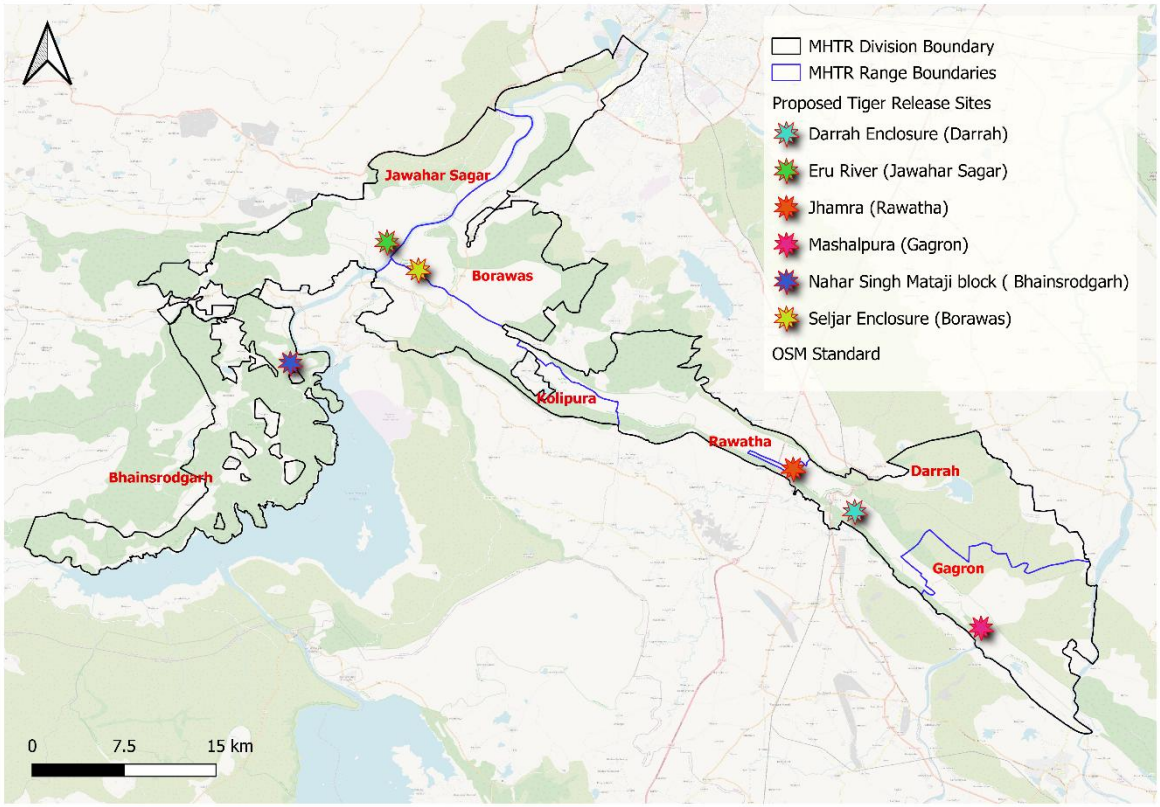
For any tiger reserve it is necessary to have a viable and sustainable tiger population for long term. According to the NTCA Protocol on Tiger Reintroduction the following plan has been made.

7.2.1.6.1. Habitat:

Habitat Suitability Mapping:

The assessments using GIS, remote sensing, and field surveys to identify suitable areas for tiger reintroduction and evaluation after checking various factors such as vegetation cover, topography, water availability, and prey abundance to prioritize potential reintroduction sites with prior experiences of staff and officers have led to designation of Core Habitat Zones where habitat conditions are optimal for supporting resident tiger populations and areas harbour dense forest cover, abundant prey populations, and minimal human disturbances as priority sites for tiger reintroduction efforts. These main areas are:

1. Selzer area (Range Borawas)
2. Laxmipura-Jhamra area (Range Rawatha)
3. Aero river area (Range Jawahar Sagar)
4. Mashalpura area (Range Gagron)
5. Darrah Enclosure area



Map 7.3: Tiger release sites

7.2.1.6.2. Prey Base Enhancement:

These above-mentioned areas are best sites to augment prey as these areas have sufficient fodder, relatively free from human disturbance and water availability throughout the year. Cheetal and Sambar translocation activities have been continuously going on in the tiger reserve for last few years which has shown results in terms of increase in herbivore population. This prey should be monitored by establishing monitoring protocols to assess the abundance, distribution, and health status of prey species within the core habitat zones and fluctuations in prey populations should be immediately addressed by mitigating potential prey shortages for reintroduced tigers. Prey augmentation enclosure sites in Mukundra tiger reserve has

to be identified based on the on-going WII Long term ecological monitoring project and translocated cheetals from Keoladeo National Park Bharatpur must be propagated in the enclosures for further augmentation in the tiger reserve area.

In Bhainsrodgarh Wildlife Sanctuary, herbivores population is very less. The only antelope that is surviving here is blue bull. Black buck, Chinkara, Chital and Sambar population is almost zero. In 2021-22, one four horned antelope was seen in the Richakho block. Total population of carnivores is dependent mainly on langurs, Blue bull and Wild pigs.

There is a big need of enhancement of herbivores population. So, one enclosure of around 300 Ha. can be erected at Saddle dam. There is a masonry boundary wall encircling this area, its height is 4 to 5 feet. It was made in year 2000. This is a mud mortar wall. So, it needs regular maintenance, and it should be made at least 8 feet of height, so that these chitals cannot run away in the nearby colonies. This can be a breeding ground for chital population. Second enclosure can be made at Nimdi Forest block in Agra. There are good grasslands and Chitals can survive here.

7.2.1.6.3. Infrastructure Development:

The specified areas should have necessary infrastructure such as pre-release enclosures, holding facilities, and veterinary clinics to support tiger reintroduction efforts and to ensure the availability of adequate resources and equipment for the safe capture, transportation, and release of reintroduced tigers. Wildlife monitoring stations equipped with camera traps, GPS collars, and remote sensing technologies to monitor tiger movements and behaviour post-reintroduction should be established. There should be designated research stations for conducting ecological studies, population monitoring, and habitat assessments to evaluate the success of reintroduction efforts.

7.2.1.6.4. Reintroduction Protocol:

7.2.1.6.4.1. Candidate Selection Criteria:

- Develop criteria for selecting suitable candidate tigers for reintroduction based on genetic diversity, health status, and behavioural attributes.
- Ensure that reintroduced tigers are compatible with the habitat conditions and prey base within the core habitat zones.

7.2.1.6.44.2. Acclimatization and Release Procedures:

- Implement standardized protocols for acclimatizing reintroduced tigers to their new environment and facilitating their gradual release into the wild.
- Monitor the post-release behaviour and adaptation of reintroduced tigers to assess their survival and integration into the resident tiger population.

7.2.1.6.5. Community Engagement and Outreach:

7.2.1.6.5.1. Stakeholder Consultation:

- Engagement with local communities, indigenous groups, and other stakeholders to solicit input and address concerns regarding tiger reintroduction efforts will be on priority.
- Also fostering collaboration and partnership-building through participatory decision-making processes and inclusive conservation initiatives would do wonders in long-term conservation of species.

7.2.1.6.5.2. Education and Awareness Programs:

- Reserve will conduct educational workshops, outreach events, and awareness campaigns to raise public awareness about tiger conservation and the importance of habitat protection.
- With the help of local NGOs authorities aims to provide training and capacity-building opportunities for local communities on coexistence strategies, wildlife monitoring, and sustainable livelihood practices.

7.2.1.6.6. Monitoring and Adaptive Management:

7.2.1.6.6.1. Post-Reintroduction Monitoring:

- Rigorous monitoring programs as per guidelines of NTCA will be adopted to track the movements, behaviour, and reproductive success of reintroduced tigers within the core habitat zones.
- Also, Tiger reserve will try to engage premier institutes to utilize advanced monitoring techniques and remote sensing technologies to gather data on tiger ecology, prey interactions, and habitat use patterns.

7.2.1.6.7. Contingency Planning and Risk Management:

- Protocols for responding to emergency situations such as tiger injuries, conflicts with humans or livestock, and natural disasters will be adopted

- Training will be provided to field staff and local community members on emergency response procedures and wildlife rescue techniques to minimize the impact of adverse events on reintroduction efforts. By implementing this detailed zone plan for tiger reintroduction in the core area of Mukandra Hills Tiger Reserve, it is possible to restore and sustain viable tiger populations while promoting the long-term conservation of biodiversity and ecological integrity within the reserve.

7.2.2 Theme plans

Management strategies sometimes cannot be confined to a particular zone and they cut across two or more zones. Various themes, which are applicable for entire CTH of Mukandra Tiger Reserve, have been developed as follows.

- Theme plan for water management during pinch period
- Theme Plan for movement of Pilgrims
- Theme Plan for Retrofitting/Mitigation of Impact due to National Highway and Railway Line
- Theme plan for Disaster Management
- Theme plan for prey species augmentation
- Theme plan for monitoring dispersing tigers into Mukandra landscape

7.2.2.1 Theme plan for water management during pinch period

Watershed management:

The core area falls in drought prone zone and watershed health of the area in general is poor. To improve the ground water status and for steady enrichment of moisture, the strategy will be “catch the water where it falls”. The construction of Talais, Check dams, and silt detention dam and nullah bunding will not only help in providing drinking water but also increase the water percolation by reducing the runoff waste. The following mechanical & Geological measures will be taken up for development of watershed.

Water harvesting by constructing Anicuts and mini-Water ponds in the area is proposed. This will ascertain continuous & regular supply of water for wild animals and increase the moisture regime of the area. It is proposed to construct Anicuts less than 2m height every year in tiger reserve area. Besides this, the existing anicuts in the reserve area constructed previously need de-silting & maintenance every year. The area of the reserve has crises – crossed network of nullahs. Intensive construction of check dams in these nullahs can help in improvement of water regime.

The core area falls in a water scarce zone. Good rainy season is observed once in every three or four years. Most of the nallahs go dry within three or four months after rains.

The habitat quality of the area needs to be improved by creating artificial water holes, well dispersed throughout the Sanctuary. Construction of such water holes will be planned in such a way so that the distance between two water points does not exceed 5 Km. The Check dams and Anicuts constructed will also serve as water points to curtail the pinch period during summer.

Since the geography of the core area does not permit installation of hand pumps or tube wells easily, it is proposed to construct artificial water holes and guzzler tanks at suitable location for providing better opportunity for the wildlife to drink water safely. Such structures will receive rainwater flowing through the nallahs in rainy season and manually filled during pinch period. Guzzlers tank system will also be used for continuous filling of water in the water holes created in the interior areas.

Anicuts:

Since area is drought prone hence to increase availability of water for wild animals, it is proposed to construct anicuts in following blocks: This will not only ensure water availability of the core but will also help in the improvement of water table in the adjacent villages. These activities must be taken up with the help of EDC so that people living in and around the MHTR will get employment which can in turn support the livelihood of villagers.

Streams and Nallahs:

These are areas where water flows and remains for a longer period of time than other areas. These constitute the drainage of water sheds and are continuous in nature in MHTR. In these areas, even in the hot summer when other areas are dry and hardly have any natural water, some small pools are available and are characterised by a belt

of green trees in the summer and this network of riparian belts are the lifeline of wildlife in this dry deciduous area.

Valley:

The terrain of MHTR is hilly and there are many valleys in the area. These areas lie between two hills with almost flat bottom and rich soil and as a result the vegetation is good. Some water remains in the nullahs in small water pools and provide sustenance to wildlife during hot dry summer.

Wetlands-Marshes:

These are sizeable areas where water remains standing throughout the year. Due to the presence of water these areas become the centre of activity of animals both wild and domestic. These water bodies contain a variety of aquatic fauna and flora, according to the depth of the water body. The main wetland area of MHTR is Girdharpura talab, kadap ka Khal, Jhamra talab, Bevda talai, Laximpura-Naraypura talai , Hatholi talab, Bhawanipura Talab, Phoot talab etc.

Threats:

Since water is a limiting factor in MHTR permanent as well as artificial water points used to be more visited by wild animals, particularly in dry season. In summer months, hunters and poachers use these places as their shelter due to presence of suitable hiding places. These areas, due to inaccessibility, are beyond the scope of daily patrolling done by forest staffs of nearby chowkis. Due to this reason, these restricted water points and habitats become an easy target for hunters and commercial poachers, as animal movements in these points become certain. Other than these, cultivation in riverine patches in dry season and sand mining in Amjhar, Kali Sindh are potential threats to the wildlife and their habitats. These activities create obstacles in natural movement of wild animals. In summer months, natural water points near periphery are regularly visited by domestic livestock's, which could spread diseases (as domestic livestock are potential carrier of various diseases).

Strategies:

- Dedicated teams (group of efficient and experienced forest staffs) will be made for intensive patrolling (in regular interval) in these vulnerable areas.

- Keep a regular surveillance at the water points to collect evidence on presence of undesirable activities from those areas.
- Control riverbed cultivation and sand mining from wildlife habitat with the help of local administration.
- Control on entry of domestic livestock inside the wildlife habitat.
- Regular monitoring of permanent water sources to check the quality and hygiene of the water sources.

Pinch period management:

The MHTR is situated in dry tropical zone receiving less rainfall. It receives about 700 mm. of rainfall, and the number of rainy days is very few. The summers are very harsh with intense heat temperatures reaching more than 48^0 c. Due to low rainfall the geomorphologic features allow very little retention of water in the sub soil. Droughts are frequent which make the water situation worse. Water scarcity becomes a limiting factor for the full potential growth of wildlife in MHTR. Shortage of water, results in the migration wild animals to outside areas in search of water and there are chances of being killed in accidents or being poached. Therefore, water management during pinch period becomes very important aspect of wildlife management. The map and the list of water holes is enclosed in **Annexure-16 & Annexure-17 respectively.**

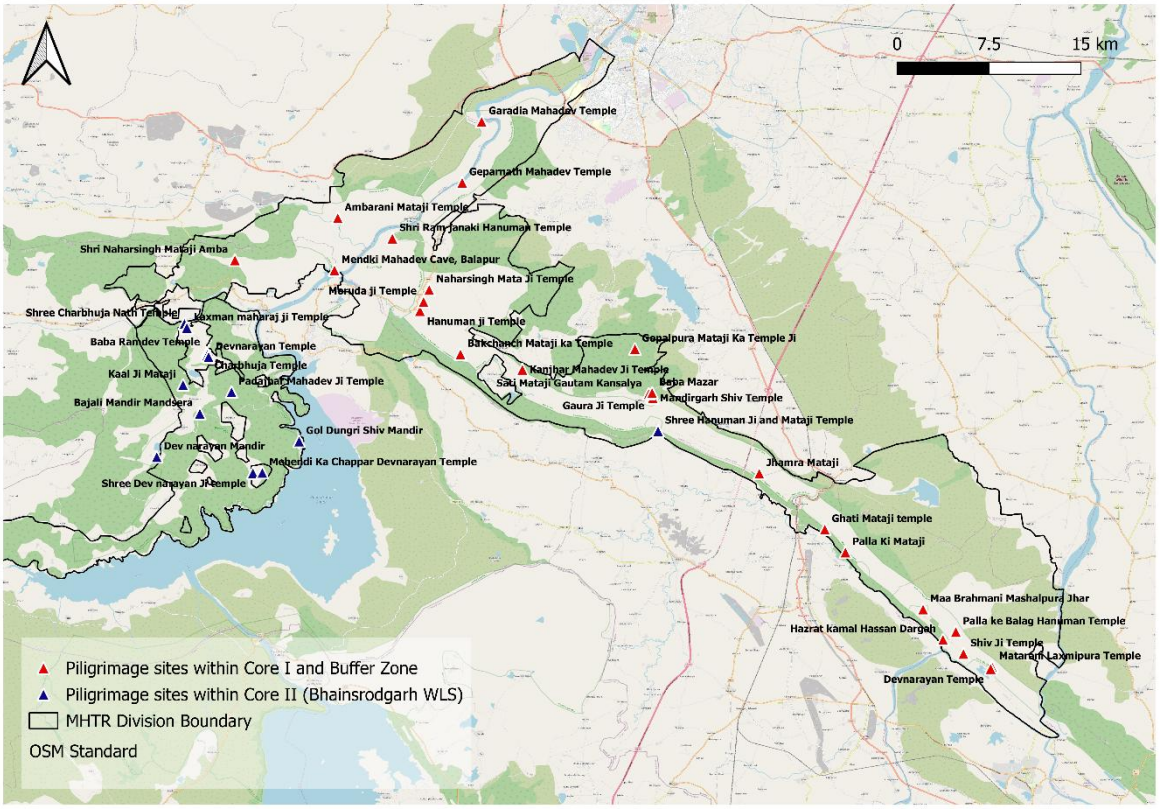
STRATEGIES:

- To provide at least one water hole in every beat (5 sq. km.) area round the year. For this new water holes are being proposed looking into the requirement of water in different habitats and ensuring proper dispersal of animals and utilization of grasses in the whole area. Further one this setup is complete; Tiger reserve authorities can plan on to have waterhole at every compartment level as well according to well defined wildlife management concepts.
- To ensure water availability throughout the year, a lift project from Chambal River which is a perennial source of water can be executed in a larger scale. Already one such system exists in Borawas range where water is lifted from Chambal using 15HP solar pump and it fills up a waterpoint 500 metres away. A large-scale project involving multiple uplift point with a network of pipelines serving multiple water holes and storage tanks of minimum 1 lakh litre capacity can permanently solve the pinch period crisis. In the rocky areas during peak summers the borewells

also fail. It is essential to use the perennial Chambal for ensuring continuous supply of water to the wildlife.

- In case of famine years, the situation may still worsen resulting into drying of most of the water holes. For this separate contingency plan after the assessing the situation should be prepared and implemented strictly.
- Bore wells should be installed at appropriate places to ensure drinking water for wild animals. In the areas where bore wells are not successful open wells may be dug. For such bore wells and wells ground water recharging should be done to ensure sustainable supply of drinking water. All wells should be covered from the top for the safety of wild animals.
- Transportation of water through tankers should be done only if no other water source is available. Water troughs should be well designed merging with natural landscape preferably under the shades of trees to avoid evaporation losses. Water troughs should be regularly cleaned to avoid contamination of diseases.
- Deepening and maintenance of old wells should be carried out periodically. The deepening and maintenance should be completed by month of March/ April.
- Shallow wells with ramps should be constructed near nullahs to ensure water for wild animals. These shallow wells are very appropriate to combat the severe water scarcity. Since these are natural and the water is easily accessible to the animals these are frequently used by them and, they require less maintenance.

7.2.2.2 Theme Plan for movement of Pilgrims:



Map 7.4: Popular pilgrimage tourism spots located inside MHTR

The places of pilgrimage in tiger reserve are listed in **Annexure-18** though there few famous temples like Garadia Mahadev, Ambarani, Padajhar Mahadeo, Chuliya Falls, Kalsiya Mahadeo, Crocodile point, Vulture Point Bridge Side and Gapernath and few small temples in core area have very much importance to local villagers residing in and around the core. At the time of Maha Shiv Ratri there is mela for three days on Mahadav Mandir, RamSagar. About 4-5 thousand people visit the temple during this time. One day mela is also organized at Kanjhar Mahadev on Maha Shiv Ratri with local pilgrims. The places of pilgrimage in core generally are visited by local people only. Proper management interventions are essential to reduce the negative impacts. There are four main places where devotees used to come for worship in Bhainsorgarh sanctuary area. These are,

1. Padajhar Mahadev Temple
2. Padajhar Mataji mandir
3. Kalasiya Mahadev Mandir
4. Shabri Mata Mandir

On shiv Ratri, Mela is being organized at all four shiv temples. Main pilgrims are local people only. The villagers residing in the villages of Sanctuary usually come in these Melas. Few tourists and pilgrims also come from nearby towns like Rawatbhata, Borav, Singoli (MP), Jawada, Ratangarh (MP) etc.

Strategies:

1- There should be minimum stay of pilgrims on such places.
2- Carrying of plastic polybags should be totally banned.
3- The speed limit for the vehicles plying inside the core should not be more that 20 km / hr.
4- The melas (like Shiv Ratri Mela) are the great opportunities to disseminate the messages of conservation to the maximum number of pilgrims.
5- On the places of pilgrimage, boards should be displayed indicating the conservation values, dos and don'ts inside the core.
6- In future, entry into these areas shall be restricted by entry system and even with entry ticket since most of the visitors coming are for tourism purpose.

Plate-7.1: Water bodies in MHTR

Ramsagar

Phoot talab

Kailash Nagri anicut

Talai

Chambal River

Kali Sindh River

7.2.2.3 Theme Plan for Retrofitting/Mitigation of Impact due to National Highway and Railway Line: -

NH 12 and Mumbai Delhi broad gauge railway line passes through core of MHTR. Incidences of accidents due to these things are very frequent. Incidentally these are very busy highway road and railway line with very high traffic load. In the month of April 2003, a tiger died in a rail accident on this Mumbai-Delhi broad gauge railway line. Recently in the year 2014 a Sambar was also killed in the railway accident. Indian government's ambitious project of connecting Delhi-Mumbai by Green-field high speed road network known as Bharatmala is also being constructed through Mukandra Hills tiger reserve.

Strategy:

A pucca wall has been built all along the Railway line to avoid accidental deaths of wildlife. Discussions are underway with the officials of PWD/NHAI and Railway department to build a tunnel or elevated road as per feasibility so that mitigation of impact due to national highway and railway line can be ensured. In this regard active co-operation with concerned dept at the higher level is very essential. Bharatmala 8 lane road network being constructed by NHAI is built through tunnel which will be passing under Mukandra Hills Tiger Reserve for around 7 km. It is a wonderful example of mitigation measure.

All the above strategies and prescriptions are going to be implemented departmentally, however assistance from any other externally aided project which may help to expedite the achievement of these objectives, would be welcome.

7.2.2.4 Theme plan for Disaster Management

In the circumstances there is disaster such as fire, epidemic etc. The Deputy Director may take the following actions.

Fire:

Adequate preventive measures like clearance of fire lines, awareness of villagers, deployment of fire squad and watchers with vehicles will be taken up in every fire season. In case of uncontrollable fire, help of firefighting squad will be sought from District Administration.

Epidemic:

Expert team may be constituted by involving a panel of veterinary experts. A detailed plan may be drawn by expert team and implemented to contain the epidemic.

7.2.2.5 Theme plan for Prey Species Augmentation

Based on the analysis done on the prey density census, the prey density in MHTR is comparatively low to support a viable number of tigers. To support the viable number of tigers and other carnivores in the reserve, augmentation of the prey species like sambar deer, spotted deer, black buck, chinkara etc needs to be done in a phased and continuous manner. The tiger reserve has already infrastructure to keep the translocated animals from other areas. There are two predator proof soft enclosures are established in the reserve in northern part ie, Sheljar (1Ha) and in southern part i.e., Darrah (28Ha). Prey species needs to be augmented in the area as a continuous process to build up a viable and flourishing population in the area in future.

In Bhainsrodgarh Sanctuary, prey population is almost zero except the blue bull. There is a big need to do efforts for Prey population augmentation. One enclosure at re-location centre, Saddle dam can be created as there is good source of water and green pasture lands can be maintained for chitals.

Strategies

- Translocate prey species from other areas preferably from wild and natural areas.
- A special dedicated team needs to be constituted for the translocation purposes.
- Creation of prey augmentation enclosures at optimal sites for propagation and release of different prey. Jawahar sagar range and Darrah range for both are on either side of the national highway and railway line.
- Training of the team shall be done by experts in this field who have practical knowledge in this translocation.
- Hands on experience training and exposure visits shall be conducted to the team infrastructure and vehicles shall be procured.
- Suitable source population shall be identified for translocation after expert team inspection and examination on various parameters of health condition.
- Some sources for translocations are mentioned as following:
    - Spotted deer's can be translocated from KNP, Bharatpur.

- Sambar can be translocated from Sariska Tiger Reserve or Ranthambhore Tiger Reserve.
- Black bucks can be translocated from Sorsan, baran

- Intra tiger reserve translocation can be opted if the prey is available more in one part of tiger reserve.
- Translocation shall be conducted after getting proper permissions from competent authorities.
- Translocated animals shall be kept in the two enclosures available in the reserve.
- Animals can be kept in the 28ha enclosure for two or more breeding cycles and can be released based on the multiplication in the population size.
- New soft enclosures of around 30 ha may be made for breeding purposes of the translocated prey animals based on the field requirement.
- Translocation of prey species shall be conducted in a continuous matter.
- Other technically sound agencies like WII, Dehradun, MP forest department, etc shall be collaborated to attain technical support.
- Financial assistance shall be tapped from state and central funds.

7.2.2.6 Theme plan for monitoring dispersing tigers into Mukandra landscape

Mukandra Hills Tiger Reserve lies in the Ranthambore tiger meta population landscape as a sink for the spilling over tiger population from the Ranthambhore source population. Past records of tiger presence have proven this fact that there is an active corridor between Ranthambore tiger reserve and Mukandra hills tiger reserve through Ramgarh wildlife sanctuary and through the Kali Sindh River. These corridors and there connecting point to the Mukandra hills tiger reserve needs to be monitored for timely identifying the animal straying into the reserve and to avoid conflicts. It is necessary for the safety of the animals also. Gagron range areas and Jawahar Sagar range areas are the two active entry points for the tigers into the Mukandra hills tiger reserve using the above mentioned two active corridors. Detailed information and prescription about tiger monitoring in the corridor area is given in the corridor plan.

Strategies

- Regular monitoring protocols based on the NTCA SOP shall be implemented in the two ranges for monitoring dispersed tiger presence.
- A coordination meeting shall be conducted regularly with the neighbouring territorial range once in a month and report shall be sent to the concerning DCF.

- Gagron and Jawar Sagar range officers shall constitute a special team whenever they get evidence of strayed tiger in their area or nearby area.
- ACF in charge of Gagron and Jawar Sagar ranges will coordinate with monitoring of the strayed animal and is responsible for proving logistic and technical support.
- Monthly report from both ranges shall be send to DCF regarding strayed animals.
- A coordination meeting with DCF Ranthambore and DCF Mukandra shall be conducted once in three months for discussing the dispersed tiger information.
- Protocol shall be put in place to inform the concerned DCF in the corridor areas along with DCF Mukandra by the DCF Ranthambore whenever a tiger is dispersed from the Ranthambore tiger reserve happens to this landscape.
- Whenever a tiger is dispersed into this corridor connecting Mukandra and Ranthambore, DCF Mukandra should coordinate with other territorial DCF regarding monitoring of the animal.
- DCF Mukandra shall send a special team for supplementing territorial DCF for technical and logistical support when and where the situation demands.
- Field director Mukandra shall review the incidence of straying of tiger into the Mukandra landscape when it happens once in a week.

CHAPTER - 8
RESEARCH, MONITORING AND TRAINING

Research is one of the major issues in the Plan Outline of the Project Tiger document, 1972. The document envisaged that the scientific staff of the reserves would undertake basic research programmes aimed at evaluating systematic factors and influences, for devising pragmatic management practices to cover specific populations and the entire ecosystems. Research constitutes a very important aspect of effective management of wildlife protected areas. Research based wildlife management is crucial for the success of any Tiger Reserve. This is a legitimate activity and must be compatible with the objectives of wildlife management in the protected area. The Tiger Reserve should have a clear wildlife research policy based on the following priorities.

8.1 Research activities

Wildlife management is a mix of field craft and science based on field research. Research in the Tiger Reserve should focus on the critical information needs, which are by and large common to most of our Protected Areas. Professional researchers working in isolation on topics or species relating to their field of interest can contribute very little for fostering wildlife management. The research should be "problem solving studies", based on a consultative process involving PA management, indigenous people and overall ground reality prevailing in our tropical setting. Some "pressure points" for PA management are common to most of our PAs, and in addition to the ongoing small term projects, wildlife research in Mukandra Hills Tiger Reserve should preferably focus on these:

Table-8.1 Research Priorities

PA Managerial Priorities	Research Areas
A. Values Relating to PA: Ecological/ Regional landscape	1. Regional changes in species richness and diversity 2. Changes in species occurrence 3. Effect on water table 4. Habitat fragmentation 5. Endangered species: prey base, age/ sex ratio, biomass computation, life table computation

	6. Chambal hydrology and biodiversity
Habitat degradation	1. Types of exotic infestation 2. Control methods
Livestock depredation by carnivores & crop damage by wild ungulates	1. Reasons for livestock depredation percentage of livestock in the food spectrum of carnivore 2. Reasons for crop damage
Habitat management practices	1. Biodiversity conservation vis-à-vis management practices in vogue
Poaching	1. Magnitude 2. Modus operandi (variations) 3. Wildlife crime intelligence and networking 4. Wildlife crime prevention
Fire	1. Nature and efficacy of existing preventive and control measures 2. Changes in the habitat due to fire 3. Changes in animal use pattern due to fire
Insects as agents of ecological change	1. Impact (Magnitude) 2. Ecological changes 3. Periodicity
In-situ conservation	1. Founder population size 2. Translocation
Eco-tourism	1. Involvement of host-communities 2. Mechanism 3. Impact assessment
Jurisprudence	1. Morphological studies 2. Biochemical studies 3. DNA fingerprinting
Wildlife disease	1. Landscape epidemiology studies 2. Linkages between sylvatic and pastoral cycles
Animal monitoring and estimation techniques	1. Customisation of software's estimation procedure, indices for various species

	2. Home range studies

B. Biotic pressures on PA: Vision beyond the PA	1. Effect of existing land use 2. Mechanism/ strategy to mitigate ill effects 3. Magnitude of crop damage outside Pas 4. Methods for mitigation 5. Decadal population growth in impact zones outside Pas (human/ cattle) 6. Resource use pattern of indigenous people 7. Legal status of the impact zones and related problems 8. Community role in conservation 9. Levels of sustainable use 10. Grazing impact 11. Regeneration status in right burdened forests 12. Impact of rights and concessions on habitat quality 13. Socioeconomics of indigenous people and dependencies 14. Resource requirements of indigenous people and dependencies 15. Traditional knowledge and occupation of indigenous communities

	16. Impact assessments of Eco-development works

Apart from the above biological/ ecological research, the Mukandra management should also encourage the collection of relevant information on the effects of the Tiger Reserve on local economy and communities of the surrounding villages. Such social research should also be developed into reports, status papers, micro plans, and other documents resulting in the formation of effective policies for upliftment / eco-development of local communities. Although these social projects may sound purely academic or official, and may not have any immediate obvious management significance, they would prove to be of a great value later, as the present scenario of the park - people interface in our country is bound to go a very long way. At present, there is no biologist working in wildlife sanctuary Bhainsrodgarh. One student from University of Kota is working on "the presence of invasive in wildlife Sanctuary Bhainsrodgarh." Other Universities and Colleges are being contacted so that more students can do projects regarding eco-systems of the Sanctuary. Till date only one student is working on research topic in the Bhainsrodgarh sanctuary.

Future strategy: -

1. Development of Infrastructure

A. Research Labs:

One main Research Lab at Kota will be constructed. The instruments required for different field research may be procured. There is an urgent need to carrying out systematic and basic research related to habitat, herbivore and carnivore status population density habitat use pattern etc. and impact of various works being carried out in an around the Protected Area. There is an urgent need of full-time research officer, researcher and assistants.

B. Meteorological Stations:

Metrological Station at Jawahar Sagar, Kolipura, Darrah, and Gagron are to be established. There is an urgent need to take proper information and collate the data systematically.

Similarly, Chemical Immobilization equipment and drugs would also be required to capture the diseased or other wild animals in stress requiring help and treatment.

C. Constitution of Animal Rescue team:

An Animal Rescue Team must be constituted by Dy. Field Director, MHTR which will carry out the rescue and rehabilitation of wild animals. The details of team as following-

Table- 8.2 Animal Rescue team

In-charge Officer	ACF Research
Range Officer	RO Flying
Veterinary Officer	Expert member
Forester	One
Forest guard	Two

The team members will be trained in, tranquilizing, trapping the distressed animal and providing it first aid, and in application of various useful instruments.

2. Constitution of Research Advisory Committee

Table-8.3 Research Advisory Committee may be constituted with the following members

Sr. No.	**Occupation**	**Designation**
(i)	Chief Wildlife Warden, Rajasthan	Chairman
(ii)	C.C.F. & FD MHTR Kota	Member
(iii)	Dy. CF & Dy. Field Director MHTR Kota	Member
(iv)	DCF, Wildlife Kota	Member
(iv)	ACF MHTR Kota	Member
(v)	Representative from WII	Member
(vi)	Vet Doctor and MSc Wildlife Science Scholar/ Professor/Head of Wildlife Dept.	Member
(vii)	ACF, Research MHTR	Member Secretary
(viii)	Any other Scientist / Forest officials Nominated by the Chief Wildlife Warden, Rajasthan.	Member/Special invitee

The Committee would have the following main activities: -

a) To finalize the selection/identification of relevant research-based studies.

b) To review the progress of research activities carried out for the MHTR

c) Provide suggestion/recommendations for improvement and smooth functioning of the research activities.

The meeting should be arranged as per the requirement, but at least once in six months. The members would be eligible to get travelling and dearness allowance and other facilities as decided by the Government from time to time.

8.2 Research Projects

Table-8.4 The following research works must be conducted

Sl. No.	Consultancy services	Contracted Individuals/ Organizations
1	Baseline mapping of PA and surrounding areas	Kota University/ WII
2	Environmental Assessment of Regional Plan	Kota University/ WII
3	PA Level Visitor Management and Participatory Eco-tourism Study	Kota University/ WII
4	Process Documentation Research	Wildlife Institute of India
5	Documentation of traditional knowledge	Wildlife Institute of India
6	Faunal Survey, on insects, fishes, reptiles and Amphibians; Conservation Status and distribution of Rare and Endangered Animals.	Zoological Survey of India
7	Floristic Survey, Vegetation Description, Conservation Status And Distribution of Rare and Endangered Plants/Plants Communities contributed for Herbarium	Botanical survey of India, Jodhpur
8	Mapping of the Protected Area (PA) & Surrounding Areas in MHTR	WII Dehradun
9	Study on Wildlife health Disease Surveillance and monitoring	WII Dehradun/IVRI Bareilly
10	Development and establishment of long term ecological programme in MHTR with reference to physical,	WII Dehradun

Apart from above short-term research work, following research works have been conducted by individuals or organization. The detailed list of ongoing and completed research projects is attached in **Annexure-19.**

8.3 Monitoring Framework

A proper monitoring mechanism is needed to assess the impact of management prescription applied in the field and help in making necessary adjustments for future management. The following areas need continuous monitoring to help in evolving an effective management strategy for the protected area.

- Change in distribution pattern and composition of wild animals in relation to vegetation change.
- Successional changes in vegetation cover
- Change in hydrology of the area due to soil and water conservation works.
- Change in habitat condition due to management interventions.
- Invasion of weeds
- Impact of different management practices on food chain.
- Change in migration pattern of major species like Leopard, Sloth Bear, Four – Horned Antelope etc.
- Reduction in anthropogenic pressure due to eco –development works.
- Change in nature of waterholes present in Kali Sindh, Chambal, Amjhar and Ahu Rivers.

The Park Management will continue to ensure that the monitoring of biological resources forms a basic routine activity in protected area management. It is the principal way in which the management can identify trends or changes and hence gauge the effectiveness of its managerial inputs. Though it may sound an unplanned and subjective procedure, it is easy to collect useful biological information in a simple, systematic and scientific manner. The management should strive to include several useful monitoring activities in the routine duties of the staff, as well as regular annual estimation of wildlife, counts and other activities. All such data should be incorporated in the MIS in a routine manner. The Tiger Reserve should continue the present system of ecological monitoring of flora and fauna. As stated above, the Reserve has a very good network of forest camps covering all vegetation cover types and habitats of wildlife. All these forest camps will be provided with camp registers containing printed Performa of information/ data collection relating to the broad phenology of the vegetation type, species-wise animal sighting with their age-class and sex-class

structures, females with fawns, lactating females, and others etc. The Performa for recording indirect evidence of tiger and leopard has also been included. As far as management is concerned, a useful inventory could be as simple as information on the distribution of important species, whose numbers reflects important ecological processes. Even crude indications of the numbers of these animal species would add to the value of inventory. A coloured photographic guide for identification of animals has been prepared and distributed among all the field staff. A photographic album of ground flora covering many species of grasses, herbs and shrubs will be prepared and will be distributed to all field staff involved in day-to-day monitoring to facilitate easy identification of species from the management point of view. The data generated from such continuous monitoring will later be inferred/ analysed into interesting trends, and form basis for species-specific and habitat specific planning in the Tiger Reserve. The proforma of the above camp register is given below. Each Forest Guard in-charge of the respective camp must fill in the requisite information derived from the daylong patrolling of his beat. This will lead to generation of a lot of data on the basic parameters required for managing a wildlife protected area. The data can be compiled for large carnivores based on camp registers and monthly presence map for tiger an leopard may be prepared.

Format of Patrolling Camp Register for Routine Ecological Monitoring

Particulars on patrolling			Phenology			
Date	Place & Compartment No.	Time	Flowering trees/ Plants	Fruiting Trees/ Plants	Leaf fall	New Leaves
1	2	3	4	5	6	7

Herd Structure of Ungulates														
Total No. of Herds (Cheetal/ Sambar/ Nilgai etc)	All Male Herd				Female-Fawn Herd				Mixed Herd					
	Adult	Sub-Adult	Fawn	Total	Adult	Sub-Adult	Fawn	Total	Male Adult	Male Sub Adult	Female Adult	Female Sub Adult	Fawn	Total
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Various stages of antlers growth					Birth Frequency of Ungulates (15 days Intervals)		Stages of Gestation	
Males with Fallen Antlers	Males with Developing Antlers	Males with Branched velvet Antlers	Males with Developed Hard Antlers	Total	Date	Total New Borns	No. of Pregnant Female	No. of Lactating Females
23	24	25	26	27	28	29	30	31

Data/ Evidence Relating to the Leopard									
Male/ Female Pugmark (No./ Unit Distance Walked)	Urination No./ Unit Distance Walked	Scraping No./ Unit Distance Walked)	Call No./ Unit Distance Walked	Scratches No./ Unit Distance Walked)	Scat No./ Unit Distance Walked	Cattle Kill	Other Kill	Stride Measurement	Straddle Measurement
32	33	34	35	36	37	38	39	40	41

8.4 Training Needs Assessment

Wildlife management is a technical, time consuming and a challenging job. Training in wildlife management is indispensable at all levels which is considerably lacking especially in the lower-level functionaries like forest guards and forester and even among RFO and DCFs to a considerable extent. Training can be a wildlife diploma course run by Wildlife Institute of India Dehradun which is of 9 to 10 months, or short duration courses may be organized at District level or F.T.I Jaipur.

Capacity building is an important component of the present project. The project is expected to provide the major source of funding for this activity proposed in the management plan so that local human resource can be further developed.

Following is the list of areas which are likely to be covered:

- Interpretation and application of laws and regulations.

- Wildlife evidence, collection of biological samples and their interpretation.
- Wildlife diseases and other health care matters.
- Postmortem of wildlife carcasses.
- Census operations.
- Participating rural appraisal and different aspects of JFM (joint forest management).
- Rescue operations of wild animals and First-aid.
- Herbarium development and maintenance.
- Training to operate computers, GPS (Global Positioning System) etc.
- Preparation of manual GIS (Gross Information System) Identification of flora & fauna existing in the park.
- Capacity Building and training on wildlife Crime
- Reporting and monitoring through M-stripes

Formal Training Courses:

The wildlife Institute of India (WII) Dehradun has two wildlife management courses other than short term i.e. one- or two-week courses. The one at DCFs and ACFs level is ten months post graduate diploma courses and the other at Range officer's level, is a certificate diploma courses of 3 months. The staff deployed for PA management will either be already trained or will be given this opportunity in order to achieve the management goals in a better way. For training a provision of Rs 20 lakhs has been kept.

Establishing a learning centre:

To educate the staff and make them aware regarding conservation of biodiversity and to familiarize them with different aspects of wildlife management, it is proposed to construct learning cum interpretation centre adjacent to Darrah gaon Rest House. Books, magazines and other reading material will be kept there to update the knowledge of the staff and visitors.

Training Needs Assessments

Though the management of the MHTR ecosystem itself is a learning process for most of the frontline staff, the Park Management should ensure that the newly inducted staff

undergoes wildlife training conducted by various Institutes in the State and outside. Officers should be encouraged to undergo Diploma as well as Certificate and Capsule courses conducted by the Wildlife Institute of India, Dehradun for officers down to the Forest Ranger. The information about the training and institute providing training is as following –

Table-8.5 Information about the training and institute providing training

Sl. No	Course Name	Course Type	Course Duration	Participant Level	Resource person/ org.	Frequency
1	Advanced Wildlife Management	Diploma Course	Nine Months	A.C.F./DCF	WII, Dehradun	Once
2	Eco-development	Module	Three Months	A.C.F./DCF	WII	Once
3	Advanced Wildlife Management	Certificate Course	Three Months	F.R.	WII	Once

Besides these Forest Guards posted in wildlife area will be trained for wildlife management at wildlife training centre at Kota. Apart from above basic trainings, trainings on other issues will also be imparted to staff and officers like communication skills, motivation etc.

Weapon training:

The staff must face the anti-social elements including hard-core criminals, who are engaged in unlawful activities. To have an effective control, the staff must be equipped with modern arms and ammunitions and should know how to handle them. A full course training in handling the arms and ammunition will be arranged for the field staff on regular basis.

Wildlife Health Monitoring Training:

Monitoring of wildlife health and treatment of various contagious diseases require some technical skills. The staff must also know the techniques to collect samples to send it to forensic laboratory or to the research centre at WII, Dehradun for its detailed analysis.

Chemical immobilization training:

It has been realized that wild animals frequently stray near the human habitation especially during summer season. Such unusual situation creates problems, both for

wild animals and human beings. Such animals that come under distress will be safely captured to be released in the wild after proper treatment.

Tourism and interpretation training:

Tourism and Interpretation are very sensitive issues. Even a slight discourteous behaviour can defame the PA as well as the Forest Department. The staff engaged in handling the tourists will be properly trained to handle the situation in a cordial manner. In doing so implementation of various Acts and Rules, related with wildlife tourism and management will also be ensured. Similarly, staff deputed for interpretation activities will be given sufficient knowledge about the Protected Area and other ongoing activities. If the tourists are not satisfied for their queries, the purpose of extension and Interpretation cannot be achieved. A fundamental training and regular refresher course training to the staff should be done. At present no systematic training on tourism and interpretation activities has been organized.

Computer Application Training:

Use of Computer application and related software's has now become an indispensable task for day-to-day management. Application of GIS and other related software and their interpretation could improve the efficiency of the P.A. Management. All these efforts may be useful, when the staff is capable enough to handle these machines. Hence a three-week **Capsule course training** for the selected staff / officers will be arranged at Jaipur. Apart from these training some other important topics may be included if required. For the use of training imparted and management of PA, GIS related software and equipment's are proposed to be procured.

8.5 Human resources development Plan (HRD Plan)

Wildlife management is a specialized branch, which needs special orientation, skill and knowledge. Training makes a technocrat and field staff perfect in their profession. Exposure of good efforts done in the *par excellence* sight develops a feeling of motivation to achieve the goal to the same degree or sometimes higher also. Not only this, but tremendous confidence is also developed if the initiative taken is appreciated by others. Hence it is always good to initiate effort to impart special training to all level of staff in various relevant fields.

Imparting of training to the field staff and the officials posted in the MHTR has got much relevance, as they must handle sensitive bio-diversity conservation vis-à-vis eco-development issue. Although adequate technical assistance and guidance would

be availed from the concerned experts, imparting regular refresher courses covering different topics is recommended for the various levels of staff of Mukandra Tiger Reserve as following –

Table-8.6 Training courses

S. No	Course Name	Course Type	Course Duration	Participant Level	Resource person/ org	Frequency
1	General wildlife management course	Orientation Course	One week	CCF/CF/DCF	WII, Dehradun	Once
1 a	--do--	Orientation Course	10 days	DCF/ACF	WII, Dehradun	Once
1 b	--do--	Orientation Course Module I	One week	Ranger Foresters	Forestry Training Institute, Jaipur	Once
1 c	--do--	Orientation Course	One week	Forest Guard & Cattle Guard	Wildlife training Centre, Kota	Once
2	Soil and moisture Conservation	Orientation Course	One week	Ranger Foresters, & Forest Guard	FTI, Jaipur	Once in a year
3	Rural development	Orientation Course	One week	Ranger Foresters, & Forest Guard	FTI, Jaipur	Once in a year
4	Enforcement of Law and Enactment's	Refresher Course	Three days	Range officers Dy. Ranger	Wildlife training Centre, Kota	Once in six months
				Foresters & Forest Guards		
5	Education Awareness course	Refresher course	One week	ACF, Range officers, Foresters and Forest guard	WII, Dehradun for DCF and ACF. FTI Jaipur For Foresters and Forest guards.	Once in two years

The senior as well as lower field staff should be exposed to latest trends and developments achieved in different subjects related with wildlife management. Such exposure would help the field staff to carry out various management practices for effective management. A regular short- course requires to be organized from time to time for the ground level field staff to impart technical expertise to carry out various

routine works, like population estimation, water hole management, wildlife habitat management and the like.

To impart training in the above topics and other useful subjects, the selected staff should be sent to Wildlife training Centre at Kota, for which funds and equipment's must be provided.

Conducting Study tours at par-excellence sites:

Eco-development study tour for EDC members and associated staff will be organised. Wildlife management study tour for Officers & field staff to other protected areas of the country will be undertaken too.

Workshops and Field Study:

Every year workshop and field study will be organized in MHTR to share the experiences gained during field works and disseminate the new knowledge and practices being used in other PAs. Some of the topic for workshop and field study may be –

- Wildlife and its habitat monitoring.
- Understanding the objective of data collection during regular patrolling.
- Wildlife census and field techniques
- Anti-poaching, Legal proceeding and forensics
- Micro planning for eco-development in surrounding villages
- Fire protection training
- EDC Account keeping
- Environmental Education and Awareness
- PA planning workshop
- Regional planning workshop
- PA management plan finalization workshop

During these types of workshops and field trainings regular interactions/ discussions between officers and field staff will also add to the understanding of new perspectives relating to wildlife management.

CHAPTER 9

TIGER POPULATION AND HABITAT ASSESSMENT

Protocol for the Monitoring of Reintroduced Tigers

The 24 x 7 monitoring protocol using radio telemetry (VHF also) & field evidence is being done. Monthly update on the ranging pattern of individual tigers is maintained besides taking note of the status of radio collars, cattle kill, association of tigers etc.

- Monitoring teams deployed for ground tracking for each tiger daily.
- Each monitoring team is comprised of one field staff and one village wildlife volunteer
- Each team is supervised by an ACF / range officer of MHTR.
- Monthly update on the ranging pattern of individual tigers maintained and sent to CWLW and NTCA.

Facilities and equipment's:

- Motor bikes modified four wheelers are provided to each dedicated monitoring team.
- A multi-channel radio-receiver, an antenna and a coax cable provided to each team.
- One GPS and a compass also provided to each team for recording locations.
- Data sheets for recording tiger locations, kills and scats.
- Sleeping bags, torch and winter cloths also provided to monitoring teams.
- A panel of forest staff for monitoring tiger from all ranges prepared. Task of monitoring will be given to everyone for 15 days after which another team will be deployed.

Responsibilities:

Each monitoring team is assigned to receive signals from the radio-collars of the reintroduced tigers as well as to record pugmarks, camera trapes and direct sightings of all tigers and document information in required format provided in **Annexure-20**

- They will enter the GPS locations of tiger through signals, pugmarks, scent marks, scratch marks etc as well as record information of their kills. Scat samples will also be collected by field monitoring team.
- Each team must inform the movements of tiger along with other information in required format daily to the wireless control station of MHTR and keep the record of the same. The wireless control station will intimate progress to concerned supervisory officer.
- The supervising team will surveillance the activities of the monitoring teams and cross check the radio-signals and locations of the tigers.
- Daily report on tigers' status (location, movement, kills and scats) is reported to the concerned Range Officer, ACF and DCF of MHTR.
- Month wise reports will be prepared by ACF and sent /submitted to the Field Director, MHTR, CWLW, Rajasthan Forest Department.

Intensive patrolling through M-STrIPES

This system will be an integral part of security system being implemented in Mukandra Hills Tiger Reserve.

Aims:

- Assist in Effective Patrolling & Protection
- Evaluate Status & Trends of Carnivores & Ungulates at Regular Intervals
- Monitor Habitat Change
- Evaluate Human Pressures
- Generate Reports to Provide Quantitative Information for Management Effectiveness Assessment and Decision Making

Applications:

- Monitoring population status, trends, and spatial occupancy
- Mapping of illegal activities and their trends
- Guiding Park Management for patrolling - spatially and intensity
- Understanding interrelations between above parameters
- Export of data for in-depth analysis in desired format

- Entry, Analysis, Interpretation, and use of Phase I data at field level
- Ready reports at desired spatial & temporal scales and for evaluating management effectiveness and guiding decision and policy making.

Plate 9.1: Tiger monitoring

Camera trap training to field staff and village wildlife volunteers

Foot patrolling

Pugmark identification

PIP

Radio Telemetry

Field Protocols & Equipment: Patrol Data collection

- Routine / Anti-poaching / Investigation Patrol
- GPS Units (or PDA‟s) and Data Collection Forms
- Training of Tiger Reserve Staff in Data Collection and Software Entry

Field Protocols & Equipment:

Ecological (Phase I) Data collection

- Carnivore Sign Survey
- Ungulate Line Transect
- Human Pressure Assessment on Plots on Transects
- Ungulate Dung on Plots on Transects
- Habitat Status on Plots on Transects
- Fixed Location PIP‟s for Tigers (min. 5 in each beat monitored once a week)
- GPS Units (or PDA‟s) and Data Collection Forms
- Training of Tiger Reserve Staff in Data Collection and Software Entry

Implementation of M-STrIPES will help in informed decision making for management and protection for the protected area managers. The spatial output available to the managers at field level at monthly and quarterly basis will help strengthening management and protection.

Implementation of M-STrIPES:

- Each beat is traversed by the patrol and sightings; evidence and incidences are recorded as per proforma.
- Data formats are prepared in Hindi or English language for data collection.
- Staff is thoroughly trained in observation and data collection.
- Data sheet is handed over to Information Assistant (IA) at Division level monthly.
- Spatial maps are generated along with different themes like carnivore sightings, herbivore presence, fire incidences, human presence, illegal felling etc.

- All these maps are generated and viewed by Divisional Forest Officer / Dy. Director at an interval of 15 days / 1 month for the division. The same can be viewed for the Tiger Reserve by Conservator of Forests/Field Director.

  Abnormality/un-natural change in the trend in the observation must be investigated thoroughly and decision taken accordingly.

- The same will be transmitted to Chief Wildlife Warden & National Tiger Conservation Authority for information.
- The decision on patrolling, protection measures and management issues can be addressed scientifically.
- The significant changes in respect of presence of carnivore, herbivore and habitat condition can be detected and necessary intervention can be taken up.

While on regular or targeted patrolling duties the personnel shall record the following information:

1) Each patrolling team shall be equipped with a GPS unit and a digital camera besides the regular equipment (e.g. wireless, torch, etc).
2) the date, time GPS coordinates of the beginning of the patrol recorded.
3) preferably the GPS unit shall be switched on throughout the patrol in a track log mode. However, due to constraints of technical Knowhow or other issues if this is not possible then a GPS coordinate recorded and written down in the record from every 30 min or at major deviations from a straight-line path.
4) the total number of persons on the patrol are recorded along with number of armed personnel and type of arms. The mode of patrol is also recorded, e.g. on foot, bicycle, motorcycle, 4WD, boat, etc.
5) a record of all illegal activities is entered in the data sheet along with time, data and coordinate stamp.
6) A record of signs and sightings or highly endangered species while on patrol is also maintained by entering the GPS coordinate, date and time of the sighting/sign as well as recording a digital picture of the same if possible.

After the end of the patrol, the GPS track log is either downloaded on to a computer (in MSTRIPES program if applicable) or the datasheet with the recorded information deposited at the range Head Quarters. The Phase IV monitoring as well as M-STrIPES

monitoring protocol is being followed in MHTR to facilitate implementation of monitoring protocol by maintaining daily patrolling log on patrolling camps/chowki registers. Periodic reports are being generated and used for management purpose since august 2012. The patrolling intensity patrolling log, patrolling time locations is already being monitored through M-STrIPES. After every monthly report review meeting of the staff will be held for further improvement.

The M-STrIPES monitoring protocol vis a vis the customization done for the tiger reserve is very useful for continuous monitoring of wildlife, habitat & its health. Fortnightly update on date entry, storage, retrieval needs to be maintained with outputs in form of reports/ maps relating to protection & ecological aspects. These outputs if significant should be treated as Alerts. Mukandra Hills has a history of tiger extinction due to poaching. The source area is exposed and the buffer area as notified is small and would hardly have any buffering effect. Hence the tigers continue to remain vulnerable to several risks. Which interalia, include poaching, poisoning and road hits.

So, the patrolling intensity needs to be monitored through M-STrIPES.

9.1 Tiger Population Estimation and Monitoring Framework (Phase IV and MStrIPES)

This is the monitoring framework prescribed by NTCA for all forested landscapes of the country.

a. Sampling for ungulate encounter rates:

In each census unit, transects are laid according to one for each broad vegetation type. If vegetation type is same throughout the unit, then a single transect will do. Each transect line should be of 2 – 4 km. Each transect line should be walked at least three times to record the ungulate encounter rates. The encounter rates are recorded in prescribed Performa and then the ungulate densities are worked out (Buckland et al., 1993). To convert encounter rates to density, an estimate of the effective strip width of these transects would be essential. The effective strip width of a transect primarily depends on the visibility (vegetation and terrain type), ability to detect ungulates by different observers and animal behaviour response (Buckland et al., 1993). However, ungulate response is likely to play an important role in disturbed areas in determining habitat and terrain-specific effective strip width by sampling selected sampling units. Modelling the transect line in a beat is habitat-specific (Jhala and Qureshi 2004), it would be able to use these estimates of effective strip widths for converting encounter

rates of ungulates to density estimates by modelling detection probabilities. The transect lines are permanently marked on field and the same transects need to be walked year after year.

b. Sampling for vegetation, human disturbance and ungulate pellets:

The same transects used for the previous exercise can be used. Ungulate encounter can be done in the morning and the same transects can be walked back in the evening to record vegetation, human disturbance and ungulate pellets. Vegetation should be sampled on every 400m along the transect. Broad vegetation type at each sampling point is to be noted down and the canopy cover within 15m distance is visually quantified into broad categories in the proforma given. 5 species of prominent trees and shrubs are noted. If weeds are present, weed abundance need to be scored on 0-4 scale (0 being absent and 4 high abundance). Within the same 15 m radius, the observer needs to record the signs of lopping, wood cutting and presence/ absence of human foot trail. On the same sampling point, a 1 m circular plot is done to quantify the ground cover. A mention needs to be made in the data sheet regarding the number of permanent human settlements, human and livestock population in the census unit if any. At every 400 m on the transect, a perpendicular transect of 20 x 2 m is taken and all pellets (wild and domestic ungulates) are counted.

Tiger Estimation and Phase IV: Intensive monitoring of source Populations

It is proposed to stratify a Tiger Conservation Unit (TCU) into tiger sign abundance classes of high, medium, low and no tiger sign at the beat and larger spatial resolution (range 100 sq. km). In each of these strata, within a landscape (TCU), actual tiger density would be estimated in three-five replicates of sufficient size (50-200 sq. km). All known techniques of tiger density estimates should be used depending on the logistic possibility within each landscape: capture-recapture based on camera traps (Karanth 1995 and 1998, Karanth and Nichols 1998, 2000 and 2002, Karanth et al., 2004, Pollock et al., 1990, Carbone et al., 2001 and Per Wegge et al., 2004), mark recapture based on pugmarks (Sharma et al., in press) and DNA profile obtained from tiger scats (Broquet and Petit 2004, Prugh et al., 2005and Xu et al., 2005). These densities will then be extrapolated for the areas under various density classes within the landscape to arrive at a tiger population estimate. We do realise that these population estimates are likely to have high variances, but since these estimates will not be used for monitoring trends (which is proposed to be done through the site

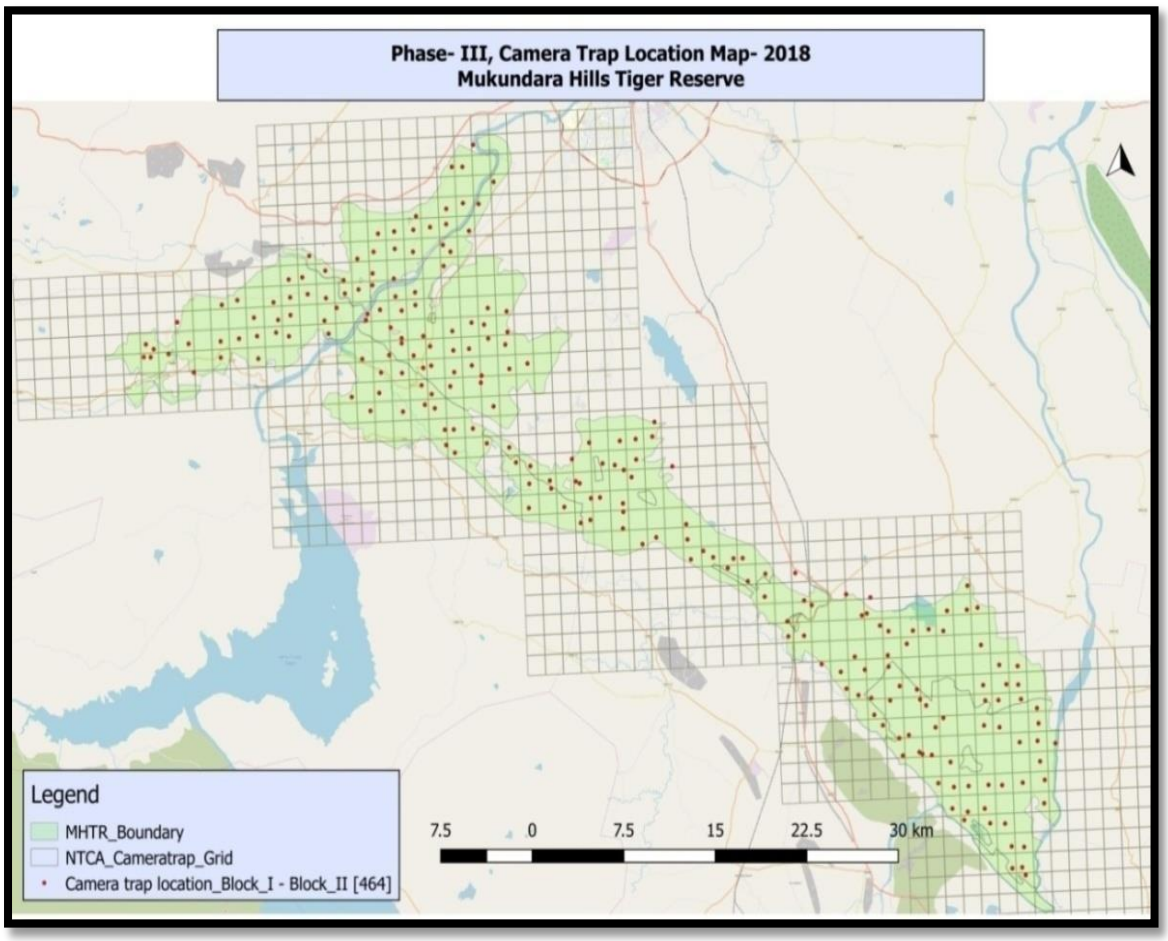
occupancy and relative abundance data), they should suffice the need for converting a relevant ecological index to a more comprehensible concept of numbers.

It is proposed that source populations of tigers (tigers in Tiger Reserves and Protected Areas) in each tiger landscape complex be monitored intensively using the following methodology.

Camera trap is the most reliable method of calculating large carnivores like big cats in the research world. This method not only gives the estimate of individuals present in that area but also helps to understand the distribution pattern of these species. Systematic deployment of camera trapping can generate various pattern of animal behaviour and movement in protect areas. The most robust population estimates derived from camera trap data apply mark-recapture analysis that assume that not all individuals are photographed and consequently attempt to estimate population size based on detection probability. There are two conditions for conducting such surveys (Matiukhina et. al., 2013-2016) one is survey must be sufficiently short to ensure that the population is closed and has no mortality, birth, immigration or emigration during the survey period and second, that multiple captures of individuals is necessary to accurately estimate detection probability.

Field design

The camera trapping for Phase IV 2023, summer session was conducted in two blocks, Block I consisted of Range- Kolipura, Rawatha, Darrah and Gagron and Block II consisted of Range- Borawas and Jawahar Sagar. In total 185 camera traps (single sided) were deployed in designated camera trapping grids, across the two blocks with a combined effort of ~5408 trap nights. The camera trap survey generated 82,628 images of animals. Twenty-six wild species were captures in 20,390 images and five domestic species were captured in 62,238 images.



Map-9.1: Location of Camera traps in Mukandra Hills Tiger Reserve

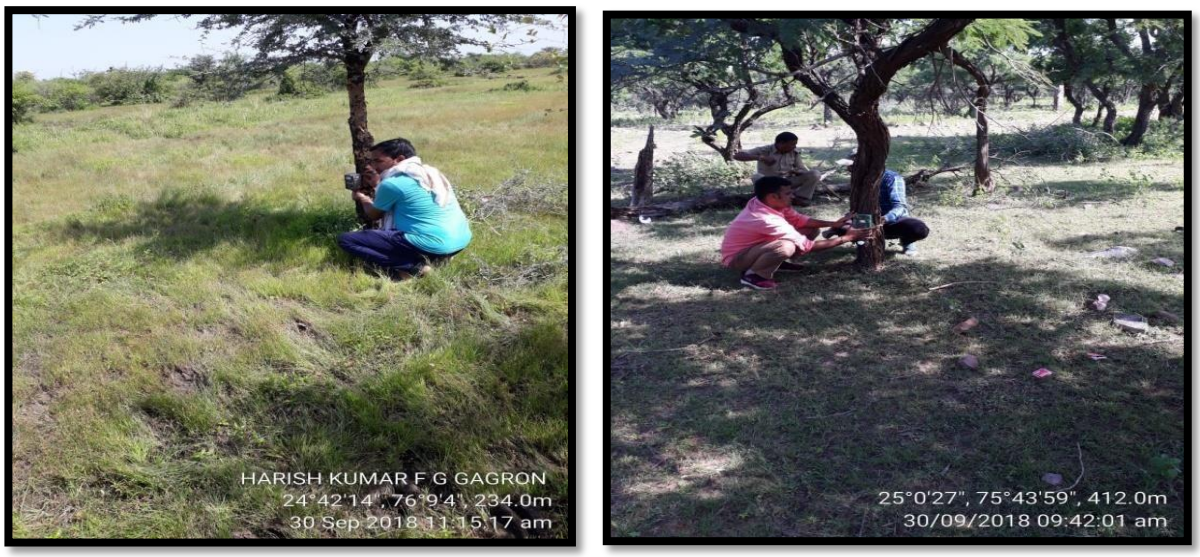


Figure 9.1 Camera trap field exercise during AITE Phase -III

Data collection method

Data was collected twice in a week. Two separate cards were made for a single camera with unique id. Unique folders were created to transfer data from the cards eg.

MUKU_001A_c001 / MUKU_001B_c001 for camera number one. Data was downloaded with the date mentioned folders.

Camera trap matrix was prepared to check the total trap nights of the camera. Every day camera was working was notes as 1 and camera stopped working as 0. List of camera trap location is provided in **Annexure-21.**

Photo registration of tigers:

Pictures of individual tigers obtained by camera traps or by regular cameras should be maintained in the form of a photo identity album. Records should be kept on the location, condition (breeding status, injury, etc) and associated tigers whenever a tiger is sighted. This will provide crude data on ranging patterns, demography and mortality.

Tiger pugmark and other signs:

Regular monitoring of tiger signs (pugmark tracings, plaster casts, etc) should be undertaken in every beat at a weekly interval with monthly compilation of data. With experience and exposure to the resident tigers and their pugmarks, the forest staff may be able to identify individual tigers from their track set characteristics (Panwar 1979, Smith et al 1999 and Sharma 2001). Sign surveys and individual tiger monitoring should become a regular task for every guard as was the practice some years ago and is currently practiced in some Tiger Reserves. The monthly data should be mapped and maintained to analyse trends.

Monitoring by telemetry in select areas:

Use modern technology of VHF, GPS and satellite telemetry to study and monitor aspects of demography, metapopulation dynamics (dispersal, ranging behaviour. In all source populations, tiger abundance and density should be estimated using camera traps, digital images of pugmarks and/or DNA profile from non-invasive methods biannually. The Project Tiger directorate will play the overall supervisory and coordination role for all the phases and tasks under each phase of the monitoring.

9.2 Habitat Assessment and Monitoring Framework

This consists of: -

a) Tiger presence and relative abundance.

b) Tiger prey presence and relative abundance and habitat quality and anthropogenic pressure at a high spatial resolution of 15-20 km^2.

We consider a forest beat (an administrative) 15-20 sq.km.in size delineated primarily on natural boundary as the unit of sampling. Since each beat is allocated to a beat guard for patrolling and protection. The boundaries of a beat are well recognized by forest staff. The sampling would be systematically distributed in all beats of tiger occupied forests (Tiger Reserve, revenue and reserve forest) Thus in effect, the entire landscape where tiger are likely to occur is sampled .The detailed methodological approach for sampling Carnivore signs, Pellet/dung counts ,habitat and anthropogenic pressure are presented in the 'Field Guide ' (Jhala and Qureshi 2004)

1. **Sampling for Tiger, Leopard, and Other Carnivore Sign Encounter Rate** To obtain data on the presence, absence and intensity of use of a beat by tigers and other carnivores, we shall quantify the relative abundance of tiger, leopard, and carnivore signs in an area. The following procedure needs to be followed for data collection:

    - A beat will be considered as a sampling unit.
    - Areas within the beat that that have the maximum potential for tiger occupancy will be intensively searched.
    - Since tigers and leopards have a tendency of using dirt roads, trails, foot paths, riverbeds and nallahas, these landscape features within the beat need to be searched intensively
    - One to three persons who know the terrain and habitat features of the beat should conduct the search for tiger's sign.
    - There should be 3-5 separate searches (in different compartments within the beat and/or at different times 1-5 days apart) each search covering about 46 km distance in areas having the best potential for tiger presence. It is important to record the distance covered and the time spent during each search separately and accurately. If time is spent resting or in other activities while conducting the search, this duration should be reported separately. If possible, the GPS coordinate of the beginning point of each search path should be recorded.
    - The total minimum distance covered while searching for tiger and other carnivore sign should be 15 km per beat.

- Tiger and leopard signs should be classified into the following categories 1) Pugmark trails, 2) Scats (Old: dry with hair and bones visible; Fresh: dry but intact with shiny surface; Very Fresh: soft, moist, and smelly, 3)

  Scrapes, 4) Scent marks (spray, rolling), 5) Rake marks on trunks, 6) Actual sighting, 7) Roaring (vocalization).

- A brief description of the topography and forest type is to be recorded for each sign.
- In case of pugmark trails, each trail set is considered as one sign (not each pugmark as one sign). In case a tiger (or other carnivore) continues to walk along a dirt road for a long distance (say 1 km), then this should be considered as one sign, and a comment recorded in the remarks section of the data regarding distance covered by a pugmark trail of a single tiger.
- Tiger and leopard signs if encountered outside of the sampling route should also be recorded with GPS coordinates (if available) and with appropriate comments.
- Special emphasis should be given to sign of tigress and leopards with cubs, and any authentic evidence of tiger cubs (sightings of cubs, lactating tigress, tracks, etc.) obtained within the past twelve months should be mentioned in the data sheet.
- While sampling for tiger and leopard signs, record should also be kept for signs of any other carnivore that are encountered.
- The number of livestock that are killed by predators within the past three months needs to be recorded in the questionnaire following the data sheet. It is important to report data sincerely. It is likely that there may be reliable information that tiger/leopard is present in the beat being sampled, but no tiger/leopard signs are recorded during the intensive search survey. In such cases, mention should be made in the remark's column of the data sheets. However, failure in obtaining tiger sign from a beat is equally important as recording tiger/leopard signs and for appropriate analysis of this data the actual data should be reported.

2. Sampling for Ungulate Encounter Rates

This protocol outlines a simple method for quantifying ungulate abundance in an area based on visual encounters while walking along fixed line transects. The following procedure needs to be followed for data collection:

- A beat would be considered as the unit for sampling.
- After considering the shape, size, vegetation, and terrain type of the beat, a transect line of a minimum of 2 km and not exceeding 4 km will be marked for sampling.
- The transect line should traverse similar habitat (broad vegetation types) as far as possible. If the beat is composed of 2 or 3 distinct vegetation types eg. Mixed Teak Forest comprising 40% of the beat and the remaining 60% comprised of Miscellaneous Forest with bamboo, then 2 separate line transects should be marked for sampling.
- The line transect within a beat may be broken up into 2 or more segments so that each segment has a minimum length of 2 km and traverses' similar habitat.
- Care should be taken that a line transect is not located near a busy road nor should it run parallel to a river or other features of the landscape which may bias sighting of ungulates.
- For each transect the point of beginning and end point coordinates (Latitude and Longitude) should be recorded by a global positioning system.
- The broad forest type and terrain type that the transect traverses needs to be recorded.
- Each transect should be walked by 1-2 persons during the early morning hours (6:30 AM to 8:30 AM). Preferably one of the persons walking should be a good field person who is able to spot wildlife.
- A record should be kept of all mammals and peafowl seen during the walk in the prescribed format. For each animal sighting the following needs to be recorded: 1) serial no of the sighting, 2) time of the sighting, 3) species (e.g. sambar, chital, wild pig, peafowl, langur, etc.), 4) group size –number of animals of the same species in the group sighted, it is important to try to count the number of animals in the group as accurately as possible. Animals are

considered to belong to two different groups if the closest animals from the two groups are separated by over 30 m.

- If possible, the number of young (fawns/calves less than 1 year of age) seen in the group should also be recorded.
- A broad habitat category (vegetation and terrain type) needs to be recorded for each sighting e.g. S. No.5. 12 chital (10 adults and 2 young) were seen at 6:40 am, in mixed teak forest, gently undulating terrain.
- Each line transects needs to be walked at least on three different mornings for estimating ungulate encounter rates.

3. Sampling for Vegetation, Human Disturbance, and Ungulate Pellets:

To quantify the habitat parameters and determine relative abundance of ungulates sampling will be done along the same line transect on which ungulate encounter rates were estimated. For economy of time and effort it would be possible to first sample the line transect during early morning hours for ungulate encounter rate and then while returning along the same line, sample for vegetation and ungulate pellets. Sampling for vegetation, ungulate dung and human disturbance will be done only once on a transect.

- Again, a beat will be the sampling unit, and sampling will be done along the established line transect.
- The beginning and end point coordinates of the line transect need to be recorded using a GPS unit.
- The same principal of laying line transects as explained in the section on ungulate encounter rates is applicable here.
- Vegetation would need to be sampled every 400 m along the transect.
- The vegetation would need to be quantified visually at the following categories for each plot: In 15 m. radius circular plot

1. Broad vegetation type and associated terrain type e.g. Grass land on hilly Plateau terrain, semi evergreen and moist deciduous forest on hilly slopes and valley etc.
2. Within approximately 15 m of the observer the five most dominant trees need to be listed in the order of dominance (abundance)

3. The observer needs to list the 5 most dominant shrub species in order of dominance (abundance) within 15m of the location. He needs to categorize shrub density (under-story vegetation) as absent, very low, low, medium, and dense. Shrubs will be assessed on five-point scale (0 to 4 i.e. absent to most abundant) for density estimation.
4. If weeds are present, their abundance needs to be scored on 0 to 4 scale (0 being absent and 4 high abundance) and the three most common weeds seen in 15 m need to be listed in order of abundance.
5. Within the same 15 m distance the observer needs to record number of signs of looping, wood cutting, and presence/absence of human foot trail.
6. The observer needs to visually quantify the canopy cover at the location. The observer should subjectively classify the proportion of the sky above him that is covered by canopy foliage and categorize it into <0.1, 0.1-0.2,

   0.2-0.4, 0.4- 0.6, 0.6-0.8, >0.8 canopy cover
7. A mention needs to be made in the data sheet regarding the number of permanent human settlements, human population, and livestock population present in the beat (to the best of his knowledge).
8. A mention needs to be made based on the observer's knowledge if any non-timber forest product is collected from the beat. If yes, which NTFP and to score the magnitude of collection on a 5-point scale (0- no collection 4-high rate of collection).

4. In 1 m radius circular plot

The observer needs to use a 2m long stick to define an imaginary circle around him with the stick as the diameter. Within this circular plot (2m diameter) the observer needs to a) quantify the percent ground cover, i.e. the proportion of the ground covered by herbs, grasses, litter, and bare ground, b) List the 3 most dominant grass species, and herb species in order of dominance.

5. Sampling for Ungulate Pellets

- ❖ Ungulate abundance will also be indexed by enumerating their faecal pellets. This exercise will be done on the same line transect that has been sampled for ungulate encounter rate. To save time, this exercise could be

done after the line transect has been sampled in the early morning for ungulate encounters.

- ❖ At every 400 m along the transect (line of walk) the observer needs to sample an area of 2m by 20m, perpendicular to the transect for quantifying ungulate pellets. This is done by using the 2 m long stick held at the centre horizontally in his hand and by walking slowly, 20m right and left of the transect alternately at every 400m
- ❖ All ungulate pellets encountered need to be recognized to ungulate species and recorded in appropriate columns of the attached data sheet
- ❖ The number of faecal pellets needs to be counted. In cases where the pellets occur in large heaps, then they should be categorized into the following categories: A (50-100), B (100-200) and C (>200).
- ❖ In areas where small livestock like sheep and goat are known to be grazed, it is possible that faecal pellets of these can be confused with wild ungulates especially those of chital. In such areas, a mention needs to be made that goat or sheep graze the area.
- ❖ In the last row of the data sheet the observer needs to report if ungulate/animal listed in the data sheet occurs in the sampled beat to the best of his knowledge irrespective of whether its pellets/dung were recorded in the plots.

9.3 Spatial Database Development:

The spatial data generated will be scientifically robust, and amenable for statistical analysis and inference. Since several replicate survey will be undertaken in each beat, it would possible to model tiger occupancy ,detection probability of tiger sign, and relative sign density at a high spatial resolution .Since data will be analysed in GIS domain several spatial attribute like human density; livestock density ,road network, topographical features, forest type and cover, meteorological data, poaching pressure and landscape characteristic will be used as covariates to model tiger occupancy and relative abundance in a landscape and individual forest patches. Time series analysis of data at a larger spatial resolution is likely to have sufficient precision for monitoring spatial occupancy of tiger in association with changes in tiger prey, habitat quality and anthropogenic pressures.

It should be tried to address the issue of reporting inflated numbers by laying emphasis on animal signs instead of numbers. Furthermore, the resolution of the data generated will be reduced to four five categories (high, medium, low and absent). Several corroborating variables like prey encounter rates, pellet group counts, and habitat condition will help in ensuring quality data; discrepancies in reporting will be easy to pinpoint. There would be an audit mechanism in place to scrutinize the data collection, compilation and analysis. National and International experts would act as observers while officers in- charge will ensure adherence to the prescribed protocol and transparency of protocol implementation.

The system once institutionalized and implemented, will not only serve to monitor tiger population but will also monitor the status of other biodiversity resources of all tiger occupied landscapes, truly exemplifying the role of tiger as a flagship. It will serve as an effective tool for decision makers. Managers and conservationist alike and will guide and plan land use policy at a landscape level.

9.4 Analysis and Reporting Framework:

Tiger monitoring team would be formed in MHTR. DCF (WL) MNP, Kota will be responsible for monitoring. Similarly, Forest Range Officers will be responsible for monitoring of wildlife in the forests under their jurisdiction. For this the exiting staff, Field Biologists of Mukandra Hills Tiger Conservation Foundation/research scholars/ NGO workers/volunteers should be involved. At range level each Range officer shall coordinate the team. The teams should constitute from concerned field staff. Assistant Conservator of Forest, Darrah shall be the overall in-charge of the Tiger Monitoring team.

A technical committee for monitoring the teams shall be formed as follows:

Field Director MHTR	-	Chairman
DCF (WL) MNP, Kota	-	Member
DCF, WL, Kota	-	Member
ACF, Darrah	-	Member Secretary

The field level monitoring shall be coordinated by Research Officer/ACF.

A final annual report shall be prepared and submitted to the committee for discussion and the corrected version of the report shall be submitted by the Field Director to Chief Wildlife Warden of Rajasthan and Member secretary NTCA New Delhi.

CHAPTER 10

PROTECTION AND INTELLIGENCE GATHERING

The comprehensive plan for protection and intelligence gathering based on the NTCA guidelines, with provisions for security auditing, networking and exchange of wildlife crime data with other prosecuting agencies within and adjoining States should be prepared.

10.1 The Tiger Cell

Along the basic lines of the Tiger Cell to be created at the State Govt. level, a similar cell will be created in the Field Director's Office at Kota. The Cell will be entrusted with the responsibility of gathering information relating to offenders, and to establish an intelligence network and monitor the progress of pending court cases related to wildlife offences. The Cell will also collaborate with the local NGOs, Police department and informers for achieving the above objectives.

There will be a body especially meant to coordinate the anti-poaching efforts of police and forest departments. The cell will review poaching/anti-poaching scenario at the headquarters from time to time and will send appropriate directions to field officers. All major anti-poaching actions will be undertaken by the SP and DFO under the aegis of this cell.

10.2 The Task Force:

10.2.1 District level Wildlife Protection Task Force:

This task force will be chaired by the Collector. SP and DFOs will be the members. They will plan joint operations related to anti encroachment drives and raids against illicit felling and poaching gangs. The committee would be as follows:

Table-10.1 District level Wildlife Protection Task Force:

1	District Collector	Chairman
2	Superintendent of Police	Member
3	District Government Pleader	Member
4	DCF, WL, Kota	Member
5	ACF/ Range Officers	Member
6	Deputy Director & DCF	Convener

This task force will be constituted to effectively monitor the detection and prosecution of wildlife offences. It is also suggested to set up a legal cell to help investigation and to ensure maximum punishments to poachers and traders of wildlife products.

10.2.2 Deployment of Tiger Protection Force:

Concerned beat guard of the beat is supposed to be responsible for the protection of flora and fauna of his beat, but it is unavoidable to provide some help to control the commission of forest offences. In addition to this, some anti-social elements also become active during festive occasions. Similarly, a few persons of some local tribe always look for an opportunity to kill wild animals to sell in the nearby markets. To supplement the protection activities, constitution of a separate Tiger Protection Force is being felt.

According to the direction of NTCA special tiger protection force must be deployed in MHTR. The Special Tiger Protection Force would be under the direct control of a Dy. Director. The Deputy Director of the reserve would ensure the proper functioning of the force. There should be a schedule of patrolling prepared by Deputy Director and supervised by ACF for each party of Tiger Protection Force.

The Special Tiger Protection Force will be equipped with firearms and provided a vehicle & mobile wireless. The task of creation of Special Tiger Protection Force is under consideration by CWLW and DG Police, Rajasthan.

Till the Special Tiger Protection Force is created a Wildlife Protection Strike Force at the tiger reserve headquarters should be constituted. This force would comprise of ex-army personnel and local people. The professional expertise of ex-army personnel and knowledge of track available with the local people would complement the effort of field staff to strengthen protection. Important features of this force would be:

1. The strike force will need to be professionally oriented through a capsule field training and equipped with wireless, weapons and vehicles apart from due authorization to perform the task. It would be under the control of the Deputy Director & DCF MHTR.
2. One squad of the Strike force would compromise of 10 ex-army personnel (including four gunmen) and 15 local persons to cover an area around 100 sq. km. There would be one Supervisor (ex-army) per squad. It is proposed to have 10 squads for Mukandra Tiger Reserve. Proper uniform dress code would be prescribed for the strike force.

3. The Strike Force would have the same immunity as any other Government field functionary for act carried out in good faith to protect wildlife and their habitat.
4. The ex-army personnel for the said force may be directly recruited from respective District level Sainik Kalayan Board and local person through Eco Development Committees (EDCs).
5. The budget, transport and other facilities, at par with the CRPF and other such organizations must be given. This Strike Force will act in any area against illegal intruders, timber mafia, poachers, armed grazers etc.

10.3 Strategy for Protection and Communication

10.3.1 Patrolling plan:

Beat Tracking- MHTR is divided in to beats. Every beat should have three staff including ex-army personnel. The bigger beats can be divided into sub beats for effective tracking of the area. The beat headquarters would be as close to the beat as possible or tent/chowki should be raised inside the beat for effective tracking of the beat area. The tracking must invariably start at sunrise and most part of the beat should be traversed on foot to collect evidence of tigers and other animals and at same time record evidence of wood cutter/ poacher of any other illegal movement that has occurred during last night. The same must be reported to range headquarters and division headquarters on the same day. Every beat must be provided fixed and handheld wireless set.

10.3.2 Anti-poaching camps

In Tiger reserve anti-poaching camps will be set up at places where poaching incidences have been reported in the past and no infrastructure of forest department exists in the vicinity of these sensitive places. As night patrolling alone cannot solve problem of poaching in such remote areas establishing anti-poaching camp is the only remedy left. The anti-poaching camps consist of minimum one person from Forest Department and one person from local village (Village wildlife volunteer).

10.3.3 Night Patrolling

(a) Range level

- Regular patrolling by vehicle – In charge Range Officer/Forest

- In a week regular patrolling at night would be done by RO/forester in sensitive areas. 5 Members of tiger protection force and local range staff would do the patrolling.
- Joint patrolling by forest and police
- Once in a month joint patrolling would be done by RO and local SHO of respective police station.
- Full moon fortnight Night patrolling

At range level once in a week before full moon night and once in a week after full moon night, night patrolling would be done in the whole range. Every naka would patrol sensitive area in his beats.

Range officer would coordinate and supervise the night patrolling throughout the range.

(b) Division level

- Night patrolling by ACFs & DCF
- Once a weeknight patrolling would be compulsorily done by ACFs & once a month by DCF in sensitive areas.
- Flying squad – Night patrolling

Night patrolling by divisional flying squad will be done twice in a week on the routes given by DCF/ACF, the flying squad will also coordinate with local range officers. The flying squad will also do joint patrolling with the ASI and 2 Constables every fortnight.

Intelligence Gathering Team

One team will be separately created for intelligence gathering and chasing poachers, apprehending wanted poachers and collecting information about illegal wildlife trade and allied activities. The team would be equipped with a separate vehicle. Local People will also be engaged. The team will operate in different areas under the control of DCF.

The team would comprise of suitable forest staff, ex-army personnel in tiger reserve to have an eye on the movement of poachers on the periphery. It will also collect information about the activities of Moriya's and wildlife traders in Sawai madhopur, Bundi, Karauli, Dausa, Tonk and Kota districts.

Joint Raids Police & Forest

Forest & police will conduct joint raids once a fortnight. The forest team will be headed by ACF while police party by Dy.SP. Sudden raids will be conducted at possible hideouts of the poachers and intensive searches will be made. This will greatly help in preventing poaching.

Deployment of Border Home Guard

Two company of Border Home Guard are deployed at range headquarter for prompt help to patrolling parties.

Reward to informers

Suitable reward to informers will be paid and secret register will be kept without declaring names of the informers. The register would be in personnel custody of DCF.

Incentive to staff

The park staff that is doing good work of tracking, information gathering, chasing and apprehending offenders will be suitably rewarded to keep their moral high.

Wildlife Crime Cell at Division Level

Crime cell will be established at division level comprising of on ACF, Data entry operator and one office staff.

Proposed protection plan:

Endangered species international trade and market forces are compelling the man to kill brutally the innocent creatures of nature to fulfil his greed. A good protection plan can ensure the well-being of wild animals in the area. The aim or concern of a protection plan is prevention of wildlife crime. This can be ensured by creating fear of being caught and punished in poachers. A fear of being detected and heavy penalty will ensure the protection of animals. The following steps, in addition to the ongoing anti-poaching strategy in MHTR are suggested in this regard.

1. Proper patrolling
2. Early detection of offence
3. Subsequent follow-up action- lock-up facility and lock-up operating protocols equivalent to police stations.
4. Effective prosecution

5. Strong presence of staff in the field and forests department should be in dominant position. While in field photograph the area and find the position of fallen antlers whether these are extracted or not or in intact position. Depending on that one should plan to patrol the areas.

Preparation of crime map

There is a need for preparation of crime map of divisions. Similarly, crime map will also be prepared for range level. A good crime map should have all the information about interstate boundary (Rajasthan-M.P. boundary), roads, vantage points and permanent camps that have been established for the purpose.

Proposed Patrolling plan

It is important that before patrolling the area one should understand the poacher's mind set and the detection of the crime should be done based on kill report, death report and wildlife articles. There may be risk. So, detection of risk is equally important for safeguards. A good show of strength helps in protection. The probability of being caught should be increased and create fear in the poachers. There will be both patrolling; vehicle or patrolling on foot patrolling.

Patrolling plan

There will be seven patrolling parties one in each range and one at division level. Each party will have one four-wheel vehicle with wireless, torch, two handsets of wireless, two rifles (ex-Army) and rest eight with lathi. One forester will lead the patrolling party. Concerned range officer will be the overall in charge of patrolling party. These patrolling parties will also cover Bundi-Kota passage and Chambal-M.P. areas along with MHTR to check the offenders.

10.4 Intelligence Gathering and Coordination

Catching wildlife poacher on the spot is very difficult and is only possible if PA management has strong intelligence network. Strong intelligence management depends on the efficacy of field staff, proper liaison with local villagers and proper availability of infrastructure. Developing proper infrastructure network around protected area helps in achieving the objectives. Once information is received reaction time must be small to catch the offender's red handed. This needs well trained and equipped force. Those who do good work in catching offenders will be suitably rewarded. Villager who helps in giving valuable information will also be rewarded.

For this sufficient secret information fund should be available with Field Director for getting information about poachers. Developing reliable informers is a must. After careful evaluation informers can be created among the hunting community directly or through some middleman. There are some people who are against such hunters in villages and town they can also be utilized. Poaching gangs after having internal rivalries can be utilized against each other and this can be means of good information about poaching.

Training centre must be well grounded with infrastructure and staff. It should work as a wing of FTI, Jaipur. The situation of training centre is excellent to provide training in practical aspects of tracking in the field, monitoring wildlife census techniques, tourism management, eco-development issues and park related poaching.

10.4.1 General strategies for controlling poaching:

The following strategies are proposed to tackle the menace of poaching:

1. Improving Staffing Pattern

The effective protection of the wildlife reserve depends on the strength of the staff. Apart from number, the quality of the staff in terms of health and training is also desired. There has been no fresh recruitment of the staff at the RFO and forester level for more than 20 years. This is the cutting edge of the department. These two cadres represent the department in the field. They are the persons who actively form the front-line staff. Trained, educated and young persons can deal with the crime better. It has become increasingly difficult to entrust them with tasks requiring certain level of training and education. Apart from this, additional pressure of communication with villagers to enlist their participation in protecting the reserve has been put on the staff. The staff also lacks regular training required to keep them fit and take coordinated action against poachers and the miscreants. Regular recruitment of the staff in required number is must.

The staffing pattern will be designed to meet the special needs of the reserve and regularly reviewed after every five years.

Special strike force will be created through careful selection and training with police force. A separate proposal for STPF is pending at state level.

Women staff has been inducted in the lower cadres to deal with women offenders.

2. Mobility

With change of time, the criminals have become equipped with fast vehicles, sophisticated weapons, mobile phones etc. The Park is not able to compete with the criminals with their existing level of operation. It will be helpful to provide gypsy/bolero to all Range Officers and Motorcycles to all Foresters. Cycles should also be kept in Range Offices and Forester's office which can be used as per the need of patrolling. It is also suggested to keep one tractor at Range Office for patrolling on hard terrain.

3. Control over Use of Fire Arms around the Park

Many people hold firearms around the park. There is a need for strict compliance of provision of section 34 of the Wildlife Protection Act 1972. The registration of weapons should be completed within stipulated time frame.

4. Control over Mining Activities

Many mines are operating close to the park. The department has no control over these mines. Explosives are very frequently used on these mines legally or illegally. It not only adds to the confusion since the explosions can be used to camouflage gunfire used for poaching. The mining activity also attracts communities as labour force, which resort to poaching. Therefore, it is essential that no mining should be done within designated eco-sensitive zone around the MHTR.

5. Firearms

It is required that firearms are provided to all officers from Field Director down to Forest Guard. Each patrolling party will be provided with firearms. The Government Order empowering forest officers to firearms is grossly inadequate. As an example, the government order restricts use of firearms in the night whereas the most poaching take place at night only.

6. Restriction of unauthorized Movement in the Park

Many villagers tend to move in the park and many a time stay there for several days. Such movements are done on the pretext of grazing animals, wood gathering, worshipping etc. This unregulated entry provides opportunity to the poachers to enter the forest to commit serious wildlife crimes. This will be closely monitored, regulated and checked from time to time.

10.4.2 Secret Information and Wildlife Crime Prevention:

The poachers generally have serious criminal behaviours. The traditional hunting communities and nomadic tribes have vast network throughout the country through marriage alliances. Inquiries have shown that information about nomadic tribes becomes very essential for preventive action to be taken to curb wildlife crimes.

At present there is no establishment or arrangement like 'THANA' to control/prevent wildlife crime. To begin with it is proposed to establish" Wildlife *Crime Control Cell"* at Kota. The cell should function day and night. One officer along with 6-8 forest personnel and a vehicle should be available for the job.

Storeroom and "Malkhana" will also be constructed at appropriate places for safe custody of arms and materials seized under various Wildlife offences.

Following steps are required to prevent wildlife crimes by professional hunting tribes:

- The forest staff should be vigilant about the movement of the hunting communities and nomadic tribes. The camps of the nomadic tribes will be searched, and an eye will be kept on their activities. It will be ensured that no such camps are allowed in the vicinity of the park.
- Forest Department will establish checkpoints to ensure that vigil is kept at all entry points and exit points to the Reserve and the roads leading to it.
- There will be random checking of transport services
- such as trains, buses etc. at regular intervals by forest officials.
- The department will recruit women staff to carry out search and nab culprits since it is suspected that most of the illegal trade is done through women.
- The department will use all means and help wildlife enthusiasts to develop network of informers in the villages, railway stations, bus stops, and cities to obtain speedy information on the crimes. Rewards to informers will be given
- The patrolling methodology used by the field staff will be suitably modified so that their movement and secrecy match that of a poacher.
- The staff is not trained in anti-poaching activities. Every year trainings will be organised for selected anti-poaching staff.
- There are inadequate weapons and ammunition. Every naka have at least one rifle gun issued. The staff will be trained annually in handling these weapons

- The prevention, detection and prosecution of forests and wildlife offences are very dismal. The record keeping and disposal of the cases is very poor. Well educated and trained forester capable of handling offence cases will be posted. Regular monitoring of cases is recommended. Separate lawyer appointed for dealing with wildlife cases will be appointed at Kota.
- Mechanisms of reporting cattle kills, and speedy compensation will be ensured.
- There is an urgent need to reduce man animal conflict and in improvement of relationship of forest department with the villagers.

Poaching is mostly carried out because wild animals stray out in the agricultural fields. The locals employed in crop protection are mostly involved in poaching. Villagers provide full protection to these locals. There is a strong link to the crop depredation and poaching by locals. There is an urgent need to identify such sensitive areas, where crop raiding is common. The crop damage compensation and cattle compensation cases will be finalized as early as possible. Range officers will process the cases and get the compensation at the earliest possible. All compensation proposals will be prepared and sent to DCF within 15 days of the incidence. Division should issue sanction order within 7 days as DCF is now authorised by CWLW to pay compensation. Availability of the funds all-round the year must be insured especially for compensation. Normally the late release of CSS sanction is major cause of delayed payment of compensation. At any cost the compensation should be paid to the person concerned within 60 days of the incidence. At present crop compensation scheme does not exist. The same scheme should be introduced at the earliest.

The Eco development committees will be activated to solicit the support of the villagers in anti-poaching drive. This will also help in developing network of informers.

The Forest Department & the Police Department will work in close coordination in the drive against poaching, training of Forest Staff and developing network of informers.

10.4.3 Field Level Improvements:

The wildlife protection requires substantial improvements at field level. A few are listed below:

- There should be round the clock readiness of the flying squad and the officers to nab the culprits. It is essential that there should be two flying squads in each

division with separate staff and vehicles for day and night. Each vehicle should be provided with two drivers.

- The maintenance of Village crime report for each village should be made mandatory at Naka level and should be reviewed by ACFs and DCFs.
- All cases should be reviewed before ACFs and further DCFs before finalizing for compounding / filing charge sheet in the court.
- Tourism/VIPs/Protocol should be separated from the protection duties and suitable infrastructure. A post of ACF should be created for tourism.
- Each Range Officer should be empowered to operate secret information service fund. The fund limit may be kept as below:

    1. Range Officer: Rs.30000 per year with max. Rs 1000 each time.
    2. DCF: Rs. 3.00 lacs per year with max Rs. 5000 each time.
    3. Field Director Rs.5.00 lacs. per year with max. Rs 10000 each time.

- There should be two legal advisors/crime assistants for the Tiger Reserve at Kota.
- There are many counter court cases and offence cases filed against the staff. This has discouraged staff in taking initiative in prevention. The counter cases are treated as private cases of the individual officer himself. All such cases must be treated as government cases, unless otherwise proved.

  Professional training to deal with wildlife offence cases should be imparted regularly.
- Forensic kits may be developed.
- Secret list of persons with criminal track record and involved in poaching either officially convicted or not, should be prepared at range level. Constant watch should be maintained on such persons.
- The ground level staffs are either old foresters and forest guards or uneducated semi-permanent cattle guards. The motivational levels are very low. Young and energetic staff should be specially deployed for this specific job.
- At range level, 5-6 forest guards should kept as reserve for emergency calls, so that any information related to poaching can be checked.

- There have been a few cases of villagers electrifying the fencing. Wild animals are getting electrocuted due to this. Villagers should be dissuaded from electrifying the fence.
- There is no malkhana to keep the seized offence material and wildlife products. One such warehouse (malkhana) should be constructed at the Range level.
- The system and procedure of forensic investigation is not well settled and laid down. Lot of confusion prevails while sending the seized wildlife material for forensic analysis. Lots of institutions like WII and Hissar veterinary college should be contacted, and agreement should be finalized for analysis.
- The teams involved in the anti-poaching operations should be rewarded properly.
- Training for judiciary, police and other law enforcing should be organised. Forest department should take lead and conduct training programmes.
- Government to be approached for declaring Wildlife Wing at par with police and they should be exempted from election duties and other duties.
- Computerized record keeping of crimes and other information should be taken up. Mechanisms of exchange of information should be evolved to have better understanding of the modus operandi of the poachers.
- The service conditions of the wildlife staff should be suitably modified so that they can work with motivation Modifications are required in conditions of leave entitlement and mess facilities etc.
- There should be prescribed time frame for investigation and filing charge sheet. Award Scheme and out of promotion Scheme should be framed to motivate the staff.
- A percentage of compensation realized in offence cases should be given to the staff.
- Forest Officers should be empowered with police powers under Arms act within 10 kms. radius from the periphery of the Tiger Reserve.

10.4.4 Security Plan by addressing Human-Wildlife Interface

The Security Plan will be for the entire Mukandra Hills Tiger Reserve (both core and buffer area). Protection is one of the most important activities in the biodiversity conservation of the Reserve. It lays stress on defence against interference, damage or destruction of any kind by the human beings and the cattle including illicit felling, grazing, NTFP collection, poaching, encroachment and fire etc. However, the following factors militate against efforts of Tiger Reserve management in ensuring protection:

1. The Tiger Reserve is surrounded by large number of human habitations.
2. The poverty in the fringe areas coupled with the demand for the forest and wild animal products exerts a considerable pressure on the Tiger Reserve.
3. Inadequacy of skilled manpower resources.
4. Inadequate intelligence network for providing timely information about impending activities.
5. Difficulty in detection and prosecution of cases.
6. General lack of awareness, understanding and support from the fringe communities.
7. Hunting by local people.

10.4.4.1 Objectives

1. To maintain and conserve biodiversity by providing efficient protection
2. To maintain and conserve viable population of tiger and its prey species
3. To check illegal and unscientific harvesting of NTFP and fuel wood
4. To enhance capacity building of staff
5. To provide infrastructure for protection
6. To save the Mukandra Hills Tiger Reserve from all forms of biotic/ anthropogenic pressures in terms of – Cattle Grazing, Poaching, Fuel Wood and Fodder removal, Fire, Encroachment & Mining, Boundary Demarcation & Mutation of forest land, Bawarias & other traditional hunters, Relocation of Villages.
7. To develop human resource to utilise them in best possible way for protection.

8. Use of modern technology and equipment enabling effective protection.

10.4.4.2 Problems in achieving the objectives

1 Inadequate staff

2 Patrolling is difficult in monsoon

3 Illicit felling and collection of NTFP

4 Improper boundary demarcation

5 Human settlements-16 villages situated in the core zone.

6 Price tag attached to wildlife products in international market, Chain of people involved in wildlife trade outside jurisdiction of Tiger Reserve Management

7 Lack of proper intelligence gathering network for Prevention of offences

8 Low motivational level of frontline staff and Officers

9 Lack of proper equipment and other resources to deal situation

10 Hostile attitude of local people and administration

10.4.4.3 Protection Strategy

The overall patrolling strategy of the Mukandra Hill Tiger Reserve includes the following features:

- Staff / chowkies listed with duty allocation and route chart. The teams are equipped with mobile wireless sets.
- The patrolling teams systematically cover the area allotted to them
- Special instructions/ provisions for squads
- Surveillance: hotels, tourist points, vehicles, bus stand, trains and other means of transportation on the fringe of the Tiger Reserve and nearby towns.
- Surveillance of traditional hunters
- Coordination with local police
- Sanctioning labourers for patrolling
- Networking
- Preparation of daily schedule
- Regular checking of marketplaces

- Surprise checking of barriers
- Preparation of “crime maps” with periodic updating
- Monitoring cattle kill, human kill, injury incidences and crop raiding
- Monitoring issues relating to compensation
- Monitoring water points near habitation
- Preparation of crime gang dossiers at range level
- Preparation of individual crime dossiers
- Monitoring of habitual offenders
- Preparation of monthly Crime Map on 1:50,000 scale indicating location of each crime with date.
- Conveying progress to Field Director/ Dy. Director daily through wireless
- Deviating from routine schedule during emergencies
- Taking note of offences registered in local police station
- Using tape recorder/ camera etc. to record evidence
- Special monitoring of water holes near human habitation during the pinch period
- Surveillance of half-eaten carcasses of livestock on account of carnivore depredation to be carried out to eliminate the possibilities of poisoning for retaliatory killing by local people.
- Continuous monitoring of the area where more than three incidents of livestock depredation are reported within a fortnight.
- Village level crime registers to be maintained at the EDCs level to keep track of villagers involved in wildlife offences.
- Maintaining list of vehicles passing through manned barrier and surprise check by senior officer at such point every month.

10.4.4.4 Security Plan-

In Mukandra Hill tiger reserve following activities, *inter alia*, form part of the Security Plan:

a) Raising, arming and deployment of Special Tiger Protection Force.

b) Use of information technology in wildlife crime prevention.

c) Launching M-STrIPES for field patrolling and monitoring conservation status of Tiger Reserve.

d) Deployment of antipoaching squad with proper equipment.

e) Establishing and maintenance of existing patrolling camps/chowkies and deployment of local work force/ Home guard/Border Home guards/ RAC for patrolling.

f) Organising vehicular patrolling by constituting squads comprising of field staff/ local work force/ Home-guard/ Border Home guards/ RAC /ex-army personnel, with wireless handset and paraphernalia for apprehending offenders, apart from prescribing a patrolling calendar for the squad.

g) Establishing and maintenance of wireless network.

h) Organising surprise raids jointly with the local police in railway stations, local trains, bus-stops, buses and possible hideouts of poachers.

i) Ensuring special site-specific protection measures, during monsoon as

Operation Monsoon – considering the terrain and accessibility.

j) Deployment of local work force / ex-army personnel / home guards/Border Home guards/RAC at sensitive places to enhance protection status of Tiger Reserve and ensure effective action against offenders.

k) Deployment of local work force for patrolling, surveillance of water holes, manning barriers, secret information, awareness generation.

l) Procurement of arms and ammunition.

m) Procurement/maintenance of Range level Anti-poaching squads.

n) Rewards to informers.

o) Legal support for defending court cases.

p) Procurement of vehicles, boats and other equipment like field gear, night vision device etc.

10.4.4.5 Strengthening of infrastructure

The following activities, inter alia, would form part of reinforcing the infrastructure in

Mukandra Hills Tiger Reserve

a) Civil Works (staff quarters, family quarters, office improvement, patrolling camp, housekeeping buildings, Interpretation Centre, Barrier Check post, culverts).

b) Maintenance, creation and upgradation of forest road network.

c) Maintenance and creation of wireless Network.

d) Maintenance and creation of fire watch system.

e) Maintenance and creation of bridges, Water harvesting structures, anicuts.

f) Maintenance, creation of fire lines.

g) Maintenance and creation of earthen ponds.

h) Procurement, maintenance of vehicles (Modified four-wheeler, Jeep, Canter, Tractor etc.)

i) Habitat improvement work including grassland development, weeds eradication, drinking water etc.

j) Procurement of hardware, software and Geographical Information System (GIS).

k) Procurement of compass, range finder, Global Positioning System (GPS), camera traps.

l) Procurement of satellite imageries for management planning.

m) Map digitization facility for management planning.

Standard Operating Procedure (SOP) will be followed for Security Plan indicating the resources available, process of ensuring effective protection through law enforcement, detection of offences, apprehending poachers, chasing cases in court of law and ensuring conviction of offenders.

Proper Supervisory checks at Range officer level, ACF level, DCF level and Field Director level will be ensured for protection of habitat, prey and reintroduced Tigers in Mukandra Hills Tiger Reserve.

Security auditing will be done for various protection measures adopted in Mukandra Hills Tiger Reserve to know efficacy of programme. The activities like secret information cover in and around tiger reserve, poaching threat, detection of offences,

follow up of court cases, conviction rate etc would security audited from time to time at reserve level. For effective protection strategy the Information regarding Beat, Naka & Range in MHTR is given in **Annexure-15 and details of barriers, watch towers and wireless stations is enclosed in Annexure-22.**

Requirement of Wireless Sets in Wildlife Sanctuary Bhainsrodgarh

S. No	Place	Fixed Sets	Handsets
1	Naka Saddle Dam	1	2
2	Naka Agra	1	2
3	Naka Ganeshpura Chowki Bheem Choraha	1	2
4	Naka Luhariya	1	2
5	Naka Luhariya, Chowki Bridge Side	1	2
	Total	**5**	**10**

10.5 Fire Protection.

Forest fires are mainly caused by people driving or walking through the road in the core, villagers passing through core, honey gatherers, grazers & tress–passers. The fires are ground fires in which the dried grasses and the litter gets burnt. Canopy fires are not observed in this area. The fire incidences in MHTR are enclosed as **Annexure-23.**

A fire protection plan based on the NTCA advisory on fire protection will be prepared every year keeping the experience of past years in view. Both preventive and combative measures will be adopted for protection of forest fire. Forest fires are mostly experienced during summer months e.g. April to June, hence a close vigil will be kept for early detection of fire.

Existing Fire lines:

1. Ranwtha to Laxmipura.
2. Bevada Talai to Khinmuch B.
3. Khinmuch B to Mashalpura
4. Block Khinmuch B to Gadde ki gadar (near rest house Darrah)
5. Forest block Manoharpura to Darrah near tower line
6. Jhamra block Manoharpura to Darrah near Padampura
7. Kethuni Kharla block Ghatoli to Damodarpura block
8. Block Ghatoli Bandar muta to doliya

9. Block Chandbaodi Bagghi Road to Borabas.

10. Kothla to Laxmipura mataji

वन्य जीव अभयारण्य, भैंसरोडगढ में फायर लाइंस की सूचना

S.No.	Name of Fire Line	Length (In Rmt.)	GPS Starting Point
1	कालाखेत वाटर हॉल से भवानीपुरा तालाब	3975	N 24^0 55' 44" E 75^0 32' 45"
2	फुटपाल रास्ते से बडलाखेडा तक	3000	N 24^0 50' 42" E 75^0 28' 27"
3	गणेशपुरा से चम्बल नदी तक	2500	N 24^0 49' 43.356" E 75^0 28' 45.0474"
4	बहेलिया नरेगा प्लांटेशन से दीवार तक	2000	N 24^0 49' 16.576" E 75^0 29' 5.643"
5	वृक्षारोपण कांटीराम नगर से रातौली कराई तक	2000	N 24^0 50' 21" E 75^0 31'21"
6	चुलिया फॉल–रियेक्टर होते हए पाडाझर मंदिर छत्री तक	3000	N 24^0 55' 13" E 75^0 34' 38"
7	चारा डिपो लुहारिया से पीर मगरा चौकी तक	3000	N 24^0 55' 25" E 75^0 28' 49"
8	ब्रिज साईट से कालाखेत वॉच टावर	3000	N 24^0 55' 38" E 75^0 33' 22"

(i) Preventive Measures:

The preventive measures will include creation of fire lines in Fire sensitive and grass bearing areas. Besides this awareness camps will be organized to obtain people's cooperation to prevent forest fires 3 Km fire lines creation is proposed during the plan period.

(ii) Combating Measures:

These measures will be taken up to extinguish forest fires once it occurs. Prompt detection of fire outbreak and communication is of utmost importance for this purpose. Watch towers will be constructed at suitable sites on high hills for keeping a watch on outbreak of fire. Existing watch towers in the reserve areas need repairs, besides this some more watchtowers will be constructed during the plan period. Each watch tower will be equipped with a team of two to three firewatchers and a wireless set for quick communication in case of fire incidence reported in fresh area. Local people will also

be motivated to cooperate in firefighting operations by providing cash or kind incentive.

10.6 Control on removal of Fuel wood and fodder

The local population has been using dried wood, as firewood for their domestic purpose but the existence of large towns like Borabas, Bhainsrodgarh, Rawatbhata, Dabi, Dhaneshwar, Darrah station, Dhabadeh, Suket, Ramganjmandi and Kota on the periphery of the core have prompted the local people to collect the fuel wood for selling in these markets. Regular patrolling of wood depots in these markets coupled with patrolling and protection in sanctuary area may help to check this practice to some extent. The Gas authorities will be coordinated to supply more LPG connections in the township on priority basic. Alternative source of energy will be provided, and people will be motivated to adopt them. Participatory meetings will be organized for creating awareness among the people in the interest of conservation of the core.

Lopping & Cutting of Trees:

The tiger reserve is surrounded by number of villages. There are 16 villages inside and more than 100 villages outside the core area within 5 km from the boundary of the tiger reserve with a large human population and a cattle population. So, the entire pressure of the livestock surrounding the sanctuary is on the forest area because the people are dependent on forest resources in terms of firewood and fodder. Lopping of Dhok, Salar, Khakhra, Kalam, Ber and many other species is done on large scale for feeding the domestic cattle. Tendu and Bamboo are used for house construction, repair and for manufacturing agricultural implements. However, no organized or commercial cutting of trees except for firewood has been observed in the core. The area towards Ramganjmandi and Suket is famous for its Kota stone quarries. Thousands of labourers are working in these areas and are totally dependent on forest for firewood. The villagers of nearby villages cut the wood and sell it to the nearby towns like Suket, Dhabadeh and Ramganjmandi. The maximum consumption of wood is during winter. The incidence of illicit wood cutting during winter is more.

Strategy:

1. Though the field staff is protecting the forests and wildlife of the core, their protection efforts will be strengthened by equipping them with more wireless sets mobile as well as stationary, especially in sensitive areas. Education and awareness will be created among local population about ill effect of such practices.

2. The eco development committees would be constituted in the villages surrounding the core within 2 km periphery and eco developmental activities shall be started.
3. The concept of Kulhadi band panchayat would be promoted.
4. Check points should be strengthened with staff, protection equipment's & communication network.

10.7 Removal of Encroachments

The encroachment in the area adjoining the boundary is primarily for agriculture. In some cases, the encroachment on forest lands is only for fodder by Gurjar community residing in the area. The area is vulnerable to encroachment because –

1. The boundary demarcation is not clear as most of the boundary pillars are missing.
2. The field staff is not well versed with the boundaries, or they pay very little attention.
3. No proper land record is being maintained at Range or Naka level.
4. Adequate survey staff is not available for resolving the dispute.
5. Mutation of forest land in the revenue records is incomplete.

Strategy:

Demarcation of the entire tiger reserve will be done a fresh with permanent boundary pillars for protecting the tiger reserve from encroachment. Maps and records will be prepared even for smallest unit of management, that is beat, and it will be made available to the lowest functionary i.e. Forest Guards. Encroached forest area is to be evicted by resorting to strict legal action and adherence to the government guidelines against encroacher. Regular patrolling during pre-monsoon period and rainy season will be carried out to check and counter encroachment efforts. The patrolling will be more intensive in the sensitive and peripheral areas.

Boundaries:

The strategy for achieving the objectives envisaged in the TCP is multi – pronged. The boundaries and rights of local people within the reserve are required to be known with maximum accuracy to enable the management to identify the area accurately on the ground. Settlement as per the provisions of Wildlife (Protection) Act 1972 and survey and demarcation of boundaries is the major prescription for success of this strategy.

Demarcation:

The area of the tiger reserve is not properly demarcated on ground, which causes many managerial problems. The field staff finds it difficult to protect the land from encroachment that sometimes results in grave conflict of the staff with the encroachers. The boundary demarcation was done in the areas declared as reserve forests but in most parts of these areas the boundary demarcation pillars are either damaged or missing. However, the entire area of the tiger reserve needs a fresh and permanent demarcation.

Erection of Boundary Pillars:

Survey points are marked on the ground and at every survey point a boundary pillar is built for further reference. The line between these points separates the boundary of the forest area from the other land areas. After marking of the survey points, both internal & external boundary pillars are built at respective points as per the prevailing rules.

Maintenance and repair of boundary pillars would be carried out every year just after the monsoon. Demarcation registers and maps with GPS coordinates would be maintained both in Range Offices and the Divisional Office. The Range Officer with the help of field staff will check the boundary pillars and get the damaged ones repaired and missing ones replaced. They will send the verification certification to the FD and Dy. C.F. at end of the year.

10.8 Human – Wildlife Conflict

The local population in the past had access to forest with limited control. After the promulgation of forest act and wildlife protection act the free access has been restricted–

- The villager's accessibility to the forest recourses has been banned.
- There is ban for collection of minor forest produce and grazing.
- The entry to the core is restricted. There is a growing feeling that the core has been created for tourists and the core no more holds promise for villagers.
- The wild animals cause damage to crop and their domestic animals which result in poaching of wild animals.

Proposed strategy

1. The villagers should be encouraged to go for permanent fencing all along the forest and village, but care should be taken that it doesn't compromise the corridor value.
2. The damage to the crop and the domestic animals should be adequately compensated.
3. The cattle compensation should be implemented.
4. The degraded areas on the periphery of PA should be developed as pasture or medicinal plants /MFP farms.
5. The entry fee to the core includes eco development surcharge, the money must be spent back in the region for development.

10.9 Control on Mining

1. Mining is another major problem in the MHTR. Mining in the areas adjoining Core area is primarily for sandstone, rubble stone, Kota stone and in rivers kalisindh Amjhar for bajri.
2. The boundary demarcation is not clear as most of the boundary pillars are missing. The forest land records are not properly maintained.
3. The field staff is not well versed with the boundaries. Very little attention is paid to guard the boundaries, boundary marks, compartment boundaries etc.

   No proper land records are being maintained at Range or naka level.

   Adequate survey staff is not available, for resolving the disputes.

General strategy:

1. Patrolling of the boundaries of the PA should be done regularly to check if there is any breach of the boundary line and whether illegal mining is there.
2. DCF, ACF, ROs should personally inspect sensitive areas from time to time as per the norms and the report thus obtained should be monitored in the review meeting.
3. All the broken or removed pillars are to be replaced immediately.

CHAPTER 11
ECOTOURISM AND INTERPRETATION

11.1 Organization Setup and Management

Tourism though has last priority in the wildlife management it can be an important activity to generate revenue and employment for the local communities and thereby making their stakes on tiger conservation.

The term ‘Eco-tourism was coined in 1983 to describe the nature-based travel with emphasis on nature education, management and development of sustainable tourism product and activity. It has gained impetus since last decade and is an internally accepted tool for conserving biodiversity. The government of India in its Tourism

Policy has defined eco-tourism as tourist’s visits for being close to nature to enjoy its enormous creation both biotic and abiotic, in a most environment friendly manner without any adverse impact in the ecosystem. However, in the definition, the welfare of the local people who are the major stakeholder of the ecosystem is not mentioned but in its policies’ cardinal principal interests of the local people is well covered.

Therefore, eco-tourism aims at the enjoyment of nature at the same time understanding the ecology, without destructing its support system, leading further to economic benefits of the indigenous people. Eco-tourism has various intricate linkages with different forms of activities with domestic, regional and international characters. It can play an important role in state’s economy and conservation initiatives.

In Mukandra Hills Tiger Reserve, there is scope of developing Eco-friendly tourism with the involvement of various stakeholders. This will benefit both PA and local people. A proper survey and assessment would be the primary activity for the above intervention. Though, activities like home stay for the tourists in the village cottages could be exciting where they could get experience of rural life with eco-friendly activities. They could also enrich themselves by participating in learning rural arts and crafts. This would benefit local communities.

Presently there is no organized setup for eco-tourism in the reserve as well as in the state especially related to wildlife, mainly due to the sensitivity of the area, lack of plans and coordinated approach. Now, the available staffs like forest guards and casual daily wager manages the tourism. There is scope of organizing the tourism set-up for

the park. There can be special trained staff and set-up which would be looking after the Tourism related activities.

11.2 Objectives:

The plan envisages strengthening the cause of conservation of the reserve through conservation-oriented tourism and to become a centre of nature education in this region.

11.3 The Strategies:

To promote Eco Tourism, following tour circuits which will cover an average of 1020 Km route distance and two boating routes which already exists are proposed so that the tourists can enjoy all above with least disturbance to the wildlife –

1. Navlav-Prempura-Masalpura-Mandibara-Ghati.
2. Navlav-Rajpura-Khanpura-Haripuradandiya-Masalpura-Mandibara
3. Darrah gaon (Darra FRH)-Bevda talai-Dooth ghati-Phoot talab-Sunderpura
4. Darrah gaon-Gadde Ka Mala- Jhamra- Laxmipura & back.
5. Rawatha -RamSagar- Mandargarh.
6. Kolipura, -Girdharpura-Chand baori- Teen – Manzil.
7. Selzar-Selzar watch tower-Teen manzil
8. Jawahar Sagar-Tappukuda-Ambarani
9. Borawas-Dobiya khan-Selzar watch tower-Lachanbawoari-Narsinghmata
10. Ratkangara-Gebernath-Jawarsagar viewpoint-Borawas
11. Boating at Kishorpura to Garadia mahadev and Jawahar Sagar dam to titanic island

Road Safari Routes in Wildlife Sanctuary Bhainsrodgarh:

12. From saddle Dam to Crocodile point to Dam viewpoint to RAPP viewpoint and back to Saddle Dam. - 10 KM
13. Saddle Dam Range Head Quarter to Saddle Dam Village to Indira Gandhiwatch Tower to Baheliya Watch Tower to Forest block Kolgarh to Baheliya gram to Chainpura to Saddle Dam Range Head Quarter. -25 KM
14. Saddle Dam Range Head Quarter to Chainoura to Padajhar Mahadevto

Mortooka Village to Bridge side to Chulia falls to Saddle Dam Range Head Quarter. 22 KM

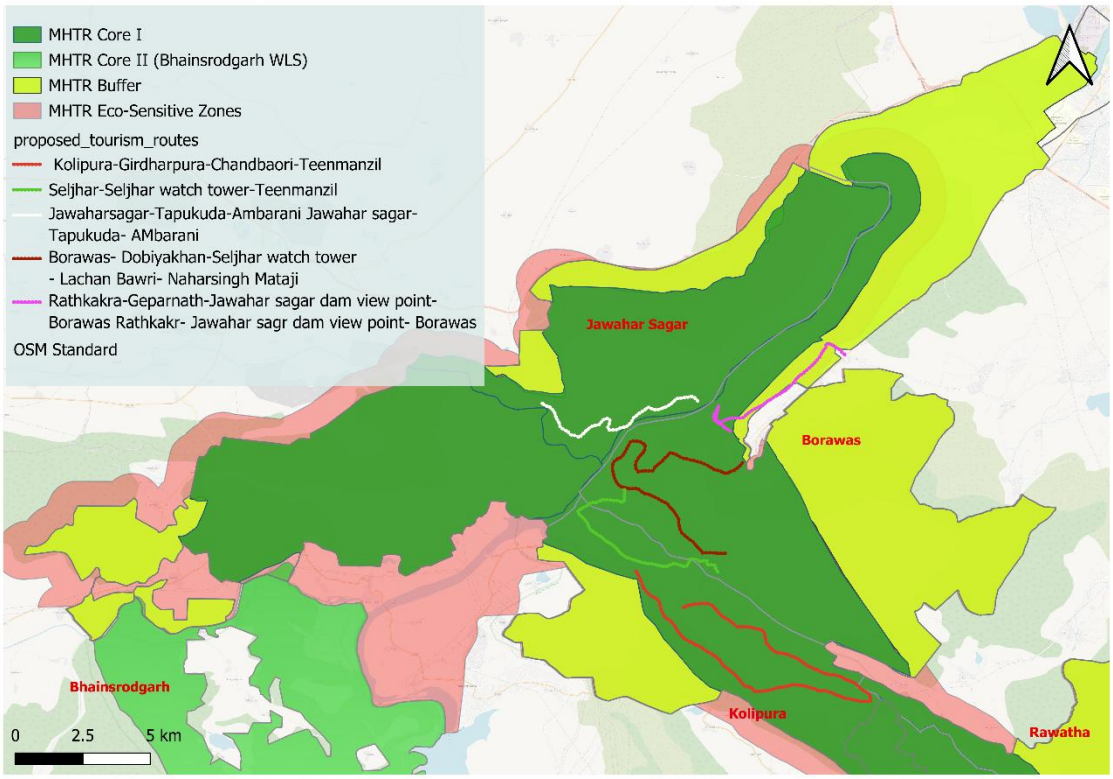
15. Saddle Dam Range Head Quarter to Rewajhar gorge Dutitalai to Agra gorgeto kalsiya Mahadev ti Agra Kala amba to Kharnai Road to Saddle Dam Range Head Quarter. - 100 KM

Boat Safari in Wildlife Sanctuary Bhainsrodgarh:

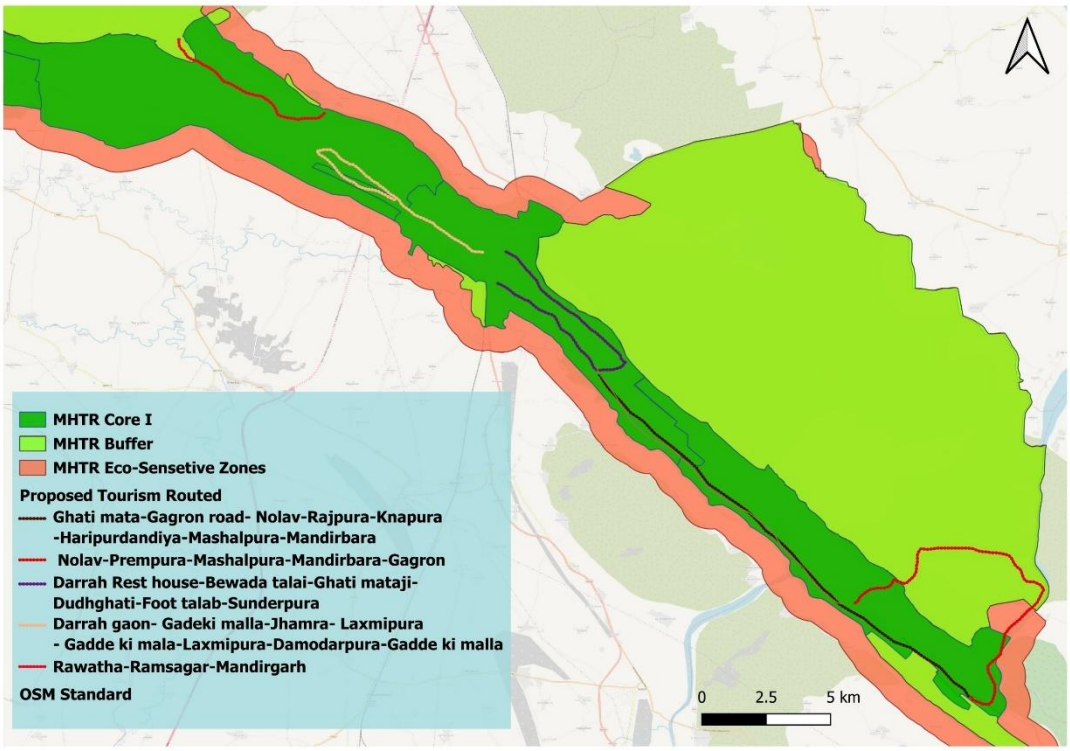
Agra Jetty near Bheru ji ka Mall to Gora deep to Nimadi & Gol Dungri to Nimdi jetty back to Agra Jetty- 40 KM

Creation of Interpretation centre at Saddle Dam:

There is a need of Interpretation centre at Saddle Dam Range Head Quarter, in which the Specialty of Bhainsrodgarh Wildlife Sanctuary can be depicted like presence of Otters, crocodiles a series of Gorges at River Chambal, Chuliya falls, Animals like civet, leopard, sambar, four horned antelope etc.



Map 11.1: Map Showing Proposed Core Tourism Zones in Borawas, Kolipura, and Jawahar Sagar Ranges



Map 11.2: Map Showing Proposed Core Tourism Zones in Darrah, Gagron and Rawatha ranges

A total length of around 128 Km of road length is proposed for developing tourism. All these forest kacha roads already exist in the area. Based on the NTCA guideline and field condition, the effective visibility and impact on both sides of the route is 200m each. Only 12.31% of the core area is proposed for tourism. Currently the tourism zone is widely distributed in whole the reserve without violating the 20% core area cap based on NTCA guideline (Normative Standards for Tourism activities and Project Tiger) Guidelines, 2012. Because the tiger reserve is situated in four districts of the state. Due to the inherent linear shape of the reserve, it is inevitable to have an impression of opening most area for tourism. Gradually based on the village relocation and field conditions the tourism zones will be rearranged for effective wildlife habitat creation.

To attract tourists apart from renovating historical malas, facilities will be developed at following places from where tourists can watch wildlife and beautiful landscape.

1	Laxmipura	5	Kolipura
2	Ram Sagar	6	Ranwtha Mahal
3	Mandargarh	7	Darrah gaon
4	Gagron	8	Selzar

The financial provision for the above will be made in the budget to meet growing tourism demand in Hadoti area which in due course will help preserving wildlife and eliminating offences through frequent visits of the area.

To create awareness about the conservation of flora & fauna and to follow ethics while visiting the reserve, eco-friendly roadside signage's, are proposed to be erected. Besides this poster will be prepared and displayed at various hotel premises in Kota, Jhalawar and around the MHTR, highlighting the flora & fauna. A brochure of tiger reserve will be prepared containing the information about MHTR. One interpretation centre will also be constructed at suitable location based on survey study.

11.3.1 Identification of Tourism Zone:

An exclusive tourism zone would be created as per the NTCA guidelines order vide Letter F. No. 15-31/2012-NTCA dated 15-10-2012 and will be monitored by the Local Advisory Committee (LAC) to enable visitors to view a cross section of PA values and get recreational value of wilderness by visiting following areas:

1. Waterfalls and Dams.
2. Religious temples.
3. Interpretation Centre.
4. Trekking.
5. Nature Trail.
6. Amphitheatre.

Selection of zone is done such that waterfalls, river side's, landscapes and dense forest area is covered in a small compact area. Entry of tourists could be permitted through *Nayagaon, Rathkankara, Kolipura, Mandergarh, Ranwtha, Morukalan, Gadde ka mala, Nolav*, *Gardiya and Ambarani,* barrier.

11.3.2 Facilities which could be made available at entry barrier: -

1. Park entry permission slip
2. Tourist guide
3. Drinking water

11.3.3 Proposed Initiatives under Ecotourism:

1. Bird watching.

2. Learning and experiencing indigenous knowledge and people.

3. Folk Arts & Crafts.

4. Amphitheatre for film shows staging folk dance, skits and ethnic art.

5. Establishment of orientation centre at *Barriers.*

6. Development of souvenir shops at entry points.

7. Creation of literature package, brochure, books, guides related with flora, fauna, local people, documentary films, caps, T-shirts on Reserve, calendars, posters etc

8. Putting sign boards on strategic places for Education & Awareness.

9. Interpretation centre (The Park has in *Garadiya in core*. The plan envisages interpreting Ecology of Deciduous Forest, animal and birds of the reserve. Experts would be consulted in this regard it will also have a small museum of the history of the wildlife, people and traditions of the area).

10. At present there is no vehicle for the tourists. Cycles etc would be tried for the tourists for trekking selected trails in the Core area.

11.4 Determination of Carrying Capacity

Depending upon the prospects of tourism in the park and based on ground realities this too needs to be calculated. The methodology for estimating the carrying capacity has been modified from *(*Cifuentes 1972).

The following three levels of carrying capacity are computed:

- Physical Carrying Capacity (PCC)
- Real Carrying Capacity (RCC)
- Effective or Permissible Carrying Capacity. (ECC)

Each subsequent level constitutes a reduced capacity level of the level which it precedes.

As per Hon'ble Supreme Court's order and directions of National Tiger Conservation Authority not more than 20 % area of the CTH can be used for Tourism purposes. Area of CTH of MHTR is 417.17 sq. km and Tourism area cannot be more than 83.434 sq. kms. Accordingly, tourism management in CTH has to be decided.

1. Physical Carrying Capacity (PCC):

PCC is defined as follows

PCC = A*V/a*Rf

A = Length of forest road or Standing Area

V/a = Vehicles per km

Rf = Rotation Factor

Rf = Total Hours for which park opens in a day/Duration of a trip

Rf = 8/4 = 2

Thus, PCC =130*2.00*2 =520 visits/day

PCC = 520 visits/day

PCC is limited by following factors:

- Road Erosion
- Disturbance to wildlife
- Temporary closing of sites

These factors are considered as follows:

-Road Erosion

Total Road Length = 130 km

Medium Erosion Risk Road (A1) = 14.0 km

High Erosion Risk Road (A2) = 10.0 Km

Low Erosion Risk Road (A3) = 106.0 km

Weightage factor for Medium Erosion (f1) = 2

Weightage factor for High Erosion (f2) = 3

Weightage factor for Low Erosion (f3) = 1

M1 = A1*f1 + A2*f2 = 14*2 + 10*3 = 58

M = A1*f1 + A2*f2 +A3*f3 =14*2 + 10*3 +106*1 = 164

Cfe = M1/M*100 = 58/164*100 = 35.37

Cfe = 35.37 %

- **Disturbance to wildlife**

Disturbance to Chital & Sambar = 2 months

For Chital & Sambar, Cfw1 = period of disturbance/total period*100 = 2/9*100 = 22.2%

Disturbance to Tiger = 2 months

For Tiger, Cfw2 = period of disturbance/total period*100 = 2/9*100 = 22.2%

Cfw = Cfw1+ Cfw2

Cfw = Cfw1+ Cfw2 = 22.2+22.2 = 44.4% say 44%

Cfw = 44%

- **Temporary closing of sites**

Cft = (1 limiting weeks/year)/36 weeks/year*100 = 2.75%

MC = Managerial Capacity

Managerial Capacity denotes the administrative capacity to manage the tourism.

The Administrative Capacity to manage the tourism is constrained to following factors:

- Staff is inadequate to manage the tourism
- The facilities for booking are inadequate
- There is no system of providing information to remote tourists
- The staff is not trained to manage tourism
- No Communication facility exists with tourism cell
- The educational qualification of the staff is inadequate
- Supervision in extensive area is difficult
- There is shortage of vehicles for supervision inside the park

2. Real Carrying Capacity (RCC)

RCC = PCC*(100-Cfe)/100*(100-Cfw)/100*(100-Cft)/100 =
520*(100-35.37)/100*(100-44)/100*(100-2.75)/100

= 520*0.646*0.560*0.973

= 183.027 visits/day

RCC = 183.027 visits/day RCC

= Real **Carrying Capacity Assumptions**

- Vehicular movement is permitted only on forest roads; hence road length is more relevant than area
- 'Standing area' is not relevant, but closeness between vehicles is important
- There is a required distance of at least 300 m between two vehicles to avoid dust (two vehicles/km)
- Three hours are needed for a single visit
- The PA is open to tourists for 9 months in a year and 8 hours a day
- Linear road length for tourists = 128.38 km

3. Effective Permissible Carrying Capacity (EPCC)

EPCC = RCC*MC

MC = 50%

EPCC = RCC*MC = 183.02*0.50

= 91.51 or 90 vehicles/day (app.) EPCC

= 90 vehicles/day

Thus, Number of vehicles to be permitted per trip would be – 45

Thus, Number of road kilo meter per vehicles would be 45 /2=22.5

Proposed kilo meter per vehicles would be- 45/2=22.5

Thus, the carrying capacity has been calculated as 24 vehicles per trip as per guidelines of the NTCA.

EPCC = 47 vehicles/day

Thus, Number of vehicles to be permitted per trip would be 24

Thus, Number of road kilometer per vehicles would be 128.38/24 = 5.3 km

Proposed kilometer per vehicles would be 128.38 /47 = 2.73 km

11.5 Implementation of Ecotourism Guidelines

Ecotourism provides for sustainable management of the resources without putting any pressure on it. Following operational guidelines are proposed for the implementation of Ecotourism:

11.5.1 For the Park Management:

- The ecotourism should be flexible, site-specific, and participatory and should form part of a larger eco-development plan.
- Assessment of the existing situation before future planning.

The ecotourism package can include:

1. Simple boarding and lodging facilities in harmony with the surrounding area.
2. Proper network in the identified tourism zone.
3. Self-guided Nature Trails.
4. Local transport facilities (*Cycles* etc).
5. Interpretive exhibits.
6. Way-Side exhibits.
7. Signage.
8. Observation Towers.
9. Public conveniences.
10. Garbage disposal facilities.
11. Staff quarters.
12. Care should be taken to prevent noise, visual pollution and only aesthetic architecture should be used.
13. Ensuring that eco-development work for identified beneficiaries is supported by soft loan from the EDC.
14. Care should be taken that no other developmental activity is coming up around the eco-tourism zone.
15. Recognition scheme in the form of award can also be established for the best eco-friendly service provider.
16. Visitors should be provided with information on Do's & Don'ts and other information and interpretation services.

17. Training programme on eco-tourism should be planned and taken for administrators, planners and operators. The host communities can be trained in hospitality business etc.

11.5.2 For the Tour operators:

- To abide by the planning, restrictions, codes and standards prescribed by the authorities.
- Implementation of desired environmental principles through regulation.
- Being sensitized towards the conservation of endangered species and biodiversity value.
- To ensure construction of structures that blends with the environment as per the prescribed building code.
- Usage of local materials, eco-friendly structures, avoiding over construction and ensuring employment for local skilled people.
- Use of Polythene bags etc should be discouraged.
- Energy and water saving devices should be used.
- Proper use of signage's as per the code of conduct.
- Control of noise, air and visual pollution.
- Respect towards historic and religious sites.
- Ensuring proper interpretation, marketing for the eco-tourism products.
- Ensuring hygiene, safety and security of visitors.
- Ensuring regular training of their staff.
- Abiding by Do's & Don'ts.
- Avoiding wastage of resources, littering.
- Respect for local cultures and traditions.

11.5.3 For the host community:

- Respect the value of environment and cultural heritage
- Avoiding overuse of resources
- Cooperate with the authorities in ensuring environment friendly and healthy tourism
- Avoid getting exploited.
- Abide by the set code of conduct and cooperate with the authorities.

11.6 Park Interpretation Programme:

It is important to convert a tourist visiting the Park into an *Eco-tourist*. This is possible by having a well-planned interpretation programme. An Eco-centre has been established at Garadiya in Jawaharsagar Range. But there is need to develop a plan for the functioning of the centre. Interpretation centres are also proposed in *Gagron and Nayagaon* when the new safari routes open.

The other components having education and entertainment value which helps in better understanding and appreciation of the concepts of conservation could be:

- Amphitheatre.
- Model nurseries depicting the importance of the native floral species found in the area.
- Library.
- Signages.
- Wayside Exhibits.
- Souvenir Shops etc

Museum of local arts & crafts, history of wildlife in the area, forest types, traditional architectures, paintings, old literature or manuscripts, maps of the area etc.

CHAPTER – 12

MISCELLANEOUS ISSUES

12.1 Housekeeping of departmental elephants

MHTR doesn't have any setup of departmental elephants.

12.2 Wildlife Health Monitoring and Disease Surveillance

Often processes of reintroduction and conservation breeding of endangered species, especially of large carnivores are high on stake. Success rate of such interventions is crucial for the management and define future flow of funds and directions of conservation interventions. Apart from ensuring adequate ecological and habitat interventions, and their monitoring management of health risks is also extremely important to maximise the survival of translocated animals and minimising the risks of health hazards.

Inside the Darrah enclosure, prey species are continuous, brought in from zoological parks and enclosures, where the animals are in close contact with humans, making them exposed to novel diseases or parasites from human presence and anthropogenic environment. When released into the wild there are chances of communication of such novel diseases into the native wildlife community that are often not immune to such novel diseases.

The enclosure harbours a significant number of stray cattle. Additionally, with the exiting loopholes in the enclosure walls and fencing, livestock and cattle from the villages in proximity also protrude into the enclosed habitat. Influx and movement of stray dogs and feral cats into the enclosure has also been observed. Such instances increase the probabilities of spatial, temporal, and dietary overlaps among the wildlife and domesticated animals, increasing the chances of introduction of novel health hazards to the existing wildlife and possess risks to the introduced carnivore species.

The World Organization for Animal Health (OIE) and the International Union for Conservation of Nature (IUCN) have established a process known as disease risk analysis to analyse and manage the potential results of scenarios involving health concerns in initiatives such as conservation breeding and translocation, which attempts to identify any potential health hazards that should be taken into consideration, offering an analysis based on evidence, existing in the native wildlife domain, and

posing a threat to the reintroduction of the species in question. Although many infectious diseases that affect carnivores have developed over millions of years in natural ecosystems, the risk of disease transmission to populations lacking immune systems is increased by rapid changes in land use, climate change, and intercontinental travel. (McCarthy et al., 2007, Munson et al., 2008; Barker et al., 2022). Therefore, to better manage the prevention and mitigation of any such potential outcomes, it is imperative to conduct a thorough scientific assessment to determine the prevalence of potential carnivore diseases in the carnivore populations and ungulate populations at the release site.

Many of the debilitating infections that have been reported to affect carnivores in India (Arora, 2003; Nayak et al., 2020) are either native to the country or are easily transmissible from domestic species. While there are many disease reports in captive settings, there is little information available about free-ranging carnivores, and there is currently no active disease monitoring program in place nationwide for these animals.

Among India's free-ranging carnivore species, several significant illnesses have been identified. At least four wild tigers in India have had canine distemper confirmed as the cause of their deaths (Nigam et al., 2016); however, a recent outbreak of the disease in the Gir landscape has resulted in the deaths of a sizable number of Asiatic lions (Mourya et al., 2019). In the past, rabies has been reported in Indian wild cats, such as tigers and leopards, but these cases seem to be uncommon (Burton 1950). In addition to this, several non-domestic felids in India have been reported to have protozoans such toxoplasma and babesia, as well as diseases including TB (Arora 2003), leptospirosis (Arora 1984), and feline panleukopenia (Sharma 1997).

Similarly, livestock and wild ungulate interactions can also lead to increases transmission of such load between them. Although not many studies in India have concentrated on such aspect; (Takuldar et al., 2020) recorded significant differences in parasitic load in case of Swamp Deer at varying levels of livestock interactions. Citing such existing scenarios, it is important to address the following aspects:

A. Assessing the prevalence of existing diseases/ disease risk load, its hazard and management strategies in

- wild ungulates (Sambar, Spotted deer, Chinkara, Nilgai, Macaques, Langurs and Wild Pigs)

- carnivores including leopard, hyena, wolves, golden jackal,
- Feral livestock inside the established 82km^{2}enclosure, and domesticated livestock, feral dogs, and domestic felines along the periphery of the reserve.

B. Assessment of risk from augmentation of prey species (chital) from human intervened areas zoos etc, and their risks to the native wild ungulates and transmission and screening prior to bringing in and releasing the populations into wild.

C. Measure the degree and spatial spread of these feral dogs and domestic livestock and cattle inside the forests and assess the degree of interaction of these species with the various taxa of wildlife inside the enclosure.

D. Assessment of the risks for disease relates carriage/ infection or mortality based on the existing risk scenarios, for concerned wildlife species that is being planned for reintroduction in near future for the rewilding process of the enclosure.

12.2.1 Disease surveillance and Prophylactic Immunization:

Protected areas are established with an aim to conserve components of biodiversity to maintain their status in the natural ecosystem to protect the species from premature extinction. Outbreak of fatal diseases among the population of wild animals has lost considerable wild fauna in the past. Large-scale mortality of Bison in South India during (1968 and 1975) and Kaziranga National Park (1981) by Rinderpest and by Foot and Mouth Disease (FMD) in 1952 had been reported in the past. Dissemination of a number of diseases, like; Rinderpest, FMD, Anthrax, TB and Rabies are common in wild animals. To maintain a good health status of the wild animals, efforts for disease surveillance is extremely important in the Protected Areas.

There is a great competition of survival among wild ungulates and cattle for both forage and water. The domestic animals encounter wild animals, particularly ungulates at common grazing fields and at waterholes. Due to this, chances of the transmission of various fatal infectious diseases from livestock to wild animals, namely Rinderpest (RP), Anthrax, Foot and Mouth Disease (FMD), Haemorrhagic Septicaemia (HS)etc., are extremely high. It is also known that there are few diseases which are communicable to carnivores form diseased ungulates, e.g. Rabies, Anthrax, Hydatidosis and Trypanosomiasis (Arora, 1994)

Free-ranging wild animals are as susceptible to diseases as any other living beings. Diseases have been a major cause of local extirpation of a number of wild animal species in India. With the increasing interaction between wild and domestic animals, the chances of disease transmission amongst them are high. Therefore, like the attempts made for recording the occurrence of disease outbreaks in wild animals of protected regions, efforts will be made to know the occurrence of specific infectious and contagious diseases in domestic animals at the periphery of the protected wildlife areas. Until and unless different epizootiological cycles of various parasitic and infectious diseases are delineated, it will not be possible to plan out measures to eradicate these diseases from free ranging wild animals.

For maintenance of health of wild animals, it is essential to monitor and survey the parasitic and infectious diseases periodically so that necessary actions could be taken to prevent disease outbreaks and control large-scale mortality. Surveillance programmes will be a major aid in the implementation of long-term health management plan on the appropriate measure to maintain healthy population of wild animals and guarding them against the risk of sudden and heavy mortality or morbidity in Protected Areas. This can be best achieved by preventing transmission of diseases between wild and domestic and in-between wild animals by manipulating the factors involved in the transmission. Establishing the database for forecasting the diseases by performing epizootiology studies in and around the Protected Areas round the year is of utmost importance and needs attention.

Preventive medicine in free ranging wild animals is more closely related to wildlife management. In wildlife medicine health of population is its highest priority. Individual animal therapy in wildlife medicine is difficult if not impossible in most instances. Preventive medicine will be practiced ensuring the health of wild animals of the reserve.

Many cattle pass through the nearby area of core. There is a serious problem of illegal cattle grazing. The common use of water hole by cattle and wild animal is the main cause of introduction of infectious diseases into wild. Following are the diseases that may attack wild animals of the reserve.

FMD	Leptospirosis
Anthrax	Protozoic
Brucellosis	Ecto-Endo parasite

12.3 Immunization of livestock:

In Mukandra Hills Tiger Reserve 14 villages present in core area. Villagers mainly dependent on animal husbandry and cattle. The cattle of these villages encounter wild animals in the area. There is every chance that the communicable diseases from the cattle are transmitted to the wild animals. This will result in fatal diseases in wild animals.

Strategy:

- List of the livestock within core area of the tiger reserve should be collected from Tehsil and maintained at Range, Naka and division level.
- Good liaison should be maintained with the districts Animal husbandry officer to carry out regular immunization and deworming of these Cattle.
- Cattle Camps should be organized by the department in collaboration with animal husbandry department to check the health of animals and immunization.
- Awareness programs should be held in villages to impart knowledge of communicable disease in cattle.
- The immunization program should be linked up with integrated cattle and dairy development program.

A. Prophylactic Immunization:

Some diseases which are common to this area and are epidemic in nature spread by both wild and domestic animals, preventive treatment against these diseases by the means of prophylactic immunization to the domestic animals will be given. Domestic cattle, which may transmit the disease among wild fauna, will be vaccinated to prevent the occurrence of FMD, Rinderpest, BQ and HS.

Such immunization is to be carried out in villages located within 5 Km. from the boundary of National Park and Sanctuary. It is believed that an animal can cover maximum distance of 5 Km. to graze and browse.

Prophylactic immunization to cover FMD, BQ and HS is to be regularly carried out with the help of Veterinary Department of Kota, Bundi, Chittorgarh, Jhalawar district every year, to reduce the chances of spread of disease from cattle to the wildlife.

Following steps will be taken in this regard:

- Ring vaccination of all the cattle of the villages in the core of MHTR.

- Establishment of a team of vet doctor, RFO, flying and his staff for quick response.
- Supply of minerals to free ranging wild animals.
- Isolation enclosure to identified sick animals.
- Chemical treatment of water resources
- De-worming
- Regulatory mechanism for cattle grazing/passage

B. Disease Surveillance:

A quick disease reporting, detection and treatment system only can achieve proper disease surveillance. In the case of wild animals, detection of disease is only based on observation on animal behaviour and their day-to-day activities. Concept of landscape epidemiology that associates the occurrence of a certain disease with the existing landscape may also be kept in the mind. The knowledge of animal species typical to the given area and particular disease maintained and spread by them may be extremely useful in disease detection and treatment. If such a disease is detected, its prophylactic treatment by immunization, water hole treatment or aerosol immunization must be done. To protect and maintain wildlife in PA with good health, it is necessary to achieve disease surveillance of native wild population and domestic cattle of adjoining villages.

Parameters for the monitoring of wild animals' health –

- General examination
- Physical examination
- Clinical observation
- Laboratory investigations
- Faecal examination
- Haematological examination
- Serological examination
- Study of kill / Mortality
- Detailed post-mortem examination
- Collection of material for laboratory examination

Mortality Survey

The mortality survey will be an ongoing process every month. The camp staff will be suitably instructed to collect all mandibles/skulls from the habitat for an assessment of species specific/ age – specific mortality. For this body conditions and scouring through visceral observation will be taken into account too.

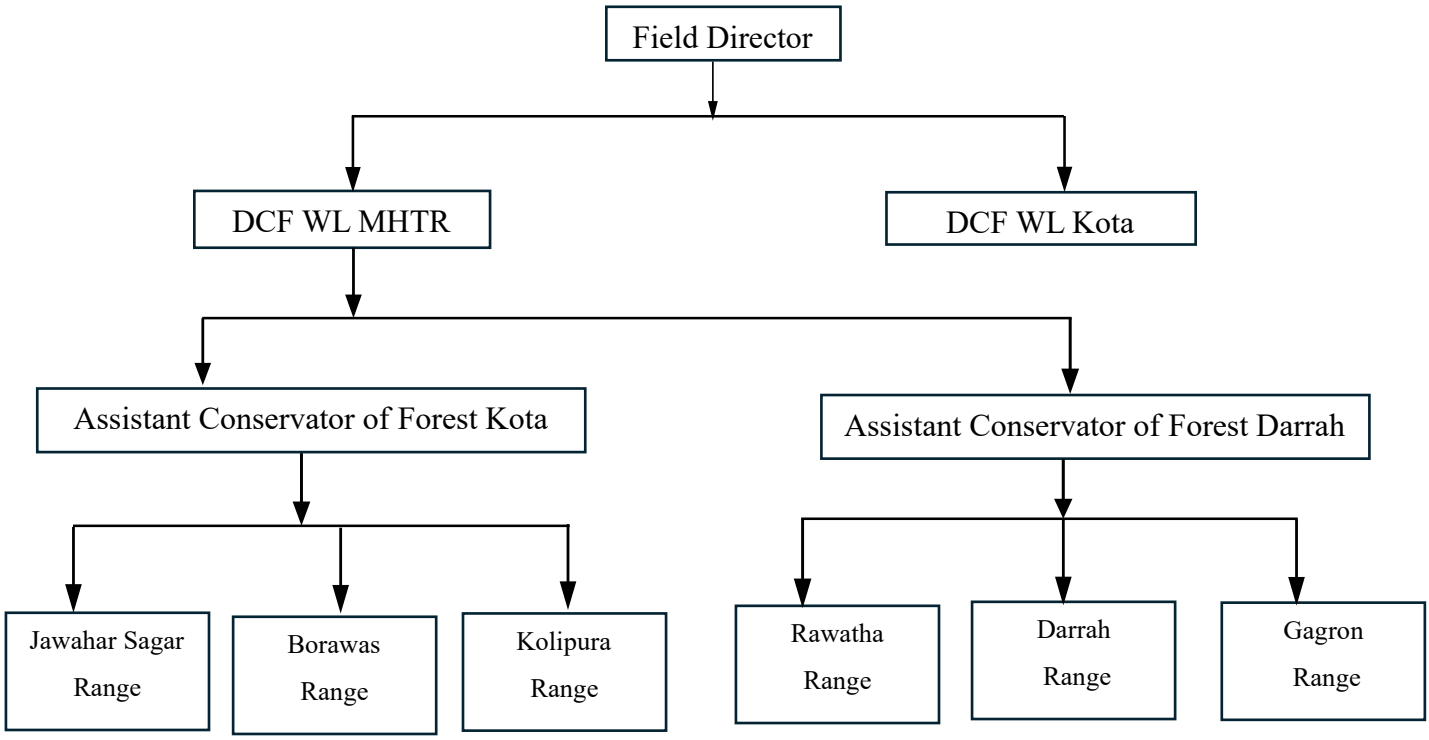
CHAPTER 13
ORGANISATION ADMINISTRATION AND BUDGET

The Tiger reserve is headed by the Field Director and Conservator of Forest (Wildlife), Kota supported by the DCF Wildlife Mukandra National Park Kota and DCF Wildlife Kota who are also the drawing and disbursing officer. As already mentioned, this tiger reserve has two administrative setups one headed by DCF Wildlife Mukandra National Park Kota and other Bhainsrodgarh Sanctuary which is managed by DCF Wildlife Kota. The Range Assistants and Beat guards are needed as per the range circle and beats respectively. Reorganization of beats has been done, and the paucity of staff would be filled as early as possible.

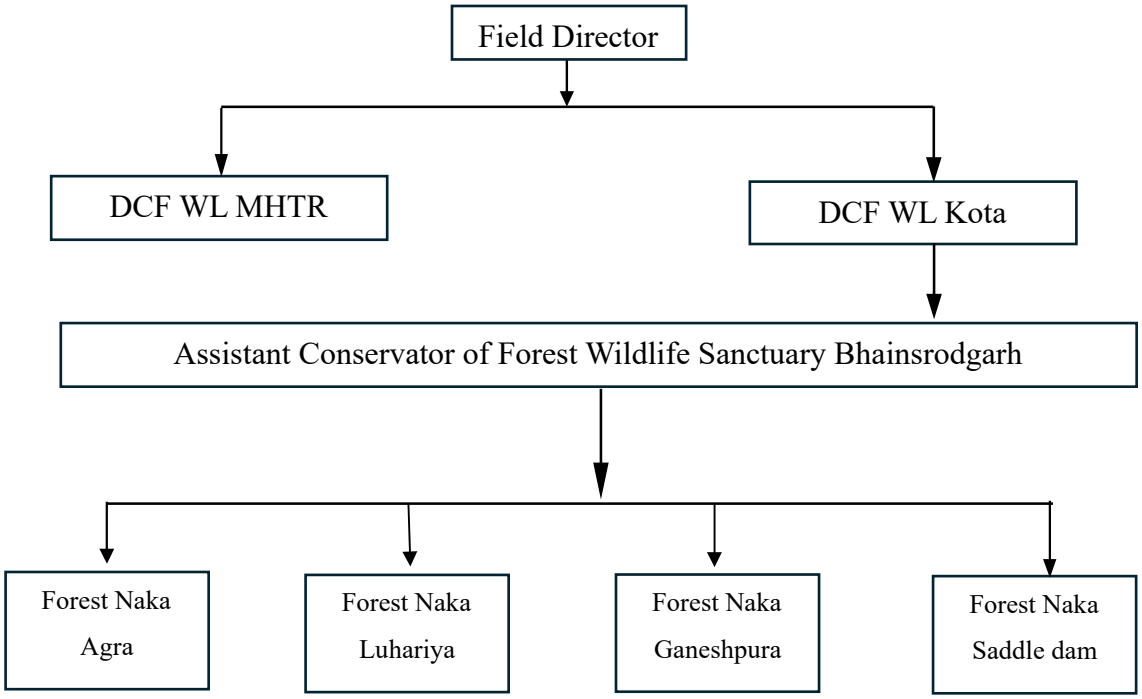
Administrative setup of Wildlife Sanctuary Bhainsrodgarh:

Wildlife Sanctuary Bhainsrodgarh has become the core of Mukandra Hill Tiger Reserve by government order. But its administrative control is with Deputy Conservator of forests, Wildlife Kota, Rest part of Mukandra Hill tiger Reserve is under the control of Deputy Conservator of forests, Wildlife Mukandra Hill tiger Reserve, Kota

Under Conservator of forests, Wildlife Kota there is one post of Assistant Conservator of forests, Wildlife Sanctuary Bhainsrodgarh who is the in charge of the sanctuary. In this Sanctuary, there is only one range and that is range Wildlife Sanctuary Bhainsrodgarh. One post of grade one ranger is there. there are four Nakas which should be headed by foresters. There are 25 beats in the Sanctuary for which we need at least 25 forest guards. There are two barriers at entry point bridge side and saddle dam. There should be four more barriers at Kotla Balaji Mandir, one at Bassi, One at Rajpura and one at Suthala Gram. Then the Protection of the Sanctuary will be ascertained.



Administrative Set up of Bhainsrodgarh Wildlife Sanctuary- The Core Area of the Mukandra Hills Tiger Reserve:



13.1 Tiger Steering Committee -

As per the requirement of section 38U Wildlife Protection Act, the process of constituting tiger steering committee for ensuring, co-ordination, monitoring, protection and conservation of tiger, co-predators and prey animals is in progress.

13.2 Tiger Conservation Foundation –

The Wildlife (Protection) Amendment Act, 2006 No. 39 of 2006, dated 3rd September 2006 Chapter-IVB, Section 38X provides for the establishment of Tiger Conservation Foundation (TCF) for the tiger reserves within the State to facilitate and support their management for conservation of tiger and biodiversity and to take initiatives in ecodevelopment by involvement of people in such development process. Mukandra hills tiger conservation foundation came into existence by state govt. order no. P3 (8) forest/2012 dated 14-02-2018 and its draft of memorandum of association and articles of association were approved by cabinet Order. no 11/2018 dated 09-02-2018. Through govt. order no. p3 (16) forest/ 2022 dated 01-03-2023 the name of the Mukandra Hills Tiger Conservation foundation was changed to Rajasthan Tiger conservation Foundation Jaipur. Official order no. f (23) new-47/mtcf/cwlw/2018/4715 dated 24.07.2023 is attached in *Annexure No. 26.*

The Tiger Conservation Foundation shall, *interalia*, have the following objectives:

(a) To facilitate ecological, economic, social and cultural development in the tiger reserves.

(b) To promote eco-tourism with the involvement of local stakeholder

communities and provide support to safeguard the natural environment in the tiger reserves.

(c) To facilitate the creation of, and or maintenance of, such assets as may be necessary for fulfilling the above said objectives.

(d) To solicit technical, financial, social, legal and other support required for the activities of the foundation for achieving the above said objectives.

(e) To augment and mobilize financial resources including recycling of entry and such other fees received in a tiger reserve, to foster stake-holder development and eco-tourism.

(f) To support research, environmental education and training in the above related fields.

The foundation is a new institutional framework which can complement the Tiger Reserve management and liaison with various eco-development committees and their confederations apart from production sectors in the

Landscape. The Foundation should be registered under the relevant rules of the State as a Trust, and as prescribed in the guidelines. It will have a State level Governing Body, apart from a field level executive committee under the Chairmanship of the Field Director with representatives of the eco-development committees as nominated by the Governing Body.

The Foundation would act as a "Non-Profit Center" and as a "Development Agency" by increasing local participation. It can secure the tiger reserve from the financial constraints by providing funding support through various sources like recycling of gate receipts, service charges, donations and the like. The Foundation may also undertake various activities related to mainstreaming of conservation, Eco-development, Staff Welfare, Visitor regulation, Field Research, facilitating Eco-development committees for market access, conducting Capacity Building programs, Ecotourism and Joint Forest Management.

13.3 Co-ordination with Line agencies / Departments

Co-ordination with Revenue, Police, Judiciary, Rural development, Agriculture, health, Veterinary, Horticulture, Zila Panchayat, Women and child development, PHED, Education, Tribal welfare, Railway etc. is taken as per need. Co-ordination with line agencies / departments are needed for:

- Better protection
- Eco-development
- Gaps in habitat development
- Conflict resolution
- Protection

It is evident from the above that co-ordination is required in many ways and in many fields. Better co-ordination will not only ease pressure on limited resources of park management but will earn general goodwill among various sectors.

Co-ordination with Police:

Especially during rainy season, the migratory sheep enter in the core and buffer area and adversely affect the natural regeneration and grasses. Due to this there is a shortage of food for herbivores and damage is caused to their habitat. During rainy season police help is essential to control the sheep during migration. It is therefore necessary that RAC or police exclusively deployed during rainy season.

For co-ordination following measures could be adopted:

- Regular meetings with line department
- Co-coordinating with District Collector, SP and CEO, ZP for organizing special meetings with line departments.
- Knowing various schemes of line departments and identifying schemes suitable for the park area.
- Reserve tour of officials of line departments.
- Accreditation and highlighting achievements of other departments in reserve area.

These are few suggestive things, but in practice convergence could be achieved only through good interpersonal relationship with officials of line departments of various levels from district to village. Officer of the park should interact with their respective counterparts in other departments.

13.4 Staff Deployment

Details of officers posted as Field Director & Chief Conservator of Forest and Deputy Conservator of forest (Deputy Director) Mukandra Hills National Park Kota are enclosed in **Annexure-24**.

Table-13.1: The existing organizational structure of the MHTR is as follows

S No.	Name of the Post	Sanctioned	Filled	Vacant
1	CCF Wildlife Kota & Field Director (ex-official) MHTR	1	1	0
2	DCF & TA to CCF Wildlife Kota & Field Director MHTR	1	1	0

3	Assistant Conservator of Forest – 1. Administration, 2. Development 3. Flying Squad	3	0	3
4	Range Forest Officer – II Grade	2	0	2
5	Assistant Account Officer	1	1	0
6	Junior Accountant	1	0	1
7	Office Superintendent	1	0	1
8	Office Assistant	2	1	1
9	PA	1	1	0
10	Clerk Grade I	2	2	0
11	Clerk Grade – II	2	1	1
12	Surveyor	1	0	1
13	Driver	1	1	0
14	IV class	3	3	0
15	Chowkidar	1	1	0
	Total	**23**	**13**	**10**

Table-13.2: The existing staff position in DCF MNP office is as follows: Office of Deputy Conservator of Forest, Mukandra National Park Kota

S No.	Name of Post	Sanctioned	Filled	Vacant
1.	Deputy Conservator of Forests Mukandra National Park	1	1	0
2	Assistant Conservator of Forests	4	1	3
3	Range Officer Grade I	2	2	0
4	Range Officer Grade II	6	5	1
5	Forester	25	7	18
6	Assistant Forester	18	12	6
7	Forest Guard	112	89	23
8	Assistant Accounts Officer	1	1	0
9	Office Assistant	1	1	0

10	Clerk grade I	2	1	1
11	Clerk Grade II	4	3	1
12	Driver	5	2	3
13	Surveyor	1	1	0
14	Veterinary Doctor	1	1	0
15	Assistant Veterinary Doctor	1	0	1
16	Class IV	2	2	0
	Total	184	129	57

STRUCTURE AND RESPONSIBILITIES:

The average manpower on each naka is 3.0 which are very less as compared to the nature of work, offences and the area. It must be increased so that things can be managed within human limitations and working capacity of the individual.

Table-13.3: Proposed Structure and Requirement of Posts for Mukandra Hills Tiger Reserve

S. No.	Name of Post	Required	Sanctioned Post	Additional Requirement	Remark
1	Chief Conservator of Forests (Wildlife) & Field Director Mukandra Hills Tiger Reserve	1	1	0	
2	TA to Chief Conservator of Forests (Wildlife) & Field Director Mukandra Hills Tiger Reserve	1	1	0	
3	Deputy Conservator of Forests Mukandra Hills Tiger Reserve Kota	1	1	0	Currently post is named as Deputy Conservator of Forests Mukandra National Park

4	ACF & TA to Deputy Director Mukandra Hills Tiger Reserve Kota	1	1	0	
5	ACF Eco Dev. & Relocation at Kota	1	0	1	
6	ACF Jhalawar HQ at Jhalawar	1	0	1	
7	ACF Jawahar Sagar HQ at Kota	1	1	0	
8	ACF Flying and Tourism	2	2	0	
9	Range Officer Grade – I st	2	2	0	
10	Range Officer Grade – II nd	8	8	0	
11	Foresters	30	17	13	
12	Asst. Foresters	30	18	12	
13	i-Forest Guards / Beat Guards 152 ii- Barrier, Check Post, wireless Station -48 iii- Flying Squad & Strike Force-50	250	52 (62 Vacant)	198	Total Area of MHTR 760 Sq. Km@ 5 per Sq. Km =152
14	Wireless Sub Inspector	2	0	2	
15	Veterinary Doctor	1	1	0	
16	Research officer (M. Sc wildlife science)	2	0	2	
17	Accountant/ Accounts officer	3	2	1	
18	Office Asst.	3	2	1	
19	Clerk Grade I	10	4	6	
20	Clerk Grade II	16	7	11	
21	Drivers	17	6	11	
22	Surveyor	3	1	2	
23	Computer operator	4	0	4	

24	Class IV	10	6	4	
	Total	413	164	289	Additional requirement of 249 posts must be created

Table-13.4: Proposed Structure and Requirement of Posts for Wildlife Sanctuary Bhainsrodgarh

S. No.	Name of Post	Sanctioned Post	At present, Working	Requirement	Remark
1	Deputy Conservator of forests, Wildlife Kota	1	1	0	
2	Assistant Conservator of forests, Wildlife Sanctuary Bhainsrodgarh	1	0	1	
3	Ranger Grade-I, Wildlife Sanctuary Bhainsrodgarh	1	0	1	
4	Ranger Grade-II, Wildlife Sanctuary Bhainsrodgarh	0	1	-1	
5	Forester	4	1	3	
6	Assistant Forester	4	2	2	
7	Forest Guard	21	7	14	

Table 13.5: Asst. Conservator of Forest Darrah HQ at Jhalawar

RFO at Darrah	RFO at Gagron	RFO At Rawatha
4 Nakas at Darrah Station (Morukalan), Sawan Bhado Dam, Darrah Gaon,	3 Naka – Mashalpura, Naulav and Raajpura	4 Nakas at Rawatha, Mandargarh, Damodarpura and Chandbaori
Beat Guards	Beat Guards	Beat Guards

Table 13.6: Asst. Conservator of Forest Jawahar Sagar HQ at Kota

RFO at Jawahar Sagar	RFO at Kolipura	RFO at Borabas
5 Nakas at Jawahar Sagar, Sripura, Khera, Gudha and Bhainsroadgarh	3 Nakas at Kolipura, Girdharpura and Kaaniya Talaab	4 Nakas at Borabas, Rath Kaankra, Bandha Dharampura and Nayagaon
Beat Guards	Beat Guards	Beat Guards

Table 13.7: Assistant Conservator of Forest, Bhainsrodgarh Sanctuary, HQ at Saddle Dam, Rawatbhata

RFO at Bhainsrodgarh Sanctuary			
Forest Naka Agra	Forest Naka Luhariya	Forest Naka Saddle Dam	Forest Naka Ganeshpura
Beat Guards	Beat Guards	Beat Guards	Beat Guards

There is no separate staff presently deployed for protection, and the existing staff is collected whenever there is any information regarding occurrence of an offence. Four special forest protection squads are required with their Headquarter at Jawahar Sagar, Darrah gaon, Gagron and Kolipura. It will comprise of one forester and 5 forest guards. This staff will be specially trained. They will be assisted by police personnel. One police party will consist of minimum 5 persons. These patrolling parties will have one vehicle for quick movement in the tiger reserve.

STAFF AMENITIES:

Staff Housing:

Office of the Field Director & Deputy Director and residential complex establishment will be at Kota. The existing and proposed buildings at Kota and in the field, which are currently in use and will continue to be used for different purposes.

Most of the buildings mentioned above are old and need urgent repairs. Besides, due to lack of compound wall, the seized forest produce is not safe, therefore it is essential to construct the compound walls as well. For management of the MHTR effectively, residential and office facilities are of utmost necessity. Apart from this, at every naka residential facility will also be provided for the staff.

Rest House:

There is only one rest house with Forest department in the MHTR. Mukandra Tiger Reserve needs 3 more rest houses along the length of reserve for better management perspective. Also, there should be regular rest house maintenance budget allotment to repair the rest houses. Other rest houses falling in MHTR are under the control of other departments.

Table-13.8: A list of current rest houses is given below:

S.No.	Name of Rest House	Place	Remark
1	Forest Rest House	Darrah gaon	Two room
2	Irrigation Rest House II nd	Jawahar Sagar	Two room

Rest houses are to be maintained as they act as inspection bungalows for the officers.

Activity Budget

Presently the Mukandra Hills Tiger Reserve gets funds from Central Government and State Government under various budget heads. Establishment cost is born by the State Government under Non-Plan Budget head.

Depending on the need for Mukandra Hills Tiger Reserve, the financial requirement for execution of various components/ requirements proposed under this Tiger Conservation Plan, for the plan period, have been detailed Mentioned in **Annexure-25.**

Plate 13.1: APO works 2018-19

Building construction

Construction of WHS

Maintenance of building

Maintenance of line transect

Two wheeler for staff

Water supply for wild animals

Plate-13.2: APO Works-II

Fire line maintenance

Eviction of encroachment

Range inspection

Maintenance of water hole

Incentives to the staff posted in MHTR:

For the management of such a tiger reserve a team of dedicated, interested and competent person is very essential. As this job is of very strenuous nature all capable staff firstly resists their posting and subsequently if posted, they keep on managing to get shifted outside. To attract the persons towards the MHTR management and hold them here, they should be given some incentive. No project howsoever attractive it may be, including the present one, can be run effectively without competent and interested staff. Therefore, a provision of special allowance @ 10% of salary (Basic pay) is proposed for this project. Also, the staff getting transferred into MHTR may be given one month salary as movement charges.

Health checkups / Insurance:

Regular health camps will be organized for health checkups of staff and villagers. Some hospitals could be contracted for complete checkup and treatment of staff and their immediate family. This will ensure better health and will in turn result into better output from staff & will have great value. Possibilities of Health insurance for staff & field assistant living in interior areas will be explored with insurance company.

13.5 Fund Raising Strategies

The NTCA will be the main fund provider for development, eco-development, research, protection, environmental education and other activities. The State Govt. will help in establishment, other developmental activities and tourism. Tiger reserve is currently mainly funded by following funds:

1. State fund
2. RPACS
3. RTCF
4. CSS APO
5. RFBDP

The entry fee deposited in MHTR foundation will be used for protection and management of protected area, eco-tourism and development of host community.

Funds may be raised from different donors through Tiger Foundation.

Apart from this fund are provided form CAMPA scheme for various activities, manual labour through MGNREGA is also deployed for maintenance of road network and creation/maintenance of earthen check dams. CSR is also being explored by the

reserve authorities to fill in the gaps in funding from other agencies where Boring, Solar, WHS works, vehicles etc. have been provided by private agencies.

10-Year Activity-Wise Budget Requirement for Core Area of Mukandra Hills Tiger Reserve - Tiger Conservation Plan

S.No.	Activity	Year 1-2 (in crores)	Year 3-4 (in cr)	Year 5-6 (in cr)	Year 7-8 (in cr)	Year 9-10 (in cr)	Total Budget (in cr)
1	**Habitat Management**	20	20	20	20	20	100
2	**Anti-Poaching Measures**	5	5	5	5	5	25
3	**Relocation of Villages**	10	10	10	10	10	50
4	**Capacity Building & Training**	2	2	2	2	2	10
5	**Monitoring & Research**	2	2	2	2	2	10
6	**Community Engagement & Awareness**	2.5	2.5	2.5	2.5	2.5	1.5
7	**Infrastructure Development**	4	4	4	4	4	20
8	**Wildlife Health Management**	1.5	1.5	1.5	1.5	1.5	7.5
9	**Compensation for Wildlife Depredation**	.2	.2	.4	.4	.5	2.2
10	**Public-Private Partnership Initiatives**	.5	.5	.75	.75	1	4.5
11	**Eco-Tourism Development**	2	2	2	2	2	10

12	**Contingency Fund**	1	1	1	1	1	5

Notes:

- The budget allocation has been distributed across five 2-year periods to ensure long-term sustainability and phased implementation of activities.
- Initial years (Year 1-2) have a higher allocation for critical activities like village relocation, infrastructure development, and habitat management.
- Regular activities such as habitat management, anti-poaching measures, and monitoring & research receive consistent funding over the 10 years.

13.6 Schedule of Operations

All the operations in the PA will be completed as per the direction and scheduled prevailing in the department. The scheduling for some Operations is given below.

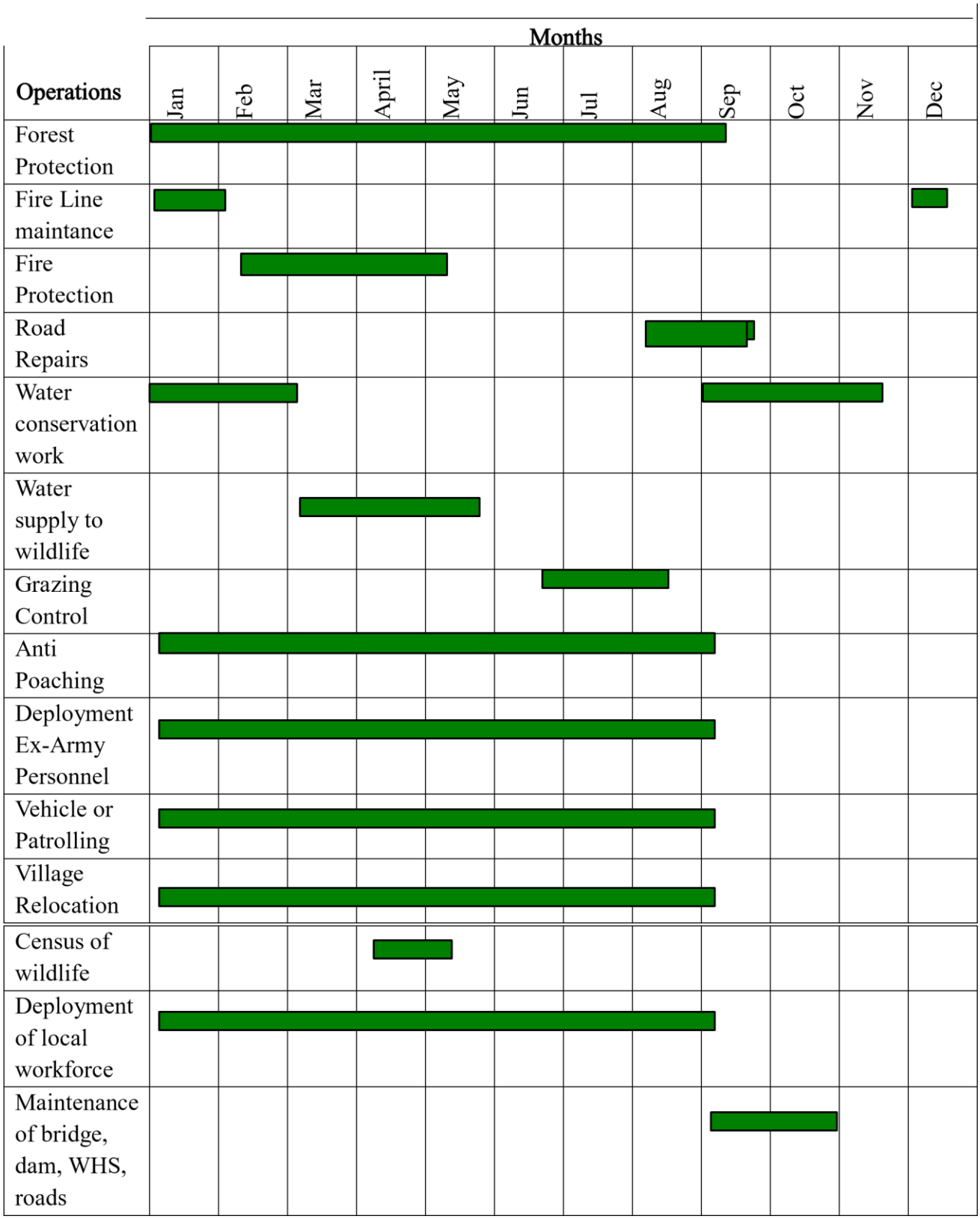


Table-13.9: Schedule of Operations

The contingency fund ensures preparedness for unforeseen circumstances throughout the plan's duration.

Chapter 14

Monitoring and Evaluation

Monitoring and Evaluation (M&E) of any activity is an important part of a plan in order to achieve its objectives and further improvement of the plan. The following criteria are prescribed for monitoring and evaluation of the activities proposed in this plan:

14.1 Criteria

The criteria of monitoring and evaluation are of two types:

1) Physical

2) Qualitative

The physical criteria consist of completion of physical activity of any work e.g. Creation of a grassland or a water source is a physical criterion. However, the durability of the grassland or the retention of water in water source, use of the grassland by herbivore or the use of water source by wild animals is qualitative criteria. The physical criteria are thus a mechanical activity while the qualitative criteria need a close observation for over a time period.

14.2 Process

The control forms for the different activities, regular monitoring registers etc accompanied by relevant photographs forms the process of monitoring and evaluation of the work. The control forms could be for following activities.

1) Boundary demarcation.
2) Fire protection.
3) Water sources and their distribution.
4) Habitat improvement.
5) Animal diseases.
6) Soil and Moisture conservation.
7) Illicit cutting.
8) Crop damage.
9) Eco-development works.
10) Animal count (Census).

The management at the moment lacks formal monitoring protocol along with the desired forms to do monitoring of various management interventions. The management plans to have proper monitoring and evaluation plan accompanied by proper control forms, monitoring registers and training and capacity building of the staff for the above exercise.

Compartment histories would also be revived and maintained by the management.

Range Officers would fill the compartment history regularly and after the scrutiny by Assistant Conservator of Forest, it will be submitted to the Field Director and Deputy Director.

14.3 Recommendations from Management Effectiveness Evaluation (MEE) report

The Management effectiveness evaluation (MEE) is an assessments report published by the National Tiger Conservation Authority (NTCA) on 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 evaluation' reflects three main themes of the PA management

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

These sets of evaluations are conducted for all the designated tiger reserve across India periodically, summarising there, performance and building immediate action plans and recommendations.

During the last of the published report the following recommendations on the following aspects were made with respect to Mukandra Hills Tiger Reserve:

1. **Landscape level conservation**

   Recommendations:

   With the existing protected area network extending from, Ranthambore tiger reserve, Ramgarh-Visdhari tiger reserve and adjoining territorial forest blocks, along with Mukandra TR and Gandhi Sagar Sanctuary further down south, the potential for conservation of the habitat at a landscape level, is have now been rendered possible as source and sink habitat, therefore it has been recommended to primarily assess the connectivity among these habitat patches

and their viability, to develop apt management interventions for long term conservation goals.

Compliance:

As per the recommendations the Bhainsrodgarh Sanctuary has already been added as a Core with the MHTR. However further it has been recommended, to merge adjoining territorial blocks into the buffer plan of MHTR to ensure vital connectivity along the potential Gandhi Sagar Sanctuary corridor.

2. **Management Plan**

Recommendations:

The approval of the TCP (Tiger Conservation Plan) should be actively pursued, so that the management approaches can be streamlined and targeted in a time bound manner.

Compliance:

The TCP has been submitted and to NTCA on 26.11.2024. Further comments received from NTCA on 21.08.2025 have been taken into consideration and revised TCP has been submitted for approval.

3. **Prey Augmentation and In-situ conservation**

Recommendations:

The demographic status, seasonal and annual population trends of the prey species are recommended to be studied, to ensure develop prey augmentation plans.

In-situ conservation breeding facilities should be developed within the tiger reserve to support the prey augmentation programme and should be monitored intensively to for understanding their demographic and survival patterns.

Compliance:

As part of an ongoing ecological restoration and prey species recovery initiative, two specialized prey augmentation enclosures are currently under construction within the designated in-situ conservation site. These enclosures are being developed to enhance the availability and sustainability of prey populations critical to the survival of apex and other co-predators' species within the native habitat

4. **Management of Anthropogenic Pressure**

Recommendations:

The land use patterns along the tiger occupied areas and potential tiger relocation areas, should be assessed at a finer scale and the impacts of hostile lands use patterns on the persistence of tigers and other endangered wildlife should be cumulatively evaluated in MHTR with immediate effects, to avoid any potential conflicting situations. Further after Tigers are released it should be intensively monitored as per established protocol.

The narrow and linear structure of the MHTR naturally makes it highly vulnerable to intrusions of anthropogenic disturbances from the human settlements located adjoining the tiger reserve boundary. Further presence of hamlets and villages, inside the core habitat of the reserve compromises the potential available suitable area for Tigers and other endangered wildlife species.

Efforts should be made for carrying out the proposed village resettlements in a time bound and urgent manner.

Overgrazing and Cattle populations have been a major threat to the tiger reserve, in terms of pressurising and depleting grassland resources and forcing in competition with the wild prey populations, thereby limiting their growth and distribution potentials.

The local community's dependence on forest resources also brings in concerns, firewood collections, lopping etc. has been still prevalent in the reserve, Attempts should be made to minimize these, without compromising with the livelihood economy and social customs of the local communities. If required, stall feeding should gradually encourage, and local communities should be made aware of its benefits. Alternatives to LPG connections (such as solar cookers, improvised smokeless chullas and biogas) should be considered to reduce the local communities' dependence on forest resources.

Compliance:

New survey of Relocation villages is being undertaken on priority basis. Further livelihood dependence in terms of extraction of firewood has been managed by providing LPG cylinders. Grazing has been a persistent problem which is being

resolved gradually by closing areas through biodiversity closures and grassland development scheme.

5. **Inclusive conservation management, addressing local communities and public domain**

   Recommendations:

   There is an urgent requirement of identification of status of human- wildlife conflict in and around the tiger reserve and addressing currently necessary issues such as introducing compensation for crop damage by wildlife. Without this, the local communities are likely to become hostile and retaliate sooner or later.

   The EDCs are nascent, and their role in tiger reserve management is limited. A more active participation of EDCs in the planning process needs to be ensure.

   MHTR should host a **website**, and all relevant information pertaining to good practices in the tiger reserve should be made available in the public domain.

   Compliance:

   Effective conservation management extends beyond ecological interventions to include transparency and public engagement. To this end, Mukundra Hills Tiger Reserve (MHTR) is committed to developing an official website that will serve as a comprehensive knowledge repository, providing public access to information on management practices, ecological monitoring, and community initiatives.

6. **Habitat Management:**

   Recommendations:

   Invasives species have infested the tiger reserve area substantially, depleting the availability of quality forage for the wild prey species. These patches are needed to be identified, and proper action plan should be developed for its monitoring, eradication, and management.

   Furthermore, efforts and investments are required for management of grassland resources and development of grasslands in the resettled village sites.

   Water points and talabs run by solar pumps should be created at regular intervals within the tiger reserve and maintained especially during the pinch period. The

efficiency of these structures should be appropriately monitored for adaptive management.

Compliance:

Invasive species are being mapped and removed to restore quality forage for wild prey, followed by native replantation and regular monitoring. Grasslands are developed in vacated village sites using native species and community stewardship. Solar-powered water points are being installed at key intervals, maintained during dry spells, and monitored for adaptive management.

7. **Human Resource Development:**

There is an urgent need for filling up the staff vacancies.

RFOs and ACFs should be regularly sent to the Wildlife Institute of India for attending wildlife diploma and certificate courses.

The frontline staff should be frequently trained in important aspects such as wildlife management and monitoring, analysing signs, evidence ad pug impression pads (PIPs), camera trapping, crime investigation, intelligence gathering, participatory approaches, etc.

Compliance:

New Forest Guards (FG) have been recruited, and sufficient post are filled. Further ACF and RO Grade I recruitments have also happened and concerning officers are being posted. The DCF's handling the tiger reserve during the last three terms have been WII Advanced Wildlife Management Diploma officers.

8. **Research activities**

Requirements:

Currently the scope of research in the tiger reserve is low. it is pertinent that long-term studies on tiger, co-predators, prey, habitat, socio-economy of local communities etc. should be initiated and continued. Moreover, information on ecosystem services rendered by the tiger reserve and carbon sequestration to mitigate climate change are some other areas which should be actively addressed. Collaborations should be made with institutes and universities, of national and international repute for carrying out such long-term research and studies in the landscape.

Compliance:

Collaborations are being made and will on go in future with institutes and NGO's Like WII & WWF also universities like University of Kota and Amity university Noida where the M.Sc. students pursued their dissertation in MHTR.

9. **Funds and Monetary resources:**

Enhancing management effectiveness will require a significant investment of money, especially for upgrading the infrastructure, skills, and equipment, training the staff and village- level engagements. Additional resources may be provided for these.

The Tiger Conservation Foundation should be made financially viable and fully operational. The scope of investments from extra-budgetary sources like CAMPA, MNREGS and rural and community development programmes of the Central and State governments should be explored for tiger conservation. The tiger reserve management should explore corporate social responsibility (CSR), which is an innovative policy instrument and can be utilized for the cause of conservation of forests and wildlife through converging partnerships. The state government and Tiger Conservation Foundation need to gear up and play a pivotal role to explore avenues to gather support through this CSR mechanism.

Area Statement of Mukandra Hills Tiger Reserve (Core or Critical Tiger Habitat Area) Annexure-1

S. No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)				
					Mukandra National Park	Darrah Sanctuary	Jawahar Sagar Sanctuary	National Gharial Sanctuary	Bhainsrodgarh Sanctuary
1	Chandbawri	Reserved	Kota	3132.65	3132.648	3132.648	0	0	0
2	Kolipura	Reserved	Kota	458.6	458.6	458.6	0	0	0
3	Rooppura	Protected	Kota	216.168	216.168	216.168	0	0	0
4	Foota(Part) Compartment 23, 32	Reserved	Kota	223.4	223.4	223.4	0	0	0
5	NeemKaKheda	Reserved	Kota	106.936	106.936	106.936	0	0	0
6	Kala Kot	Reserved	Kota	276.168	276.168	276.168	0	0	0
7	Shyodanpura	Reserved	Kota	38.296	38.296	38.296	0	0	0
8	Sankad	Reserved	Kota	50	50	50	0	0	0
9	Borkui	Reserved	Kota	284.904	284.904	284.904	0	0	0
10	Bagchanch	Protected	Kota	1064.21	1064.208	1064.208	0	0	0
11	KesraJhumkiya	Reserved	Kota	154.328	154.328	154.328	0	0	0
12	Karondi	Reserved	Kota	100.968	100.968	100.968	0	0	0
13	Kanjhar	Reserved	Kota	56.928	56.928	56.928	0	0	0
14	Girdharpura	Reserved	Kota	667.304	667.304	667.304	0	0	0
15	BurjwaliChouki	Reserved	Kota	1561.51	1561.512	1561.512	0	0	0
16	Doliya(Part)	Reserved	Kota	1881.3	1881.3	1881.3	0	0	0

	Compartment61-68, 70-73								
17	Damodarpura	Reserved	Kota	2450.49	2450.488	2450.488	0	0	0
18	Darrah	Reserved	Kota	625.944	625.944	625.944	0	0	0
19	Manoharpura	Reserved	Kota	1400.65	1400.648	1400.648	0	0	0

S. No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)				
					Mukandra National Park	Darrah Sanctuary	Jawahar Sagar Sanctuary	National Gharial Sanctuary	Bhainsrodgarh Sanctuary
20	Ghatoli	Protected	Kota	762.08	762.08	762.08	0	0	0
21	Amjhar-B	Protected	Kota	45.424	45.424	45.424	0	0	0
22	BurjwaliChouki-II	Protected	Kota	63.74	63.74	63.74	0	0	0
23	Borabas	Reserved	Kota	3018.01	3018.008	0	3018.008	0	0
24	LohDungri(Part)	Reserved	Kota	525	525	0	0	525	0
25	Tholanpur	Reserved	Kota	635.016	635.016	0	635.016	0	0
26	Mashalpura-A(Part)	Reserved	Kota	1196.18	0	1196.184	0	0	0
	Mashalpura-A(Part)	Reserved	Jhalawar	411.316	0	411.316	0	0	0
27	Kheemuch-B(Part)	Reserved	Kota	1274.75	0	1274.748	0	0	0
	Kheemuch-B(Part)	Reserved	Jhalawar	181.248	0	181.248	0	0	0
28	Akelgarh (Part)	Reserved	Kota	775	0	0	0	775	0
29	GudhaRajpura	Reserved	Bundi	3014.53	0	0	3014.528	0	0

30	Ambarani	Reserved	Bundi	6745.92	0	0	6745.92	0	0
31	Mashalpura-B(Part) Compartment49,50,53,56-63	Reserved	Jhalawar	2476.6	0	2476.6	0	0	0
32	KanyaTalab(Part)	Reserved	Chittorgarh	145	145	0	145	0	0
33	Peermagra(Part)	Reserved	Chittorgarh	3295	0	0	3295	0	0
34	Madar Chouk	Protected	Chittorgarh	401.027	0	0	401.027	0	0
35	Valapura	Protected	Chittorgarh	289.491	0	0	289.491	0	0
36	Bhainsroadgarh	Protected	Chittorgarh	180	0	0	180	0	0
37	Padajhar	Reserved	Chittorgarh	2703	0	0	0	0	2703
38	Kolgarh	Reserved	Chittorgarh	6086	0	0	0	0	6086
39	Bandarmuta	Reserved	Chittorgarh	1925	0	0	0	0	1925
40	Richko	Reserved	Chittorgarh	1049	0	0	0	0	1049

S. No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)				
					Mukandra National Park	Darrah Sanctuary	Jawahar Sagar Sanctuary	National Gharial Sanctuary	Bhainsrodgarh Sanctuary
41	Mamorgarh	Reserved	Chittorgarh	1823	0	0	0	0	1823
42	Nimadi	Reserved	Chittorgarh	1929	0	0	0	0	1929
43	Kalakhet hatipaga	Reserved	Chittorgarh	2003	0	0	0	0	2003
44	Mandesara Part B, C,D,E	Protected	Chittorgarh	750	0	0	0	0	750
45	Dhoodi Talai	Protected	Chittorgarh	593	0	0	0	0	593
46	Ratoli	Protected	Chittorgarh	305	0	0	0	0	305

47	Goldulari	Protected	Chittorgarh	25	0	0	0	0	25
48	Kalakhet B	Reserved	Chittorgarh	117.99	0	0	0	0	117.99
	Total (Core Forest area)			59495.1					

Annexure-2

Area Statement of Mukandra Hills Tiger Reserve (Revenue Village)

S. No.	Village Name	Land Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)				
					Mukandra National Park	Darrah Sanctuary	Jawahar Sagar Sanctuary	National Gharial Sanctuary	Bhainsrodgarh Sanctuary
1	Kharlibawdi	Agriculture	Kota	12.79	12.79	12.79	0	0	0
2	Rooppura	Agriculture	Kota	69.54	69.54	69.54	0	0	0
3	Laxmipura	Agriculture	Kota	15.84	15.84	15.84	0	0	0
4	Giridharpura	Agriculture	Kota	634.6	0	634.6	0	0	0
5	Damodarpura	Agriculture	Kota	88.58	0	88.58	0	0	0
6	Kolipura	Agriculture	Kota	40.57	0	40.57	0	0	0
7	Mukandra (Darrahgaon)	Agriculture	Kota	96.08	0	96.08	0	0	0
8	Akhava (Bhuki)	Agriculture	Kota	165.83	0	165.83	0	0	0
9	Ghati	Agriculture	Kota	74	0	74	0	0	0
10	RojakaTalab		Bundi	0	0	0	0	0	0
11	Jawaharsagar		Bundi	0	0	0	0	0	0
12	Mashalpura	Agriculture	Jhalawar	147	0	147	0	0	0
13	Narayanpura	Agriculture	Jhalawar	37	0	37	0	0	0
14	Ambarani	Agriculture	Chittorgarh	37.21	0	0	37.21	0	0
15	Nosera	Agriculture	Chittorgarh	29.07	0	0	29.07	0	0

16	Bhainsrodgarh	Agriculture	Chittorgarh	83	0	0	83	0	0
17	Udpurya	Agriculture	Chittorgarh	127	0	0	0	0	127
18	Bhawanipura	Agriculture	Chittorgarh	326	0	0	0	0	326
19	Khalgav	Agriculture	Chittorgarh	191	0	0	0	0	191
20	Luharya	Agriculture	Chittorgarh	1778	0	0	0	0	1778

S. No.	Village Name	Land Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)				
					Mukandra National Park	Darrah Sanctuary	Jawahar Sagar Sanctuary	National Gharial Sanctuary	Bhainsrodgarh Sanctuary
21	Padhajar Khurd	Agriculture	Chittorgarh	154	0	0	0	0	154
21	Mortuka	Agriculture	Chittorgarh	114	0	0	0	0	114
23	Hatoli	Agriculture	Chittorgarh	447	0	0	0	0	447
24	Bakhatpura	Agriculture	Chittorgarh	255	0	0	0	0	255
25	Suthala	Agriculture	Chittorgarh	511	0	0	0	0	511
26	Prempura	Agriculture	Chittorgarh	255	0	0	0	0	255
27	Dariba	Agriculture	Chittorgarh	148	0	0	0	0	148
28	Dhoodi talai	Agriculture	Chittorgarh	165	0	0	0	0	165
29	Mandesara	Agriculture	Chittorgarh	572	0	0	0	0	572
30	Ratanpura	Agriculture	Chittorgarh	808	0	0	0	0	808
31	Footpal	Agriculture	Chittorgarh	504	0	0	0	0	504

32	Baheliya	Agriculture	Chittorgarh	831	0	0	0	0	831
33	Lasana	Agriculture	Chittorgarh	206	0	0		0	206
34	Jhujhla	Agriculture	Chittorgarh	40	0	0	0	0	40
35	Nali	Agriculture	Chittorgarh	830	0	0	0	0	830
36	Kolpura	Agriculture	Chittorgarh	179	0	0	0	0	179
37	Chainpura	Agriculture	Chittorgarh	105	0	0	0	0	105
			Total (Revenue)	9576.11					

(10)

Annexure-3

सत्यमेव जयते	राजस्थान राज–पत्र विशेषांक	RAJASTHAN GAZETTE Extraordinary
	साधिकार प्रकाशित	Published by Authority
	चैत्र 28 गुरुवार, शाके 1935– अप्रेल 18 2013 *Chaitra 28, Thursday, Saka 1935–April 18, 2013*	

भाग 1 (ख)

महत्वपूर्ण सरकारी आज्ञायें ।

वन विभाग

अधिसूचना

जयपुर, अप्रेल 9, 2013

संख्या प.3(8)वन/2012:– वन्यजीव (सुरक्षा) अधिनियम, 1972 (1972 का केन्द्रीय अधिनियम संख्या–53) की धारा 38V की शक्तियों का प्रयोग करते हुए राष्ट्रीय बाघ संरक्षण प्राधिकरण की अभिशंषा एवं सम्बद्ध ग्राम सभा तथा विशेषज्ञ समिति से परामर्श उपरान्त राज्य सरकार एतद्द्वारा अनुसूची–I (अ) में वर्णित वन एवं राजस्व क्षेत्र (41717.188 है.) एवं I(ब) में वर्णित वन एवं राजस्व क्षेत्र (34282.274 है.) कुल क्षेत्र 75999.462 हैक्टेयर को मुकन्दरा हिल्स व्याघ्र आरक्षिति (Tiger Reserve) घोषित करती है। उक्त मुकन्दरा हिल्स व्याघ्र आरक्षिति में से अनुसूची–I(अ) में वर्णित क्षेत्र को व्याघ्र संरक्षण के प्रयोजनार्थ अक्षत क्षेत्र रखे जाने के लिए "क्रान्तिक व्याघ्र निवासी क्षेत्र" (Critical Tiger Habitat) तथा इसके चारों ओर, अनुसूची–I(ब) में वर्णित क्षेत्र, जिसका उद्देश्य वन्यजीव और मानव क्रियाकलापों के बीच स्थानीय व्यक्तियों के जीविकोपार्जन, विकास, सामाजिक और सांस्कृतिक अधिकारों की सम्यक् मान्यता के साथ सह अस्तित्व का संवर्धन करना है, को "मध्यवर्ती क्षेत्र" (Buffer Area) घोषित करती है। क्रान्तिक व्याघ्र निवासी क्षेत्र की सीमाऐं अनुसूची–II(अ) में तथा मध्यवर्ती क्षेत्र की सीमाऐं अनुसूची–II(ब) में वर्णित हैं। उक्त "क्रान्तिक व्याघ्र निवासी क्षेत्र" (Critical Tiger Habitat) एवं "मध्यवर्ती क्षेत्र" (Buffer Area) को भविष्य में मुकन्दरा हिल्स व्याघ्र आरक्षिति (Mukandra Hills Tiger Reserve) के रूप मे जाना जावेगा।

मुकन्दरा हिल्स व्याघ्र आरक्षिति (Mukandra Hills Tiger Reserve)

अनुसूची–I(अ)

"क्रान्तिक व्याघ्र निवासी क्षेत्र" (Critical Tiger Habitat)

जिला–कोटा

वन क्षेत्र

क्र. सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हैक्टर)
1	2	3	4	5
1.	झान्दबावडी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	3132.648
2.	कोलीपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	458.600
3.	रूपपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	216.168
4.	फूटा (कम्पार्टमेंट सं. 23,32)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	223.40
5.	नीम का खेडा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	106.936
6.	कालाकोट	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	276.168
7.	श्योदानपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	38.296
8.	साकड	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	50.00
9.	बोरदूद	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	284.904
10.	डगचाचा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	1064.208
11.	केसरा झुमकिया	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	154.328
12.	[illegible]	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	100.968
13.	कनकार	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	56.928
14.	शिवदरपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	667.304
15.	बुजगाली चौकी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	1561.512
16.	डोलिया (कम्पार्टमेंट सं. 61-68,70-73)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	1881.300

1	2	3	4	5
17.	दामोदरपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	2450.488
18.	दर्रा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	625.944
19.	मनोहरपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	1400.648
20.	घाटोली	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	762.080
21.	अमझार-(ए)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	45.424
22.	बुर्जवाली चौकी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	63.74
23.	बोराबास	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	3018.008
24.	लोहडूंगरी (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	525.00
25.	थोलनपुर	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	635.016
26.	मशालपुरा-ए (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	1196.184
27.	खीमच-बी (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	1274.748
28.	अकेलगढ़ (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	775.00
			.योगः-	**23045.948**

जिला-कोटा
राजस्व क्षेत्र

क्र. सं.	ग्राम का नाम	ग्राम पंचायत	त्हसील	क्षेत्रफल (हैक्टर)
1.	खड़ली बावरी	भंवरिया	लाड़पुरा	12.79
2.	रूपपुरा	बोराबास	लाड़पुरा	69.54
3.	लक्ष्मीपुरा	भंवरिया	लाड़पुरा	15.84
4.	गिरधरपुरा	डोलिया	लाड़पुरा	634.60
5.	दामोदरपुरा	भंवरिया	लाड़पुरा	88.58
6.	कोलीपुरा	बोराबास	लाड़पुरा	40.57
7.	मुकन्दरा (दरा गाँव)	पीपल्दा	रामगंजमंडी	96.08
8.	अखावा (भुकी)	बोराबास	लाड़पुरा	165.83
9.	घाटी	कुकड़ाखुर्द	रामगंजमंडी	74.00
			योगः-	**1197.83**

जिला-बून्दी
वन क्षेत्र

क्र. सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हैक्टर)
1.	गुडा राजपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	3014.528
2.	अम्बा रानी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	6745.920
			योगः-	**9760.448**

जिला-बून्दी
राजस्व क्षेत्र

क्र.सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हैक्टर)
1.	रोजा का तालाब	धनेश्वर	बून्दी	0.00
2.	जवाहर सागर	जवाहर सागर	बून्दी	0.00
			योगः-	**0.00**

जिला-झालावाड़
वन क्षेत्र

क्र. सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हैक्टर)
1.	मशालपुरा-ए आंशिक	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	411.316
2.	मशालपुरा-बी (आंशिक) (कम्पार्टमेंट सं. 49,50,53, 56-63)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	2476.60
3.	खीमच-बी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	181.248
			योगः-	**3069.164**

जिला--झालावाड़

राजस्व क्षेत्र

क्र. सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हैक्टर)
1.	मशालपुरा	गागरोन	झालरापाटन	147.00
2.	नारायणपुरा	गागरोन	झालरापाटन	37.00
			योगः-	**184.00**

जिला-चित्तौड़गढ़

वन क्षेत्र

क्र. सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हैक्टर)
1.	कानिया तालाब (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	145.00
2.	पीर मगरा (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	3295.00
3.	मदार चौक	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	401.027
4.	बालापुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	289.491
5.	भैंसरोड़गढ़	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	180.00
			योगः-	**4310.518**

जिला-चित्तौड़गढ़

राजस्व क्षेत्र

क्र. सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हैक्टर)
1.	अम्बा रानी	भैंसरोड़गढ़	रावतभाटा	37.21
2.	नोसेरा	श्रीपुरा	रावतभाटा	29.07
3.	भैंसरोड़गढ़	भैंसरोड़गढ़	रावतभाटा	83.00
			योगः-	**149.28**

"क्रान्तिक व्याघ्र निवासी क्षेत्र" (Critical Tiger Habitat) का विवरण

वन क्षेत्र : **40186.078 हैक्टेयर**

राजस्व क्षेत्रः **1531.110 हैक्टेयर**

योगः **41717.188 हैक्टेयर**

अनुसूची-- I(ब)

"मध्यवर्ती क्षेत्र" (Buffer Area)

जिला--कोटा

वन क्षेत्र

क्र.सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हैक्टर)
1.	मशालपुरा--ए (आंशिक) (कम्पार्टमेंट सं. 1--24,37--49)	उप वन संरक्षक, कोटा	आरक्षित वन	7282.570
2.	मशालपुरा--बी (आंशिक) (कम्पार्टमेंट सं. 1--17)	उप वन संरक्षक, कोटा	आरक्षित वन	4537.870
3.	लोह डूंगरी	उप वन संरक्षक, कोटा	आरक्षित वन	488.800
4.	राडी डन्ड	उप वन संरक्षक, कोटा	रक्षित वन	2593.157
5.	फूटा (कम्पार्टमेंट सं0 -7,12-22,24-31)	उप वन संरक्षक, कोटा	आरक्षित वन	3107.500
6.	डोलिया (कम्पार्टमेंट सं. -31-35,37-43,46-51,57-60,69)	उप वन संरक्षक, कोटा	आरक्षित वन	3617.900
7.	अमझार -- बी			116.128
			योगः-	**21743.925**

जिला–कोटा
राजस्व क्षेत्र

क्र.सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हैक्टर)
1.	चांद बावड़ी	डोलिया	लाड़पुरा	19.98
2.	जसपुरा (नया गांव)	डोलिया	लाड़पुरा	116.17
3.	हरिपुरा (गैर आबाद)	डोलिया	लाड़पुरा	86.32
4.	केशोपुरा	भंवरिया	लाड़पुरा	26.38
5.	मन्दरगढ़	भंवरिया	लाड़पुरा	423.53
6.	रेल (गैर आबाद)	भंवरिया	लाड़पुरा	67.35
7.	कैलाश नगरी	दान्ता	सांगोद	0.00
			योगः–	**739.73**

जिला–झालावाड़
वन क्षेत्र

क्र.सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हैक्टर)
1.	मशालपुरा–ए (कम्पार्टमेंट सं0 25–36)	उप वन संरक्षक, झालावाड़	आरक्षित वन	692.23
2.	मशालपुरा–बी (कम्पार्टमेंट सं0 18–48,51,52,54,55)	उप वन संरक्षक, झालावाड़	आरक्षित वन	6027.80
3.	लक्ष्मीपुरा	उप वन संरक्षक,वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	103.448
			योगः–	**6823.478**

जिला–झालावाड़
राजस्व क्षेत्र

क्र.सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हैक्टर)
1	बोरकूँआ (कानपुरा का मजरा)	गगरोन	झालरापाटन	8.16
2	हरिपुरा डांडिया	गगरोन	झालरापाटन	148.00
3	गोल बाव	गगरोन	झालरापाटन	0.00
5	गागरोन	गगरोन	झालरापाटन	320.00
6	लक्ष्मीपुरा प्रेमपुरा	गगरोन	झालरापाटन	288.30
7	नोलाव	गगरोन	झालरापाटन	113.00
8	कोथला घाटी	गगरोन	झालरापाटन	113.00
			योगः–	**990.46**

जिला–चित्तौड़गढ़
वन क्षेत्र

क्र.स.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हैक्टर)
1.	कान्या तलाब	उप वन संरक्षक, चित्तौड़गढ़	आरक्षित वन	2398.000
2.	गैर नगरा (कम्पार्टमेंट सं. -23, 27,28)	उप वन संरक्षक,वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	320.00
3.	भैंसरोड़गढ़ 'बी'	उप वन संरक्षक,वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	17.00
4.	श्रीपुरा ए,बी,सी	उप वन संरक्षक,वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	425.00
5.	खालगाँव ए–बी	उप वन संरक्षक,वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	124.681
6.	गुजर	उप वन संरक्षक,वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	700.00
			योगः–	**3984.681**

मध्यवर्ती क्षेत्र (Buffer area) का विवरण

वन क्षेत्र :	32552.084 हैक्टेयर
राजस्व क्षेत्र :	1730.190 हैक्टेयर
योग :	34282.274 हैक्टेयर
महायोग :	75999.462 हैक्टेयर

अनुसूची–II(अ)

(मुकन्दरा हिल्स टाईगर रिजर्व के क्रान्तिक व्याघ्र निवासी क्षेत्र का सीमा विवरण)

उत्तरी सीमा :–

ऐरू नदी के उत्तरी छोर से जहां वन खण्ड अम्बारानी की सीमा प्रारम्भ होती है, से वन खण्ड अम्बारानी की उत्तरी सीमा के सहारे–सहारे, जिला बूंदी एवं कोटा की सीमाओं के मिलान बिन्दु से होते हुऐ चम्बल नदी के किनारें तक, जो जवाहर सागर अभयारण्य की सीमा भी है। तत्पश्चात चम्बल नदी के विपरीत किनारें तक तथा किनारे के लम्बवत चलते हुए राष्ट्रीय घड़ियाल अभयारण्य की सीमा के मिलान बिन्दु तक। तत्पश्चात राष्ट्रीय घड़ियाल अभयारण्य की सीमा, जो अकेलगढ़ वन खण्ड में से होकर गुजरती है, पर चलते हुए तथा घड़ियाल अभयारण्य के क्षेत्र को सम्मिलित करते हुऐ गैपरानाथ के नाले तक। तत्पश्चात राष्ट्रीय घड़ियाल अभयारण्य की सीमा के सहारे–सहारे, जो लोह डूंगरी वन खण्ड में से होकर गुजरती है तथा मुकन्दरा हिल्स राष्ट्रीय उद्यान की सीमा भी है, वन खण्ड बोराबास की सीमा के मिलान बिन्दु तक। तत्पश्चात वन खण्ड बोराबास की उत्तर–पूर्वी सीमा पर चलते हुये कोटा–बोराबास जाने वाले रास्ते तक, बोराबास वन खण्ड को सम्मिलित करते हुऐ तथा ग्राम बोराबास को बाहर निकालते हुये। तत्पश्चात बोराबास से चांदबावड़ी जाने वाले मार्ग जो फायर लाईन भी है तथा वन खण्ड चांदबावड़ी की सीमा भी है, के सहारे–सहारे, वन खण्ड फूटा के कम्पार्टमेंट संख्या 23 की सीमा के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेन्ट संख्या 23 की उत्तरी सीमा पर चलते हुए तथा उक्त कम्पार्टमेन्ट को सम्मिलित करते हुऐ वनखण्ड चांदबावड़ी की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड चांदबावड़ी की सीमा के सहारे–सहारे, वनखण्ड फूटा के कम्पार्टमेन्ट संख्या 32 की सीमा के मिलान बिन्दु तक। तत्पश्चात उक्त कम्पार्टमेन्ट की उत्तर–पूर्वी सीमा पर चलते हुए तथा उक्त कम्पार्टमेन्ट को सम्मिलित करते हुए ग्राम चांदबावड़ी की राजस्व सीमा के मिलान बिन्दु तक, जो कि मुकन्दरा हिल्स राष्ट्रीय उद्यान की सीमा भी है, तक। तत्पश्चात वन खण्ड फूटा के कम्पार्टमेंट संख्या 32 की दक्षिणी–पश्चिमी सीमा पर चलते हुऐ ग्राम चांदबावड़ी एवं ग्राम हरीपुरा (गैर आबाद) की राजस्व भूमि बाहर करते हुऐ तथा ग्राम अखावा की राजस्व भूमि को सम्मलित करते हुऐ वन खण्ड केसरा झूमकिया की उत्तरी सीमा के मिलान बिन्दु तक। वन खण्ड केसरा झूमकिया की उत्तरी सीमा के मिलान बिन्दु से उक्त वन खण्ड की उत्तरी सीमा के सहारे–सहारे वन खण्ड डोलिया के कम्पार्टमेंट संख्या 73,72,71,70,68,61 की उत्तरी सीमा के सहारे–सहारे, उक्त कम्पार्टमेंटो को सम्मिलित करते हुए, वन खण्ड दामोदरपुरा की उत्तरी सीमा तक। तत्पश्चात वन खण्ड दामोदरपुरा की उत्तरी बाहरी सीमा पर चलते हुऐ वन खण्ड दामोदरपुरा को सम्मिलित करते हुए वन खण्ड दरा की उत्तरी सीमा तक, वन खण्ड दरा को सम्मलित करते हुऐ, वन खण्ड मशालपुरा–ए के कम्पार्टमेंट संख्या 50 की उत्तरी सीमा के मिलान बिन्दु तक, जो मुकन्दरा हिल्स राष्ट्रीय उद्यान की सीमा भी है। तत्पश्चात मशालपुरा–ए के कम्पार्टमेंट संख्या 50,51,52,53 व 54 की उत्तर–पूर्वी सीमा पर चलते हुऐ तथा उक्त कम्पार्टमेंटों को सम्मिलित करते हुए मशालपुरा–बी के कम्पार्टमेंट संख्या 49 के मिलान बिंदू तक, जो दर्रा अभयारण्य की सीमा भी है। तत्पश्चात वन खण्ड मशालपुरा–बी के कम्पार्टमेंट संख्या 49,50,53,55 व 56 की उत्तर–पूर्वी सीमाओं के सहारे–सहारे उक्त कम्पार्टमेंटो को सम्मिलित करते हुऐ काली सिन्ध नदी के मिलान बिन्दु तक, जो दरा अभयारण्य की सीमा भी है।

पूर्वी सीमा :–

वनखण्ड मशालपुरा–बी के कम्पार्टमेंट संख्या 56 की उत्तरी सीमा जो काली सिन्ध नदी के किनारें पर मिलती है, से नदी के किनारें–किनारें कम्पार्टमेंट संख्या 56 एवं 57 की पूर्वी सीमा तक, उक्त कम्पार्टमेन्टों को सम्मिलित करते हुए, जो कि दरा अभयारण्य की सीमा भी है।

दक्षिणी सीमा :–

काली सिंध नदी तथा वन खण्ड मशालपुरा–बी के कम्पार्टमेंट संख्या 57 की दक्षिणी सीमा के मिलान बिन्दु से प्रारम्भ होकर उक्त वनखण्ड के कम्पार्टमेंट संख्या 57,63 व 58 की दक्षिणी–पश्चिमी सीमा के सहारे–सहारे तथा उक्त कम्पार्टमेन्टों को सम्मिलित करते हुऐ, ग्राम गागरोन, कोथला घाटी, नोलाव एवं ग्राम लक्ष्मीपुरा उर्फ प्रेमपुरा को एवं उनकी राजस्व भूमि को व वनखण्ड लक्ष्मीपुरा को बाहर करते हुए, वन खण्ड मशालपुरा–बी के कम्पार्टमेंट न. 61 एवं 62 की बाहरी पूर्वी सीमा के सहारे–सहारे आहू नदी तथा कम्पार्टमेन्ट संख्या 62 की दक्षिण–पश्चिमी सीमा के मिलान बिन्दु तक। कम्पार्टमेन्ट संख्या 62 की दक्षिणी सीमा तथा आहू नदी के मिलान बिन्दु से प्रारम्भ होकर वनखण्ड मशालपुरा–बी की दक्षिण–पश्चिमी सीमा के सहारे–सहारे, वनखण्ड खीमच–बी की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड खीमच–बी को सम्मिलित करते हुए उक्त वनखण्ड की दक्षिणी–पश्चिमी सीमा के सहारे–सहारे उक्त वनखण्ड के कम्पार्टमेन्ट संख्या 9 की दक्षिणी सीमा के अन्तिम बिन्दु तक, जो दरा अभयारण्य की सीमा भी है। तत्पश्चात कम्पार्टमेन्ट संख्या 9 की पश्चिमी सीमा के सहारे–सहारे, वनखण्ड अमझार–बी को बाहर रखते हुए, वनखण्ड मनोहरपुरा की दक्षिणी सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड मनोहरपुरा की दक्षिणी सीमा के सहारे–सहारे वनखण्ड अमझार–बी को बाहर करते हुए वनखण्ड अमझार–ए के मिलान बिन्दु तक। तत्पश्चात वनखण्ड अमझार–ए की दक्षिणी–पश्चिमी सीमा के सहारे–सहारे तथा उक्त वनखण्ड को सम्मिलित करते हुए, वनखण्ड मनोहरपुरा की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड मनोहरपुरा की दक्षिणी सीमा के सहारे–सहारे ग्राम घाटोली तक। तत्पश्चात वन खण्ड घाटोली की दक्षिणी सीमा के सहारे–सहारे तथा उसे सम्मिलित करते हुए, वनखण्ड बुर्जवाली चौकी, काला कोट, नीम का खेड़ा, एवं कोलीपुरा की दक्षिणी–पश्चिमी सीमा के सहारे–सहारे उक्त वन खण्डो को सम्मिलित करते हुऐ जो मुकन्दरा

हिल्स राष्ट्रीय उद्यान की सीमा भी है तक। तत्पश्चात कोलीपुरा ग्राम के राजस्व क्षेत्र एवं रूपपुरा के राजस्व क्षेत्र को सम्मिलित करते हुऐ, कोलीपुरा–रावत भाटा मार्ग के साथ–साथ वन खण्ड कान्या तालाब के कोलीपुरा–रावतभाटा मार्ग के दायीं ओर के क्षेत्र को सम्मिलित करते हुऐ, कान्या तालाब के कम्पार्टमेंट न. 1 तथा थोलनपुर की पश्चिमी सीमा के सहारे–सहारे, कोटा, चित्तौड़गढ़ तथा बून्दी जिले की सीमाओं के मिलान बिन्दु तक, कोटा, चित्तौड़गढ़ तथा बून्दी जिले की सीमाओं के मिलान बिन्दु से चम्बल नदी के उत्तरी छोर पर वनखण्ड पीर मगरा की निकटतम सीमा के मिलान बिन्दु तक, तत्पश्चात वन खण्ड पीरमगरा की दक्षिणी सीमा के सहारे–सहारे, उक्त वनखण्ड को सम्मिलित करते हुए; वन खण्ड बालापुरा की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड बालापुरा की दक्षिणी सीमा के सहारे–सहारे, उक्त वनखण्ड को सम्मिलित करते हुऐ, पीरमगरा वनखण्ड की बाहरी सीमा के मिलान बिन्दु तक। तत्पश्चात पीरमगरा वन खण्ड की दक्षिणी सीमा के सहारे–सहारे, वन खण्ड मदार चौक के मिलान बिन्दु तक। तत्पश्चात वन खण्ड मदार चोक की बाहरी सीमा के साथ–साथ तथा उक्त वन खण्ड को सम्मिलित करते हुऐ, वन खण्ड भैंसरोडगढ़ पार्ट–ए के मिलान बिन्दू तक। तत्पश्चात वन खण्ड भैंसरोडगढ़ पार्ट–ए की बाहरी सीमा के सहारे–सहारे उक्त वनखण्ड को सम्मिलित करते हुऐ तथा वन खण्ड भैंसरोडगढ़ पार्ट–बी को बाहर रखते हुऐ भैंसरोडगढ़ से श्रीपुरा–लोटियाना जाने वाली सड़क के सहारे–सहारे, वन खण्ड पीरमगरा के कम्पार्टमेंट न. 23,27 व 28 (आंशिक) को बाहर करते हुऐ, कम्पार्टमेन्ट संख्या 28 की पश्चिमी सीमा के उक्त सड़क के उत्तर मे स्थित मिलान बिन्दु तक। तत्पश्चात पीर मगरा वन खण्ड की बाहरी सीमा के सहारे–सहारे वन खण्ड खालगांव ए–बी के मिलान बिन्दु तक।

पश्चिमी सीमा :–

वनखण्ड पीरमगरा तथा वनखण्ड खालगांव ए–बी के दक्षिणी सीमाओं के मिलान बिन्दु से प्रारम्भ होकर वनखण्ड पीरमगरा की पश्चिमी सीमा के सहारे–सहारे वन खण्ड खाल गांव ए–बी को बाहर करते हुऐ नोसेरा घाटे तक। तत्पश्चात नोसेरा घाटे से वन खण्ड गुडाराजपुरा की पश्चिमी सीमा के सहारे–सहारे एवं उक्त वन खण्ड की सीमा के एरू नदी के मिलान बिन्दु तक, तत्पश्चात एरू नदी के उत्तरी छोर पर स्थित वनखण्ड अम्बा रानी की सीमा के मिलान बिन्दु तक।

अनुसूची–II (ब)

(मुकन्दरा हिल्स व्याघ्र आरक्षिति के मध्यवर्ती क्षेत्र का सीमा विवरण)

खण्ड 1 :–

वनखण्ड मशालपुरा–बी एवं वनखण्ड लक्ष्मीपुरा के मिलान बिन्दु से प्रारम्भ होकर वनखण्ड मशालपुरा–बी के कम्पार्टमेंट संख्या 62 की दक्षिण–पूर्वी सीमा के सहारे–सहारे आहू नदी के मिलान बिन्दु तक। तत्पश्चात आहू नदी के सहारे–सहारे काली सिंध नदी के मिलान बिन्दु तक। तत्पश्चात काली सिंध नदी के किनारे–किनारे वनखण्ड मशालपुरा–बी के कम्पार्टमेन्ट नं. 57 के मिलान बिन्दु तक। काली सिंध नदी तथा कम्पार्टमेन्ट नं. 57 की दक्षिण–पश्चिमी सीमा के मिलान बिन्दु से प्रारम्भ होकर उक्त वनखण्ड की दक्षिण–पश्चिमी के सहारे–सहारे, कम्पार्टमेन्ट संख्या 63, 58 व 59 की बाहरी दक्षिण–पश्चिमी सीमा के सहारे–सहारे, कम्पार्टमेन्ट सं. 61 के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेन्ट नं. 61 व 62 की पूर्वी सीमा के सहारे–सहारे वनखण्ड लक्ष्मीपुरा के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेन्ट सं. 62 की दक्षिणी–पश्चिमी सीमा के सहारे–सहारे आहू नदी के मिलान बिन्दु तक, जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट क्षेत्र की सीमा भी है, तक। वनखण्ड लक्ष्मीपुरा तथा राजस्व क्षेत्र ग्राम लक्ष्मीपुरा उर्फ प्रेमपुरा, नोलाव, कोथला घाटी एवं गागरोन को सम्मिलित करते हुए।

खण्ड 2 :–

वनखण्ड मशालपुरा–बी के कम्पार्टमेन्ट 56 की उत्तरी सीमा तथा काली सिंध के मिलान बिन्दु से प्रारम्भ होकर राजस्व क्षेत्र राजपुरा को बाहर करते हुए तथा वनखण्ड मशालपुरा–बी की पूर्वी सीमा के सहारे–सहारे, कम्पार्टमेन्ट संख्या 31 व काली सिंध नदी के किनारे पर मिलान बिन्दु तक। तत्पश्चात वनखण्ड मशालपुरा–बी की पूर्वी व उत्तरी सीमा के सहारे–सहारे वनखण्ड मशालपुरा–बी को सम्मिलित करते हुए, वनखण्ड मशालपुरा–ए की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड मशालपुरा–ए की उत्तरी सीमा के सहारे–सहारे तथा उक्त वनखण्ड को सम्मिलित करते हुए, ग्राम मोरू कला गांव को बाहर करते हुए, वनखण्ड दरा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड दरा की सीमा के सहारे–सहारे मशालपुरा–ए के कम्पार्टमेन्ट सं. 50 की सीमा के मिलान बिन्दु तक। तत्पश्चात मशालपुरा–ए के कम्पार्टमेन्ट संख्या 50,51,52,53,54 तथा वनखण्ड मशालपुरा–बी के कम्पार्टमेन्ट नं. 49,50,53,55 तथा 56 की उत्तर–पूर्वी सीमाओं के सहारे–सहारे, उक्त कम्पार्टमेन्टों को बाहर करते हुए, कम्पार्टमेन्ट सं. 56 तथा काली सिंध नदी के किनारे स्थित मिलान बिन्दु तक। जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट क्षेत्र की सीमा भी है, तक।

खण्ड 3 :–

वनखण्ड दामोदरपुरा से लगे वनखण्ड डोलिया के कम्पार्टमेन्ट संख्या 57 की बाहरी सीमा से प्रारम्भ होकर कम्पार्टमेन्ट सं. 58,59,51,37,35,33,32,31,48,46 की बाहरी सीमा के सहारे–सहारे तथा उक्त

सीमा के अन्तर्गत आने वाले कम्पार्टमेन्टों को सम्मिलित करते हुए, वनखण्ड डोलिया के कम्पार्टमेन्ट संख्या 71 की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड डोलिया के कम्पार्टमेन्ट संख्या 46 की पश्चिमी सीमा तथा कम्पार्टमेन्ट सं. 71 की उत्तरी सीमाओं के मिलान बिन्दु से प्रारम्भ होकर, कम्पार्टमेन्ट संख्या 71,70,68,61 की उत्तरी सीमा पर होते हुए, तथा उक्त कम्पार्टमेन्टों को बाहर करते हुए, वनखण्ड दमोदरपुरा की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड दमोदरपुरा की उत्तर–पश्चिमी सीमा के सहारे–सहारे वनखण्ड डोलिया के कम्पार्टमेन्ट संख्या 57 के मिलान बिन्दु तक, जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट की सीमा भी है। उक्त सीमा के अन्तर्गत आने वाले ग्राम जसपुरा, रेल (गैर आबाद), केशोपुरा तथा मन्दरगढ़ की राजस्व क्षेत्र भी सम्मिलित है।

खण्ड 4 :–

वनखण्ड फूटा के कम्पार्टमेन्ट संख्या 31,30,29,28,19,15,13,12,7,20,21 एवं 22 की बाहरी सीमा के सहारे–सहारे तथा इस सीमा के अन्तर्गत आने वाले कम्पार्टमेन्टों को सम्मिलित करते हुए वनखण्ड राड़ी ढंड के मिलान बिन्दु तक। तत्पश्चात वनखण्ड राड़ी ढंड की बाहरी दक्षिण–पूर्वी तथा पूर्वी–उत्तरी सीमा के सहारे–सहारे तथा उक्त वनखण्ड को सम्मिलित करते हुए वनखण्ड लोह डूंगरी के मिलान बिन्दु तक। तत्पश्चात वन खण्ड लोह डूंगरी की सीमा के सहारे–सहारे गैपरनाथ के नाले तक। तत्पश्चात गैपरनाथ के नाले से राष्ट्रीय घड़ियाल अभयारण्य की सीमा के सहारे–सहारे वनखण्ड बोराबास की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड बोराबास की सीमा के सहारे–सहारे वनखण्ड चांदबावड़ी के मिलान बिन्दु तक। ग्राम बोराबास एवं उसके राजस्व क्षेत्र को बाहर करते हुए, तत्पश्चात वनखण्ड चांद बावड़ी की बाहरी सीमा के सहारे–सहारे वन खण्ड फूटा के कम्पार्टमेन्ट नं. 23 की सीमा के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेन्ट सं. 23 की दक्षिण–पूर्वी सीमा के सहारे–सहारे कम्पार्टमेन्ट को बाहर करते हुए वनखण्ड चांद बावड़ी की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड चांद बावड़ी की सीमा के सहारे–सहारे वनखण्ड फूटा के कम्पार्टमेन्ट सं. 32 की सीमा के मिलान बिन्दु तक। तत्पश्चात उक्त कम्पार्टमेन्ट की दक्षिण–पूर्वी सीमा के सहारे–सहारे तथा उक्त कम्पार्टमेन्ट को बाहर करते हुए ग्राम चांद बावड़ी की राजस्व सीमा के मिलान बिन्दु तक, जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट की सीमा भी है। तत्पश्चात ग्राम चांद बावड़ी एवं हरीं पुरा ग्राम के राजस्व क्षेत्र को सम्मिलित करते हुए कम्पार्टमेन्ट सं. 31 के प्रारम्भिक मिलान बिन्दु तक।

खण्ड 5 :–

वन खण्ड खालगांव ए–बी तथा वनखण्ड पीरमगरा के उत्तर–पश्चिम दिशा में स्थित मिलान बिन्दु से प्रारम्भ होकर वन खण्ड खालगांव ए–बी पश्चिमी की सीमा के सहारे–सहारे वन खण्ड भुजर के मिलान बिन्दु तक। तत्पश्चात वन खण्ड भुजर के कम्पार्टमेंट संख्या 12b की सीमा पर होते हुये तथा कम्पार्टमेंट संख्या 12a के मिलान बिन्दु तक। तत्पश्चात जवाहर सागर अभयारण्य की पश्चिमी सीमा के सहारे–सहारे वनखण्ड श्रीपुरा–बी के मिलान बिन्दु तक। तत्पश्चात वनखण्ड श्रीपुरा–बी की पश्चिमी सीमा से प्रारम्भ होकर तथा राजस्व क्षेत्र को बाहर करते हुये वनखण्ड भुजर के मिलान बिन्दु तक। तत्पश्चात वन खण्ड श्रीपुरा–सी के मिलान बिन्दु तक। तत्पश्चात वन खण्ड श्रीपुरा–सी की सीमा पर चलते हुये तथा उक्त वन खण्ड को सम्मिलित करते हुये वन खण्ड खाल गांव ए–बी के मिलान बिन्दु तक। तत्पश्चात वन खण्ड खाल गांव ए–बी की दक्षिण–पूर्वी सीमा पर चलते हुये वनखण्ड पीरमगरा के मिलान बिन्दु तक। तत्पश्चात वन खण्ड खाल गांव ए–बी की सीमा पर चलते हुये वनखण्ड पीरमगरा के मिलान बिन्दु तक। तत्पश्चात वन खण्ड खाल गांव ए–बी की सीमा पर चलते हुये प्रारम्भिक बिन्दु तक जो कि वनखण्ड ए–बी तथा वन खण्ड पीरमगरा की कोमन सीमा तथा मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटिकल हैबिटाट क्षेत्र की सीमा भी है, तक।

खण्ड 6 :–

वनखण्ड श्रीपुरा ए,बी,सी का पार्ट–ए की पश्चिमी सीमा तथा बहामणी नदी के मिलान बिन्दु से प्रारम्भ होकर उक्त वनखण्ड की सीमा के सहारे–सहारे तथा उक्त वनखण्ड को सम्मिलित करते हुए।

खण्ड 7 :–

लोटियाना–भैंसरोडगढ़ सड़क के दक्षिण में वनखण्ड–पीरमगरा के कम्पार्टमेंट संख्या 28 की सीमा पर चलते हुये कम्पार्टमेंट संख्या 27 व 23 की दक्षिणी सीमा पर चलते हुये तथा इन्हें सम्मिलित करते हुये वनखण्ड भैंसरोडगढ़–बी के मिलान बिन्दु तक। तत्पश्चात वनखण्ड भैंसरोडगढ़–बी की सीमा पर चलते हुये कम्पार्टमेंट–23 के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेंट संख्या 23 व 27 की सीमा पर सड़क के किनारे–किनारे चलते हुये कम्पार्टमेंट संख्या 28 की सीमा के प्रारम्भिक बिन्दु तक जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटिकल टाईगर हैबिटाट की सीमा भी है, तक।

खण्ड 8 :–

रामगढ़–से बोराबास जाने वाली सड़क के दक्षिण में स्थित वनखण्ड–कान्या तालाब के कम्पार्टमेंट संख्या–1 की सीमा से प्रारम्भ होकर उक्त वन खण्ड की सीमा पर चलते हुये तथा उक्त वन खण्ड को सम्मिलित करते हुये वन खण्ड कालाकोट के मिलान बिन्दु तक। तत्पश्चात वन खण्ड कान्या

तालाब तथा वन खण्ड कालाकोट, नीम का खेड़ा तथा कोलीपुरा की कॉमन सीमा पर चलते हुये रावतभाटा–बोराबास सड़क तक तथा उक्त सड़क के दक्षिणी किनारे के सहारे–सहारे चलते हुये प्रारम्भिक बिन्दु तक जो कि मुकन्दरा हिल्स टाईगर रिज़र्व के क्रिटिकल हैबिटाट क्षेत्र की सीमा भी है, तक।

खण्ड 9 :–

दरा–झालावाड़ सड़क के किनारे वनखण्ड अमझार–बी की सीमा से प्रारम्भ होकर उक्त वन खण्ड की सीमा पर झालावाड़–दरा मार्ग के सहारे–सहारे दरा–घाटोली मार्ग के मिलान बिन्दु तक। तत्पश्चात उक्त वन खण्ड की सीमा पर, मार्ग दरा–घाटोली के सहारे–सहारे जो वन खण्ड मनोहरपुरा की सीमा भी है तथा मुकन्दरा हिल्स टाईगर रिज़र्व के क्रिटिकल हैबिटाट की सीमा भी है, तक। तत्पश्चात वन खण्ड अमझार–बी की सीमा पर चलते हुये तथा उक्त वन खण्ड को सम्मिलित करते हुये प्रारम्भिक बिन्दु तक।

राज्यपाल की आज्ञा से,
सी.एस. रत्नासामी,
शासन सचिव,
वन विभाग,
शासन सचिवालय, जयपुर।

राज्य केन्द्रीय मुद्रणालय, जयपुर।

राजस्थान सरकार
वन विभाग

पं.एफ. नं. 3(22)वन/2023 **जयपुर, दिनांक**

अधिसूचना

वन्य जीव (संरक्षण) अधिनियम, 1972 (1972 का केन्द्रीय अधिनियम संख्या 53) की धारा 38C द्वारा प्रदत्त शक्तियों का प्रयोग करते हुयें राज्य सरकार राष्ट्रीय बाघ संरक्षण प्राधिकरण की अभिशंषा एवं संबंद्ध ग्राम सभा तथा विशेषज्ञ समिति से परामर्श उपरान्त एतद्द्वारा इस विभाग की पूर्व अधिसूचना क्रमांकः प3(8)वन/2012/ दिनांक 09 अप्रेल, 2013, जिसका प्रकाशन राजस्थान राज पत्र के विशेषांक के भाग 1(ख) में दिनांक 18.04.2013 में हुआ है, जिसके द्वारा मुकन्दरा हिल्स व्याघ्र आरक्षिति (Tiger Reserve) क्षेत्र घोषित किया गया था, में निम्न संशोधन करती है, अर्थात्:—

संशोधन

उक्त अधिसूचना में,—

(i) विद्यमान अभिव्यक्ति "अनुसूची—I(अ) में वर्णित वन एवं राजस्व क्षेत्र (41717.188 है.) एवं I (ब) में वर्णित वन एवं राजस्व क्षेत्र (34282.274 है.) कुल क्षेत्र 75999.462 हैक्टेयर" को अभिव्यक्ति "अनुसूची—I(अ) में वर्णित वन एवं राजस्व क्षेत्र (69071.178 है.) एवं I(ब) में वर्णित वन एवं राजस्व क्षेत्र (44507.522 है.) कुल क्षेत्र 113578.70 हैक्टेयर"से प्रतिस्थापित किया जायेगा;

(ii) अनुसूची—I(अ) में क्रान्तिक व्याघ्र निवासी क्षेत्र के नीचे विद्यमान निम्न अभिव्यक्ति,

"जिला—चित्तौड़गढ़
वन क्षेत्र

क्र.सं	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हेक्टर)
1.	कानिया तालाब (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	145.00
2.	पीर मगरा (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	3295.00
3.	मदार चौक	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	401.027
4.	बालापुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	289.491
5.	भैंसरोड़गढ़	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	180.00
			योगः—	**4310.518**

जिला—चित्तौड़गढ़
राजस्व क्षेत्र

क्र.सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हेक्टेयर)
1ण	अम्बा रानी	भैंसरोड़गढ़	रावतभाटा	37.21
2ण	नोसेरा	श्रीपुरा	रावतभाटा	29.07
3ण	भैंसरोड़गढ़	भैंसरोड़गढ़	रावतभाटा	83.00
			योगः—	149.28

"क्रान्तिक व्याघ्र निवासी क्षेत्र" (Critical Tiger Habitat) का विवरण

वन क्षेत्रः 40186.078 हैक्टेयर

राजस्व क्षेत्रः 1531.110 हैक्टेयर

योगः 41717.188 हैक्टेयर

को अभिव्यक्ति,

"जिला—चित्तौड़गढ़
वन क्षेत्र

क्र.सं	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हेक्टेयर)

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1ण	कानिया तालाब (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	145.00
2ण	पीर मगरा (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	3295.00
3ण	मदार चौक	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	401.027
4ण	बालापुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	289.491
5ण	भैंसरोड़गढ़	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	180.00
6ण	पाडाझर	उप वन संरक्षक, वन्यजीव, कोटा	आरक्षित वन	2703.0
7ण	कोलगढ	उप वन संरक्षक, वन्यजीव, कोटा	आरक्षित वन	6086.0
8ण	बांदरमुक्ता	उप वन संरक्षक, वन्यजीव, कोटा	आरक्षित वन	1925.0
9ण	रिचाखो	उप वन संरक्षक, वन्यजीव, कोटा	आरक्षित वन	1049.0
10ण	मामोरगढ	उप वन संरक्षक, वन्यजीव, कोटा	आरक्षित वन	1823.0
11ण	निमडी	उप वन संरक्षक, वन्यजीव, कोटा	आरक्षित वन	1929.0
12ण	कालाखेत, हाथीपगा	उप वन संरक्षक, वन्यजीव, कोटा	आरक्षित वन	2003.0
13ण	मण्डेसरा पार्ट बी.सी.डी.ई.	उप वन संरक्षक, वन्यजीव, कोटा	रक्षित वन	750.0
14ण	दुधितलाई पार्ट–ा	उप वन संरक्षक, वन्यजीव, कोटा	रक्षित वन	593.0
15ण	रातोली	उप वन संरक्षक, वन्यजीव, कोटा	रक्षित वन	305.0
16ण	गोलदुगारी	उप वन संरक्षक, वन्यजीव, कोटा	रक्षित वन	25.0
17ण	कालाखेत–ब	उप वन संरक्षक, वन्यजीव, कोटा	आरक्षित वन	117.99
			योग:–	**23619.508**

जिला–चित्तौड़गढ़
राजस्व क्षेत्र

क्र.सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हेक्टेयर)
1ण	अम्बा रानी	भैंसरोड़गढ़	रावतभाटा	37.21
2ण	नोसेरा	श्रीपुरा	रावतभाटा	29.07
3ण	भैंसरोड़गढ़	भैंसरोड़गढ़	रावतभाटा	83.00
4ण	उदपुरिया	सणीता	रावतभाटा	127.0
5ण	भवानीपुरा	सणीता	रावतभाटा	326.0
6ण	खालगाव	मण्डेसरा	रावतभाटा	191.0
7ण	लुहारिया	लुहारिया	रावतभाटा	1778.0
8ण	पाडाझर खुर्द	लुहारिया	रावतभाटा	154.0
9ण	मोरटूका	लुहारिया	रावतभाटा	114.0
10ण	हाथोली	लुहारिया	रावतभाटा	447.0
11ण	बखतपुरा	लुहारिया	रावतभाटा	255.0
12ण	सुठाला	लुहारिया	रावतभाटा	511.0
13ण	प्रेमपुरा	बस्सी	रावतभाटा	255.0
14ण	दारीबा	बस्सी	रावतभाटा	148.0
15ण	दुधीतलाई	राजपुरा	रावतभाटा	165.0
16ण	मण्डेसरा	मण्डेसरा	रावतभाटा	572.0
17ण	रतनपुरा	मण्डेसरा	रावतभाटा	808.0
18ण	फुटपाल	मण्डेसरा	रावतभाटा	564.0
19ण	बहलिया	कुशालगढ	रावतभाटा	511.0
20ण	लसाना	कुशालगढ	रावतभाटा	204.0
21ण	झुझला	कुशालगढ	रावतभाटा	40.0

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22ण	नली	कुशालगढ	रावतभाटा	830,0
23ण	कोलपुरा	मण्डेसरा	रावतभाटा	179,0
24ण	चैनपुरा	कुशालगढ	रावतभाटा	105,0
			योगः–	**8194.28**

उपरोक्त क्षेत्र स्वैच्छिक विस्थापन/अधिकार अधिग्रहण पश्चात् क्रांतिक व्याघ्र निवासी क्षेत्र का भाग होगा।

"कान्तिक व्याघ्र निवासी क्षेत्र" (Critical Tiger Habitat) का विवरण

वन क्षेत्रः 59495.068 हैक्टेयर

राजस्व क्षेत्रः 9576.11 हैक्टेयर

योगः 69071.178 हैक्टेयर

"

से प्रतिस्थापित किया जायेगा;

(iii) अनुसूची–I(ब) के नीचे विद्यमान निम्न अभिव्यक्ति,

"मध्यवर्ती क्षेत्र (Buffer Area)

जिला–कोटा

वन क्षेत्र

क्र.सं	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हेक्टेयर)
1ण	मशालपुरा – ए (आंशिक) (कम्पार्टमेंट सं.– 1–24,37–49)	उप वन संरक्षक, कोटा	आरक्षित वन	7282.570
2ण	मशालपुरा–बी (आंशिक) (कम्पार्टमेंट सं.– 1–17)	उप वन संरक्षक, कोटा	आरक्षित वन	4537.870
3ण	लोह डूंगरी	उप वन संरक्षक, कोटा	आरक्षित वन	488.800
4ण	राड़ी डन्ड	उप वन संरक्षक, कोटा	रक्षित वन	2593.157
5ण	फूटा (कम्पार्टमेंट सं.– 7,12–22,24–31)	उप वन संरक्षक, कोटा	आरक्षित वन	3107.500
6ण	डोलिया (कम्पार्टमेंट सं.– 31–35,37–43,46–51,57–60,69)	उप वन संरक्षक, कोटा	आरक्षित वन	3617.900
7ण	अमझार – बी	उप वन संरक्षक, कोटा		116.128
			योगः–	**21743.925**

"

को अभिव्यक्ति,

" मध्यवर्ती क्षेत्र (Buffer Area)

जिला–कोटा

वन क्षेत्र

क्र.सं	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हेक्टेयर)
1ण	मशालपुरा – ए (आंशिक) (कम्पार्टमेंट सं.– 1–24,37–49)	उप वन संरक्षक, कोटा	आरक्षित वन	7282.570
2ण	मशालपुरा–बी (आंशिक) (कम्पार्टमेंट सं.– 1–17)	उप वन संरक्षक, कोटा	आरक्षित वन	4537.870
3ण	लोह डूंगरी	उप वन संरक्षक, कोटा	आरक्षित वन	488.800
4ण	राड़ी डन्ड	उप वन संरक्षक, कोटा	रक्षित वन	2593.157
5ण	फूटा (कम्पार्टमेंट सं.–	उप वन संरक्षक,	आरक्षित वन	3107.500

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	7,12–22,24–31)	कोटा		
6ण	डोलिया (कम्पार्टमेंट सं.– 31–35,37–43,46–51,57–60,69)	उप वन संरक्षक, कोटा	आरक्षित वन	3617.900
7ण	अमझार — बी	उप वन संरक्षक, कोटा	आरक्षित वन	116.128
8ण	बर्डकलां किशोर सागर	उप वन संरक्षक मुकन्दरा राष्ट्रीय उद्यान कोटा	रक्षित वन	3066.54
9ण	बरखेडा	उप वन संरक्षक मुकन्दरा राष्ट्रीय उद्यान कोटा	रक्षित वन	90.76
10ण	बोराबास बी	उप वन संरक्षक मुकन्दरा राष्ट्रीय उद्यान कोटा	रक्षित वन	137.81
11ण	अकेलगढ	उप वन संरक्षक मुकन्दरा राष्ट्रीय उद्यान कोटा	आरक्षित वन	2784.138
12ण	सकतपुरा (कम्पार्टमेंट17,20,21)	उप वन संरक्षक मुकन्दरा राष्ट्रीय उद्यान कोटा	रक्षित वन	410.35
13ण	रांवठा	उप वन संरक्षक मुकन्दरा राष्ट्रीय उद्यान कोटा	रक्षित वन	45.35
14ण	राष्ट्रीय चम्बल घडियाल अभयारण्य	उप वन संरक्षक मुकन्दरा राष्ट्रीय उद्यान कोटा	अभयारण्य	2385.0
			योगः–	**30663.873**

से प्रतिस्थापित किया जायेगा;

(iv) अनुसूची–I(ब) के नीचे विद्यमान अभिव्यक्ति,

" मध्यवर्ती क्षेत्र (Buffer area) का विवरण

वन क्षेत्रः 32522.084 हैक्टेयर

राजस्व क्षेत्रः 1730.190 हैक्टेयर

योगः 34282.274 हैक्टेयर

महायोगः 75999.462 हैक्टेयर"

को अभिव्यक्ति,

"जिला–बूंदी
वन क्षेत्र

क्र. सं	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हेक्टेयर)
1	करौंदी (कम्पार्टमेंट 10 से 20)	उप वन संरक्षक मुकन्दरा राष्ट्रीय उद्यान कोटा	आरक्षित	856.80
2	रामपुरिया (कम्पार्टमेंट 9)	उप वन संरक्षक मुकन्दरा राष्ट्रीय उद्यान कोटा	आरक्षित	26.60
3	धने वर (कम्पार्टमेंट 11)	उप वन संरक्षक मुकन्दरा राष्ट्रीय उद्यान कोटा	आरक्षित	67.80
4	अम्बारानी ए	उप वन संरक्षक मुकन्दरा राष्ट्रीय उद्यान कोटा	आरक्षित	354.10
				1305.30

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मध्यवर्ती क्षेत्र (Buffer area) का विवरण
वन क्षेत्रः 42777.332 हैक्टेयर
राजस्व क्षेत्रः 1730.190 हैक्टेयर

योगः 44507.522 हैक्टेयर

महायोगः 113578.70 हैक्टेयर"

से प्रतिस्थापित किया जायेगा;

(v) अनुसूची–II(अ) (मुकन्दरा हिल्स टाईगर रिजर्व के क्रांतिक व्याघ्र निवासी क्षेत्र का सीमा विवरण) में विद्य मान अभिव्यक्ति,

''पश्चिम सीमाः–

वनखण्ड पीरमगरा तथा वनखण्ड खालगांव ए–बी के दक्षिणी सीमाओं के मिलान बिन्दुओं से प्रारम्भ होकर वनखण्ड पीरमगरा की पश्चिमी सीमा के सहारे–सहारे वन खण्ड खाल गांव ए–बी, को बाहर करते हुए, नोसेरा घाटे तक। तत्पश्चात नोसेरा घाटे से वन खण्ड गूडाराजपुरा की पश्चिम सीमा के सहारे–सहारे एवं उक्त वन खण्ड की सीमा के एरू नदी के मिलान बिंदु तक, तत्पश्चात एरू नदी के उत्तरी छोर पर स्थित वनखण्ड अम्बा रानी की सीमा के मिलान बिन्दु तक।'' को अभिव्यक्ति

"वनखण्ड पीरमगरा तथा वनखण्ड खालगांव –ए, बी दक्षिणी सीमाओं के मिलान बिन्दुओं से प्रारम्भ होकर वनखण्ड पीरमगरा की पश्चिमी सीमा के सहारे–सहारे वनखण्ड खालगांव ए,बी, को बाहर करते हुए,मेसरोडगढ अभयारण्य के वन खण्ड पाडाझर, कोलगढ, बांदरमुक्ता, रिवाखो, मामोरगढ, निमडी, कालाखेत, हाथीपगा, नण्डेसरा पार्ट बी.सी.डी.ई., दुधितलाई पार्ट–ा, रातोली, गोलदुगारी, कालाखेत–ब को सम्मिलित करते हुए, नोसेरा घाटे तक। तत्पश्चात नोसेरा घाटे से वनखण्ड गूडा राजपुरा की पश्चिम सीमा के सहारे–सहारे एवं उक्त वनखण्ड की सीमा के एरू नदी के मिलान बिंदु तक। तत्पश्चात एरू नदी के उत्तरी छोर पर स्थित वन खण्ड अम्बारानी की सीमा के मिलान बिन्दु तक। ''से प्रतिस्थापित किया जायेगा;

(vi) अनुसूची–II(ब) (मुकन्दरा हिल्स व्याघ्र आरक्षित के मध्यवर्ती क्षेत्र का सीमा विवरण) में विद्यमान अभिव्यक्ति,

''खण्ड 2

वनखण्ड मशालपुरा–बी के कम्पार्टमेन्ट 56 की उत्तरी सीमा तथा काली सिंध के मिलान बिन्दु से प्रारम्भ होकर राजस्व क्षेत्र राजपुरा को बाहर करते हुए तथा वनखण्ड मशालपुरा–बी की पूर्वी सीमा के सहारे–सहारे कम्पार्टमेन्ट संख्या 31 व काली सिंध नदी के किनारे पर मिलान बिन्दु तक। तत्पश्चात वनखण्ड मशालपुरा–बी की पूर्वी व उत्तरी सीमा के सहारे–सहारे वनखण्ड मशालपुरा–बी को सम्मिलित करते हुए वनखण्ड मशालपुरा–ए की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड मशालपुरा–ए की उत्तरी सीमा के सहारे–सहारे तथा उक्त वनखण्ड को सम्मिलित करते हुए, ग्राम मोरू कला गॉव को बाहर करते हुए, वनखण्ड दरा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड दरा की सीमा के सहारे–सहारे मशालपुरा–ए के कम्पार्टमेन्ट सं. 50 की सीमा के मिलान बिन्दु तक। तत्पश्चात मशालपुरा–ए के कम्पार्टमेन्ट संख्या 50,51,52,53,54 तथा वनखण्ड मशालपुरा–बी के कम्पार्टमेन्ट नं. 49,50,53,55 तथा 56 की उत्तर–पूर्वी सीमाओं के सहारे–सहारे उक्त कम्पार्टमेन्टों को बाहर करते हुए कम्पार्टमेन्ट सं. 56 तथा काली सिंध नदी के किनारे स्थित मिलान बिन्दु तक। जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट क्षेत्र की सीमा भी है तक।' को अभिव्यक्ति

''वनखण्ड मशालपुरा–बी के कम्पार्टमेन्ट 56 की उत्तरी सीमा तथा काली सिंध के मिलान बिन्दु से प्रारम्भ होकर राजस्व क्षेत्र राजपुरा को बाहर करते हुए तथा वनखण्ड मशालपुरा–बी की पूर्वी सीमा के सहारे–सहारे कम्पार्टमेन्ट संख्या 31 व काली सिंध नदी के किनारे पर मिलान बिन्दु तक। तत्पश्चात वनखण्ड मशालपुरा–बी की पूर्वी व उत्तरी सीमा के सहारे–सहारे वनखण्ड मशालपुरा–बी को सम्मिलित करते हुए वनखण्ड मशालपुरा–ए की सीमा के मिलान बिन्दु तक। ग्राम सोरू कला गॉव को बाहर करते हुए, वनखण्ड दरा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड दरा की सीमा के सहारे–सहारे मशालपुरा–ए के कम्पार्टमेन्ट सं. 50 की सीमा के मिलान बिन्दु तक। तत्पश्चात मशालपुरा–ए के कम्पार्टमेन्ट संख्या 50,51,52,53,54 तथा वनखण्ड मशालपुरा–बी के कम्पार्टमेन्ट नं. 49,50,53,55 तथा 56 की उत्तर–पूर्वी सीमाओं के सहारे–सहारे उक्त कम्पार्टमेन्टों को बाहर करते हुए कम्पार्टमेन्ट सं. 56 तथा काली सिंध नदी के किनारे स्थित मिलान बिन्दु तक। जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट क्षेत्र की सीमा भी है तक।' को अभिव्यक्ति

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की सीमा पर होते हुए, कनवास रैंज तक। तत्पश्चात कनवास दरा रोड के बायीं तरफ का वन क्षेत्र। तत्पश्चात वनखण्ड सीमा पर होते हुए, ग्राम मोरू कला, कालिया कुई गॉव को बाहर करते हुए वनखण्ड दरा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड दरा की सीमा के सहारे—सहारे मशालपुरा—ए के कम्पार्टमेन्ट सं. 50 की सीमा के मिलान बिन्दु तक। तत्पश्चात मशालपुरा—ए के कम्पार्टमेन्ट संख्या 50,51,52,53,54 तथा वनखण्ड मशालपुरा—बी के कम्पार्टमेन्ट नं. 49,50,53,55 तथा 56 की उत्तर—पूर्वी सीमाओं के सहारे—सहारे उक्त कम्पार्टमेन्टों को बाहर करते हुए कम्पार्टमेन्ट सं. 56 तथा काली सिंध नदी के किनारे स्थित मिलान बिन्दु तक। जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट क्षेत्र की सीमा भी है तक।''से प्रतिस्थापित किया जायेगा

(vi) अनुसूची—II(ब) (मुकन्दरा हिल्स व्याघ्र आरक्षित के मध्यवर्ती क्षेत्र का सीमा विवरण) में विद्यमान अभिव्यक्ति,

''खण्ड 4:—

वनखण्ड फूटा के कम्पार्टमेन्ट संख्या 31,30,29,28,19,15,13,12,7,20,21, एवं 22 की बाहरी सीमा के सहारे—सहारे तथा इस सीमा के अन्तर्गत आने वाले कम्पार्टमेन्टों को सम्मिलित करते हुए वनखण्ड राडी दंड के मिलान बिन्दु तक। तत्पश्चात वनखण्ड राडी दंड की बाहरी दक्षिण—पूर्वी तथा पूर्वी—उत्तरी सीमा के सहारे—सहारे तथा उक्त वनखण्ड को सम्मिलित करते हुए वनखण्ड लोह डूंगरी के मिलान बिन्दु तक। तत्पश्चात वन खण्ड लोह डूंगरी की सीमा के सहारे—सहारे गैपरनाथ के नाले तक। तत्पश्चात गैपरनाथ के नाले से राष्ट्रीय घडियाल अभयारण्य की सीमा के सहारे—सहारे वनखण्ड बोराबास की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड बोराबास की सीमा के सहारे—सहारे वनखण्ड चांद बावडी के मिलान बिन्दु तक। ग्राम बोराबास एवं उसके राजस्व क्षेत्र को बाहर करते हुए, तत्पश्चात वनखण्ड चांदबावडी की बाहरी सीमा के सहारे—सहारे वन खण्ड फूटा के कम्पार्टमेन्ट नं. 23 की सीमा के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेन्ट सं. 23 की दक्षिण—पूर्वी सीमा के सहारे—सहारे कम्पार्टमेन्ट को बाहर करते हुए वनखण्ड चांद बावडी की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड चांद बावडी की सीमा के सहारे—सहारे वनखण्ड फूटा के कम्पार्टमेंट संख्या 32 की सीमा के मिलान बिन्दु तक। तत्पश्चात उक्त कम्पार्टमेंट की दक्षिण—पूर्वी सीमा के सहारे—सहारे तथा उक्त कम्पार्टमेंट को बाहर करते हुए, ग्राम चांद बावडी की राजस्व सीमा के मिलान बिन्दु तक जो कि मुकन्दरा हिल्स टाईगर रिजर्व की क्रिटीकल टाईगर हेबिटाट की सीमा भी है। तत्पश्चात ग्राम चांदबावडी एवं हरिपुरा ग्राम के राजस्व क्षेत्र को सम्मिलित करतें हुए कम्पार्टमेंट संख्या 31 के प्रारम्भिक मिलान बिन्दु तक।'' को अभिव्यक्ति,

''खण्ड 4:—

वनखण्ड फूटा के कम्पार्टमेन्ट संख्या 31,30,29,28,19,15,13,12,7,20,21, एवं 22 की बाहरी सीमा के सहारे—सहारे तथा इस सीमा के अन्तर्गत आने वाले कम्पार्टमेन्टों को सम्मिलित करते हुए वनखण्ड राडी दंड के मिलान बिन्दु तक। तत्पश्चात वनखण्ड राडी दंड की बाहरी दक्षिण—पूर्वी तथा पूर्वी—उत्तरी सीमा के सहारे—सहारे तथा उक्त वनखण्ड को सम्मिलित करते हुए वनखण्ड लोह डूंगरी के मिलान बिन्दु तक। तत्पश्चात वन खण्ड लोह डूंगरी की सीमा के सहारे—सहारे गैपरनाथ के नाले तक। तत्पश्चात गैपरनाथ के नाले से राष्ट्रीय घडियाल अभयारण्य की सीमा के सहारे—सहारे वनखण्ड बोराबास की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड बोराबास की सीमा के सहारे—सहारे वनखण्ड चांद बावडी के मिलान बिन्दु तक। ग्राम बोराबास एवं उसके राजस्व क्षेत्र को बाहर करते हुए, तत्पश्चात वनखण्ड चांदबावडी की बाहरी सीमा के सहारे—सहारे वन खण्ड फूटा के कम्पार्टमेन्ट नं. 23 की सीमा के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेन्ट सं. 23 की दक्षिण—पूर्वी सीमा के सहारे—सहारे कम्पार्टमेन्ट को बाहर करते हुए वनखण्ड चांद बावडी की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड चांद बावडी की सीमा के सहारे—सहारे वनखण्ड फूटा के कम्पार्टमेंट संख्या 32 की सीमा के मिलान बिन्दु तक। तत्पश्चात उक्त कम्पार्टमेंट की दक्षिण—पूर्वी सीमा के सहारे—सहारे तथा उक्त कम्पार्टमेंट को बाहर करते हुए, ग्राम चांद बावडी की राजस्व सीमा के मिलान बिन्दु तक जो कि मुकन्दरा हिल्स टाईगर रिजर्व की क्रिटीकल टाईगर हेबिटाट की सीमा भी है। तत्पश्चात ग्राम चांदबावडी एवं हरिपुरा ग्राम के राजस्व क्षेत्र को सम्मिलित करतें हुए कम्पार्टमेंट संख्या 31 के प्रारम्भिक

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मिलान बिन्दु तक तत्पश्चात वनखण्ड अकेलगढ के वन क्षेत्र को सम्मिलित करते हुए, रावतभाटा कोटा रोड के बायीं तरफ का वनक्षेत्र नयागांव तक। तत्पश्चात इन्जिनियरिंग कॉलेज के पिछे वन क्षेत्र एवं नदी को सम्मिलित करते हुए कोटा बेराज तक। तत्पश्चात कोटा बेराज से कोटा थर्मल पॉवर प्लांट को बाहर निकालते हुए, नान्ता रोड के बायीं तरफ का वन क्षेत्र एवं नदी किनारे से 01 किमी तक के वन क्षेत्र को सम्मिलित करते हुए। तत्पश्चात बूंदी जिले के वनखण्ड कंरोदी (कम्पार्टमेंट संख्या 10–20) रामपुरिया (कम्पार्टमेंट संख्या 09) एवं धनेश्वनर (कम्पार्टमेंट संख्या 11) को सम्मिलित करते हुए, नेशनल हाईवे कोटा चित्तौड के बायीं तरफ का वन क्षेत्र। तत्पश्चात अवग्रीकृत वनखण्ड अम्बारानी–ए को सम्मिलित करते हुए।''

से प्रतिस्थापित किया जायेगा।

राज्यपाल की आज्ञा से,

(मोनाली सेन)
विशेषाधिकारी, वन

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RajKaj Ref No. : 4854336

7

MUKANDRA HILLS TIGER RESERVE-KOTA

MAP OF DRAINAGE, RIVER AND ROAD

GIS Center, Information Technology Wing
2013
(For use as per National Map Policy)
FOR DEPARTMENTAL USE ONLY

Legend

- DISTRICT ROAD
- KACHHA TRACK
- NATIONAL HIGHWAY
- STATE HIGHWAY
- RAILWAY
- DRAINEG
- RIVER
- CTH_BUFFER_PARIFERY

0 1 2

NOT TO SCALE

THIS MAP HAS BEEN PREPARED FOR MANAGEMENT PURPOSES ONLY. FOR LEGAL PURPOSES, FOREST LAND RECORDS SHOULD BE CONSULTED

FOREST DEPARTMENT, RAJASTHAN

Annexure- 5

A LIST OF FLORA

(A = Abundant, C= Common, L = Less common, R = Rare, I = introduced)

S. No.	Botanical Name	Common Name	Family	Status
1	*Acacia catechu*	Khair	Mimosaceae	A
2	*Acacia leucophloea*	Ronjh	Mimosaceae	A
3	*Acacia nilotica*	Desi Bawalia	Mimosaceae	L
4	*Acacia senegal*	Kumta	Mimosaceae	R
5	*Adina cordifolia*	Haldu	Rubiaceae	L
6	*Aegle marmelos*	Bili	Rutaceae	L
7	*Ailanthus excelsa*	Ardusa, Paba	Simaroubaceae	L
8	*Alangium salviifolium*	Ankol	Alangiaceae	A
9	*Albizia lebbeck*	Black Siris	Mimosaceae	L
10	*Albizia odoratissima*	Safed Siris	Mimosaceae	L
11	*Albizia procera*	Safed Siris	Mimosaceae	R
12	*Annona squamosa*	Sitaphal	Annonaceae	C
13	*Anogeissus latifolia*	Dhuvda	Combretaceae	C
14	*Anogeissus sericea*	Adrukh, Indok	Combretaceae	R
15	*Azadirachta indica*	Neem	Meliaceae	L
16	*Balanites aegyptiaca*	Hingot	Balanitaceae	C
17	*Bauhinia purpurea var. variegata*	Kachnar	Caesalpiniaceae	R
18	*Bauhinia racemosa*	Jhinjha, Heetri	Caesalpiniaceae	L
19	*Bombax ceiba*	Semal	Bombacaceae	L
20	*Boswellia serrata*	Salar	Burseraceae	L
21	*Bridelia retusa*	Asan, Lampan	Euphorbiaceae	R
22	*Butea monosperma*	Khakhro	Papilionaceae	A
23	*Casearia elliptica*	Mojal	Lecythidaceae	R
24	*Cassia fistula*	Karmela	Caesalpiniaceae	L
25	*Cassia siamea*	Kasid	Caesalpiniaceae	I
26	*Cordia myxa*	Gunda, Lisoda	Ehretiaceae	L
27	*Crataeva religiosa*	Varna	Capparaceae	R
28	*Dalbergia latifolia*	Sisam	Papilionaceae	R
29	*Dalbergia paniculata*	Dhoban	Papilionaceae	R
30	*Dalbergia sissoo*	Sandeshro	Papilionaceae	I
31	*Delonix elata*	Sandeshro	Caesalpiniaceae	C
32	*Diospyros melanoxylon*	Timru	Ebenaceae	C
33	*Ehretia laevis*	Tambolia	Ehretiaceae	L
34	*Phyllanthus emblica* (*Emblica officinalis*)	Amla	Euphorbiaceae	L
35	*Erythrina suberosa*	Dhed Khakhro	Papilionaceae	R
36	*Eucalyptus* sp.	Nilgiri	Myrtaceae	I
37	*Ficus benghalensis*	Vad	Moraceae	C

38	*Ficus hispida*	Kamri	Moraceae	R
39	*Ficus racemosa*	Umara	Moraceae	C
40	*Ficus religiosa*	Piplo	Moraceae	C
41	*Firmiana colorata*	Kodan, Kodala	Sterculiaceae	R
42	*Flacourtia montana*	Kankan	Flacourtiaceae	C
43	*Gardenia resinifera*	Dikamari	Rubiaceae	R
44	*Gmelina arborea*	Sewan	Verbenaceae	R
45	*Grewia hirsuta*	Khad Dhaman	Tiliaceae	L
46	*Grewia tenax*	Gangeti	Tiliaceae	L
47	*Grewia tiliaefolia*	Dhaman	Tiliaceae	L
48	*Holoptelea integrifolia*	Kanji	Ulmaceae	L
49	*Hymenodictyon excelsum*	Lunio	Rubiaceae	R
50	*Kydia calycina*	Moti Hirvani	Malvaceae	R
51	*Lannea coromandelica*	Godla	Anacardiaceae	A
52	*Leucaena leucocephala*	Subabul	Mimosaceae	I
53	*Limonia acidissima*	Kotbadi	Rutaceae	R
54	*Madhuca indica*	Mahudo	Sapotaceae	A
55	*Mallotus philippensis*	Kanku, Rohan	Euphorbiaceae	R
56	*Mangifera indica*	Amba	Anacardiaceae	C
57	*Melia azedarach*	Bakain Limdo	Meliaceae	L
58	*Miliusa tomentosa*	Umb	Annonaceae	L
59	*Mitragyna parviflora*	Kalam	Rubiaceae	C
60	*Moringa oleifera*	Sahjana	Moringaceae	L
61	*Oroxylum indicum*	Tentu, Pharry	Bignoniaceae	R
62	*Phoenix sylvestris*	Khajur	Arecaceae	A
63	*Pithecellobium dulce*	Kikar	Mimosaceae	R
64	*Pongamia pinnata*	Karanj	Papilionaceae	A
65	*Prosopis cineraria*	Khijdo	Mimosaceae	R
66	*Prosopis juliflora*	Vilayati	Mimosaceae	I
67	*Pterocarpus marsupium*	Bia	Papilionaceae	R
68	*Sapindus emarginatus*	Aritha	Sapindaceae	R
69	*Schrebera swietenioides*	Mokho	Oleaceae	R
70	*Soymida febrifuga*	Royan	Meliaceae	R
71	*Sterculia urens*	Kadayo	Sterculiaceae	L
72	*Syzygium cumini*	Jambu	Myrtaceae	R
73	*Syzygium heyneanum*	Makkaniya Jambu	Myrtaceae	A
74	*Tamarindus indica*	Khatri Amli	Caesalpiniaceae	L
75	*Tecomella undulata*	Rohida	Bignoniaceae	R
76	*Tectona grandis*	Sag, Sagwan	Verbenaceae	L
77	*Terminalia arjuna*	Kohda	Combretaceae	L
78	*Terminalia bellirica*	Baheda	Combretaceae	A
79	*Wrightia tinctoria*	Dudhia	Apocynaceae	A
80	*Wrightia tomentosa*	Dudhia	Apocynaceae	L
81	*Ziziphus mauritiana*	Bordi	Rhamnaceae	A
82	*Ziziphus xylopyrus*	Ghat Bor	Rhamnaceae	I

Sl. No	Botanical Name	Common Name	Family	Status
1.	*Senegalia catechu*	Kair	Fabaceae	A
2.	*Vachellia leucophloea*	Ronjh	Mimosaceae	A
3.	*Vachellia nilotica*	Desi Bawalia	Mimosaceae	L
4.	Senegalia senegal	Kumta	Fabaceae	R
5.	*Adina cordifolia*	Haldu	Rubiaceae	L
6.	*Aegle marmelos*	Bili	Rutaceae	L
7.	*Ailanthus excelsa*	Ardusa, paba	Simaroubaceae	L
8.	*Alangium salvifolium*	Ankol	Alangiaceae	A
9.	*Albizia lebbeck*	Black siris	Mimosaceae	L
10.	*Albizia odoratissima*	Safed siris	Mimosaceae	L
11.	*Albizia procera*	Safed siris	Mimosaceae	R
12.	*Annona sequamosa*	Sitaphal	Annonaceac	C
13.	*Anogeissus latifolia*	Dhuvda	Combretaceae	C
14.	*Anogeissus sericea*	Adrukh , Indok	Combretaceae	R
15.	*Azadirachta indica*	Neem	Meliaceae	L
16.	*Balanites aegyptica*	Hingot	Balanitaceae	C
17.	*Bauhinia variegata*	Kachnar	Fabaceae	R
18.	*Bauhinia racemosa*	Jhinjha, Heetri	Fabaceae	L
19.	*Bombax ceiba*	Semal	Malvaceae	L
20.	*Boswellia serrata*	Salar	Burseraceae	L
21.	*Bridelia retusa*	Asan, Lampan	Euphorbiacceae	R
22.	*Butea monosperma*	Khakhro	Fabaceae	A
23.	*Casearia tomentosa*	Mojal	Salicaceae	R
24.	*Cassia fistula*	Karmela	Fabaceae	L
25.	*Cassia siamea*	Kasid	Caesalapiniaceae	I
26.	*Cordia myxa*	Gunda, Lisoda	Boraginaceae	L
27.	*Crataeva nurvala*	Varna	Capparaceae	R
28.	*Dalbergia latifolia*	Sisam	Fabaceae	R
29.	*Dalbergia paniculata*	Dhoban	Fabaceae	R
30.	*Dalbergia sissoo*	Sandeshro	Fabaceae	I
31.	*Delonix elata*	Sandeshro	Fabaceae	C
32.	*Diospyros melanoxylon*	Timru	Ebenaceae	C
33.	*Ehretia laevis*	Tambolia	Boraginaceae	L
34.	*Emblica officinalis*	Amla	Phyllanthaceae	L
35.	*Erythrina suberosa*	Dhed khakhro	Fabaceae	R
36.	*Eucalyptus teriticornis*	Nilgiri	Myrtaceae	I
37.	*Ficus benghalensis*	Vad	Moraceae	C
38.	*Ficus hispida*	Kamri	Moraceae	R
39.	*Ficus racemosa*	Umara	Moraceae	C

40.	*Ficus religiosa*	Piplo	Moraceae	C
41.	*Firmiana colorata*	Kodan, Kodala	Malvaceae	R

42.	*Flacourtia Montana*	Kankan	Salicaceae	C
43.	*Gardenia resinifera*	Dikamari	Rubiaceae	R
44.	*Gmelina arborea*	Sewan	Verbinaceae	R
45.	*Grewia hirsute*	Khad Dhaman	Malvaceae	L
46.	*Grewia tenax*	Gangeti	Malvaceae	L
47.	*Grewia tiliifolia*	Dhaman	Malvaceae	L
48.	*Holoptelea integrifolia*	Kanji	Ulmaceae	L
49.	*Hymenodictyon excelsum*	Lunio	Rubiaceae	R
50.	*Kydia calycina*	Moti hirvani	Malvaceae	R
51.	*Lannea coromandelica*	Godla	Anacardiaceae	A
52.	*Leucaena leucocephala*	Subabul	Fabaceae	I
53.	*Limonia acidissima*	Kotbadi	Rutaceae	R
54.	*Madhuca indica*	Mahudo	Sapotaceae	A
55.	*Mallotus philippensis*	Kanku, Rohan	Euphorbiaceae	R
56.	*Mangifera indica*	Amba	Ancardiaceae	C
57.	*Melia azedarach*	Bakain limdo	Meliaceae	L
58.	*Miliusa tomentosa*	Umb	Annonaceae	L
59.	*Mitragyna parviflora*	Kalam	Rubiaceae	C
60.	*Moringa oleifera*	Sahjana	Moringaceae	L
61.	*Oroxylum indicum*	Tentu , Pharry	Bignoniaceae	R
62.	*Phoenix sylvestris*	Khajur	Arecaceae	A
63.	*Pithecellobium dulce*	Kikar	Mimosaceae	R
64.	*Pongamia pinnata*	Karanj	Papilionaceae	A
65.	*Prosopis cineraria*	Khijdo	Mimosaceae	R
66.	*Prosops juliflora*	Vilayati	Mimosaceae	I
67.	*Pterocarpus marsupium*	Bia	Fabaceae	R
68.	*Sapindus emarginatus*	Aritha	Sapindaceae	R
69.	*Schrebera swietenioides*	Mokho	Oleaceae	R
70.	*Soymida fabrifuga*	Royan	Meliaceae	R
71.	*Sterculia urens*	Kadayo	Malvaceae	L
72.	*Syzygium cumini*	Jambu	Myrtaceae	R
73.	*Syzygium heyneanum*	Makkaniya Jambu	Myrtaceae	A
74.	*Tamarindus indica*	Khatri Amli	Caesalpiniaceae	L
75.	*Tecomella undulata*	Rohida	Bignoniaceae	R
76.	*Tectona grandis*	Sag. Sagwan	Lamiaceae	L
77.	*Terminalia arjuna*	Kohda	Combreataceae	L
78.	*Terminalia bellirica*	Baheda	Combreataceae	A

79.	*Wrightia tinctoria*	Dudhia	Apocyanaceae	A
80.	*Wrightia tomentosa*	Dudhia	Apocyanaceae	L
81.	*Ziphius mauritiana*	Bordi	Rhamnaceae	A
82.	*Ziziphus xylopyrus*	Ghat bor	Rhammaceae	I

SHRUBS

S. No.	Botanical Name	Common Name	Family	Status
1	*Adhatoda vasica*	Ardusa	Acanthaceae	C
2	*Agave americana*	Ketaki	Agavoideae	R
3	*Calotropis gigantea*	Akdo	Asclepiadaceae	A
4	*Calotropis procera*	Akdo	Asclepiadaceae	L
5	*Capparis decidua*	Ker	Capparaceae	R
6	*Capparis grandis*	Pandan Bor	Capparaceae	R
7	*Capparis sepiaria*	Kanther	Capparaceae	A
8	*Carissa congesta*	Karamada	Apocynaceae	L
9	*Cassia auriculata*	Awala	Caesalpiniaceae	A
10	*Cassia occidentalis*	—	Caesalpiniaceae	L
11	*Clerodendrum phlomidis*	Arani	Lamiaceae	L
12	*Dendrocalamus strictus*	Bans	Poaceae	C
13	*Dendrophthoe falcata*	Vahi-hankal	Loranthaceae	C
14	*Dichrostachys cinerea*	Goya Khair	Fabaceae	C
15	*Euphorbia neriifolia*	Thor	Euphorbiaceae	C
16	*Euphorbia nivulia*	Thor	Euphorbiaceae	C
17	*Helicteres isora*	Marod Phalli	Sterculiaceae	A
18	*Holarrhena antidysenterica*	Kadwa	Apocynaceae	A
19	*Hibiscus lobatus*	Kadwa	Malvaceae	L
20	*Jatropha curcas*	Rattan Jyot	Euphorbiaceae	A
21	*Jatropha gossypiifolia*	Chhoti Rattan Jyot	Euphorbiaceae	A
22	*Kirganelia reticulata*	Kambori	Phyllanthaceae	A
23	*Leptadenia pyrotechnica*	Khinp	Asclepiadaceae	A
24	*Mimosa hamata*	Aila	Fabaceae	R
25	*Nyctanthes arbor-tristis*	Tamta	Oleaceae	A
26	*Plumbago zeylanica*	Chitrak	Plumbaginaceae	L
27	*Ricinus communis*	Arando	Euphorbiaceae	R
28	*Flueggea leucopyrus*	Shenvi	Phyllanthaceae	L
29	*Securinega virosa*	Shenvi	Phyllanthaceae	L
30	*Thespesia lampas*	Paras Papal	Malvaceae	R
31	*Viscum articulatum*	Vando	Santalaceae	L
32	*Vitex negundo*	Nagod	Lamiaceae	A
33	*Vogelia indica*	Chitawal	Plumbaginaceae	A
34	*Waltheria indica*	Chitawal	Malvaceae	L
35	*Woodfordia fruticosa*	Dhavadi	Lythraceae	L
36	*Ziziphus glabrata*	Bordi	Rhamnaceae	L
37	*Ziziphus nummularia*	Chanibor	Rhamnaceae	L

CLIMBERS

S. No.	Botanical Name	Common Name	Family	Status
1	*Abrus precatorius*	Ratti	Fabaceae	C
2	*Ampelocissus latifolia*	Khata limbu	Vitoideae	C
3	*Argyreia sericea*	Samudrasok	Convolvulaceae	L
4	*Asparagus racemosus*	Satvari	Asparagoideae	L
5	*Butea superba*	Khakhra-vel	Fabaceae	R
6	*Canavalia gladiata*	Alad	Fabaceae	L
7	*Cardiospermum halicacabum*	Kak mardika	Sapindaceae	A
8	*Cayratia carnosa*	Grapes	Vitaceae	C
9	*Celastrus paniculatus*	Mali	Celastraceae	L
10	*Cissampelos pareira*	Pahod bel	Menispermaceae	C
11	*Cissus repanda*	Panibel	Vitaceae	C
12	*Clitoria ternatea*	Aparajita	Fabaceae	R
13	*Coccinia indica*	Tindori	Cucurbitaceae	C
14	*Cocculus hirsutus*	Vevdi	Menispermaceae	C
15	*Cosmostigma racemosum*	Vevdi	Asclepiadaceae	R
16	*Cryptolepis buchanani*	Vevdi	Apocynaceae	C
17	*Cucumis callosus*	Kachri	Cucurbitaceae	C
18	*Cuscuta reflexa*	Amarvel	Convolvulaceae	C
19	*Dioscorea bulbifera*	Varahi kand	Dioscoreaceae	C
20	*Dioscorea hispida*	Bhoi kand	Dioscoreaceae	C
21	*Dioscorea pentaphylla*	Kudvel	Dioscoreaceae	C
22	*Hemidesmus indicus*	Dudhvel	Apocynaceae	C
23	*Hiptage benghalensis*	Ameti	Malpighiaceae	R
24	*Ipomoea nil*	Kaladana	Convolvulaceae	C
25	*Ipomoea pes-tigridis*	Kaladana	Convolvulaceae	C
26	*Ipomoea sindica*	Kaladana	Convolvulaceae	L
27	*Ipomoea sepiaria*	Kaladana	Convolvulaceae	—
28	*Leptadenia reticulata*	Nani dodi	Asclepiadaceae	R
29	*Luffa echinata*	Turia	Cucurbitaceae	C
30	*Luffa echinata*	Kakadvel	Cucurbitaceae	C
31	*Maerua arenaria*	Hemkans	Capparidaceae	R
32	*Merremia emarginata*	Musakani	Convolvulaceae	C
33	*Merremia aegyptiaca*	Mochukkodi	Convolvulaceae	C
34	*Merremia hederacea*	Hemkans	Convolvulaceae	C

S. No.	Botanical Name	Common Name	Family	Status
35	*Momordica balsamina*	Hemkans	Cucurbitaceae	R
36	*Momordica dioica*	Kikoda	Cucurbitaceae	A
37	*Mucuna pruriens*	Kavach	Papilionaceae	C
38	*Oxystelma esculentum*	Kavach	Asclepiadaceae	R
39	*Pergularia daemia*	Kavach	Asclepiadaceae	C
40	*Pueraria tuberosa*	Gejvi	Fabaceae	C
41	*Passiflora edulis*	Passion fruit	Passifloraceae	L
42	*Rhynchosia bracteata*	Kamal vel	Fabaceae	C
43	*Rhynchosia minima*	—	Fabaceae	C
44	*Rivea hypocrateriformis*	Faug, Fag	Convolvulaceae	C
45	*Tinospora bracteata*	Faug, Fag	Menispermaceae	C
46	*Trichosanthes bracteata*	Ratrani	Cucurbitaceae	C
47	*Trichosanthes cucumerina*	Ratrani	Cucurbitaceae	C

HERBS

S. No	Botanical Name	Common Name	Family	Status
1.	*Abelmoschus manihot*	Jungle Bhindi	Malvaceae	C
2.	*Abutilon indicum*	Kanghi	Malvaceae	C
3.	*Acalypha ciliata*	Kuppi	Euphorbiaceae	C
4.	*Acalypha malabarica*	Khokali	Euphorbiaceae	C
5.	*Acalypha indica*		Euphorbiaceae	C
6.	*Acanthospermum hispidum*		Asteraceae	A
7.	*Achyranospermum aspera*	Ulta kanta	Lamiaceae	A
8.	*Aeschynomene indica*		Fabaceae	C
9.	*Ageratum conyzoides*		Asteraceae	C
10.	*Aloe barbadensis miller*	Patha	Lilaceae	R
11.	*Alysicarpus hamosus*	Patha	Fabaceae	C
12.	*Alysicarpus longifolius*	Patha	Fabaceae	C
13.	*Alysicarpus procumbens*		Fabaceae	C
14.	*Alysicarpus rotundifolia*	Patha	Fabaceae	C
15.	*Alysicarpus tetragonoloba*	Patha	Fabaceae	C
16.	*Alysicarpus vaginalis*	Patha	Fabaceae	C

17.	*Ammannia baccifera*	Aginbuti	Lythraceae	C
18.	*Ammania gracilis*	--	Lythraceae	C
19.	*Amarania hybridus*	Chaulai	Ammrantaceae	C
20.	*Amarania spinosus*	Kanta Chaulai	Ammrantaceae	C
21.	*Amarania tricolor*	Jangli choulai	Ammrantaceae	C
22.	*Argemone mexicana*	Satyanashi	Papaveraceae	A
23.	*Bidens bipinnata*	Kumra	Asteraceae	A
24.	*Baccopa bipinnata*	Brahmi	Scrophulanaceae	
25.	*Blepharis liniriaefolia*	Utangan	Acanthaceae	C
26.	*Blumea glomerata*	Kukuroundha	Asteraceae	C
27.	*Borreria stricta*	--	Rubiaceae	A
28.	*Brassica nigra*	Kali Rai	Cruciferae	L
29.	*Cannabis sativa*	Bhang	Cannabianaceae	R
30.	*Cassia abrus*	Chimod	Caesalpiniaceae	C
31.	*Cassia pumila*	Sarmal	Caesalpiniaceae	C
32.	*Cassia tora*	Puwad	Caesalpiniaceae	C
33.	*Celosia argentea*	Morshika	Ammrantaceae	C
34.	*Centella asiatica*	Brahmi	Apsiaceae	R
35.	*Chenopodipum album*	Chil	Chenoprodiaceae	C
36.	*Cleome gynandra*	Karaila	Capparaceae	C
37.	*Cleome viscose*	Hulhul	Capparaceae	C
38.	*Clitoria biflora*	--	Papilionaceae	L
39.	*Commelina benghalensis*	Kanaua	Commelinaceae	A
40.	*Commelina haskami*	Kanvaliya	Commelinaceae	A
41.	*Commelina paludosa*	Jal Kanval	Commelinaceae	A
42.	*Corchorus acutangulus*	Ban Patsan	Tiliaceae	L
43.	*Corchorus capsularis*	Safed Patsan	Tiliaceae	L
44.	*Corchorus depressus*	Bhanti	Tiliaceae	L

45.	*Coronopus didymus*	Chhoti Bhutghas	Cruciferae	L
46.	*Crotalaria filipes*	Jungli San	Papilionaceae	R
47.	*Crotalaria juncea*	Sanai	Papilionaceae	C
48.	*Crotalaria medicaginea*	Ran Methi	Papilionaceae	C
49.	*Curcuma amada*	Amba Haldi	Zingiberaceae	L
50.	*Curcuma inodora*	Sugandhit Haldi	Zingiberaceae	L
51.	*Cyanotis fasciculata*	Jal Neelkanth	Commelinaceae	C
52.	*Cyathocline rotundifolia*	Golpatta	Compositae	C
53.	*Cyperus compressus*	Motha	Cyperaceae	C
54.	*Cyperus rotundifolia*	Gol Motha	Cyperaceae	C
55.	*Desmodium dichotomum*	Shalparni	Papilionaceae	C
56.	*Desmodium gangeticum*	Salparni	Papilionaceae	C
57.	*Desmodium rotundifolium*	Golpat Shalparni	Papilionaceae	C
58.	*Desmodium neomaxicum*	—	Papilionaceae	C
59.	*Desmodium trifolium*	Teenpatti Shalparni	Papilionaceae	C
60.	*Dipteracanthus patulus*	Neel Barhanta	Acanthaceae	L
61.	*Dipteracanthus micranthus*	Neel Barhanta	Acanthaceae	L
62.	*Dipteracanthus prostratus*	—	Acanthaceae	L
63.	*Echinops echinatus*	Bhangra	Compositae	C
64.	*Eclipta alba*	Bhringraj	Compositae	C
65.	*Eclipta prostrata*		Euphorbiaceae	C
66.	*Euphorbia geniculata*	Dudhiya	Euphorbiaceae	C
67.	*Euphorbia hirta*	Dudhi	Euphorbiaceae	C
68.	*Euphorbia hypericifolia*	Choti Dudhi	Euphorbiaceae	C

69.	*Euphorbia prostrata*	Bichhu Dudhi	Euphorbiaceae	C
70.	*Evolvulus alsinoides*	Shankhpushpi	Convolvulaceae	C
71.	*Haplanthus tentaculatus*		Acanthaceae	L
72.	*Haplanthus verticillatus*		Acanthaceae	L
73.	*Hydrilla verticillata*	Jalnaal	Hydrocharitaceae	C
74.	*Hygrophila auriculata*	Kokilaksha	Acanthaceae	C
75.	*Indigofera cordifolia*	Neel Patti	Papilionaceae	A
76.	*Indigofera tinctoria*	Neel Kanthi	Papilionaceae	C
77.	*Justicia repens*	Kharmor	Acanthaceae	C
78.	*Lepidagathis trinervis*	Pathar-phor Buti	Acanthaceae	A
79.	*Lepidium sativum*	Chandrashoor / Halim	Cruciferae	C
80.	*Leucas aspera*	Chota Halkusa / Gophaa	Labiatae	A
81.	*Leucas cephalotes*	Dronapushpi / Guma	Labiatae	C
82.	*Leucas zeylanica*	Kubo / Goma Madhupati	Labiatae	C
83.	*Limnophila indica*	Papri / Gulabi	Scrophulariaceae	C
84.	*Lindenbergia indica*	Patthar Chatti / Pili Buti	Scrophulariaceae	—
85.	*Nervilia aragoana*	Sthalapadma	Orchidaceae	R
86.	*Neuracanthus sphaerostachys*	Putliyo	Acanthaceae	R
87.	*Ocimum canum*	Jungli Tulsi	Labiatae	C
88.	*Phyllanthus niruri*	Bhui Amla	Euphorbiaceae	A
89.	*Physalis maxima*	Popatiya	Solanaceae	A
90.	*Physalis minima*	Popatiya	Solanaceae	C

91.	*Physalis peruviana*	Rasbhari	Solanaceae	C
92.	*Portulaca oleracea*	Moti Luni / Kulfa	Portulacaceae	R
93.	*Portulaca quadrifida*	Choti Luni / Zini Luni	Portulacaceae	R
94.	*Pulicaria angustifolia*	Ban Ajwain	Compositae	C
95.	*Rungia parviflora*	Neel Buti	Acanthaceae	C
96.	*Ruellia tuberosa*	Jal Buti	Acanthaceae	C
97.	*Sesamum indicum*	Til	Pedaliaceae	C
98.	*Sesbania bispinosa*	Jhanjhania	Papilionaceae	L
99.	*Sida cordifolia*	Bala	Malvaceae	C
100.	*Sida rhombifolia*	Garmi Buti	Malvaceae	C
101.	*Smithia sensitiva*	Lajwanti	Papilionaceae	C
102.	*Solanum nigrum*	Makoi	Solanaceae	C
103.	*Solanum surattense*	Bhuiringni	Solanaceae	C
104.	*Sphaeranthus indicus*	Gorakh Mundi	Compositae	C
105.	*Tephrosia purpurea*	Sarphoka	Papilionaceae	C

GRASSES

S. No	Botanical Name	Hindi Common Name (English script)	Family	Status
1	*Alloteropsis cimicina*	Kali Ghaas	Poaceae	L
2	*Andropogon pertusus*	--	Poaceae	L
3	*Apluda aristata*	--	Poaceae	C
4	*Apluda mutica*	--	Poaceae	C
5	*Aristida adscensionis*	Lapdu	Poaceae	C
6	*Aristida funiculata*	Laso Lapdu	Poaceae	L
7	*Arthraxon serrulatus*	--	Poaceae	C
8	*Brachiaria racemosa*	--	Poaceae	C
9	*Cenchrus setigerus*	Dhaman	Poaceae	L
10	*Chloris dolichostachya*	--	Poaceae	C
11	*Chloris montana*	--	Poaceae	C
12	*Chloris virgata*	Ban Ghaas	Poaceae	C
13	*Coix lacryma-jobi*	Gurmala / Ratti	Poaceae	R
14	*Cymbopogon martinii*	Rohish Ghaas / Palmarosa	Poaceae	L
15	*Cynodon dactylon*	Dub / Doob	Poaceae	A
16	*Dendrocalamus strictus*	Baans	Poaceae	A
17	*Dichanthium annulatum*	Marvel Ghaas / Lapti	Poaceae	A
18	*Digitaria ascendens*	Makra Ghaas	Poaceae	C
19	*Digitaria granularis*	Chhoti Makra	Poaceae	C
20	*Dinebra retroflexa*	Jangli Ghaas	Poaceae	C
21	*Echinochloa colona*	Samo / Sawa	Poaceae	A
22	*Eragrostis ciliaris*	Bhurbhuri	Poaceae	A

S. No	Botanical Name	Hindi Common Name (English script)	Family	Status
23	*Eragrostis japonica*	Japani Ghaas	Poaceae	L
24	*Eragrostis pilosa*	Pilua Ghaas	Poaceae	L
25	*Eragrostis viscosa*	Chipkali Ghaas	Poaceae	L
26	*Heteropogon contortus*	Surwala / Khar Ghaas	Poaceae	A
27	*Melanocenchris jacquemontii*	Jakham Ghaas	Poaceae	A
28	*Oryza sativa*	Dhaan / Chawal	Poaceae	C
29	*Paspalidium flavidum*	Peela Ghaas	Poaceae	C
30	*Paspalidium geminatum*	Joda Ghaas	Poaceae	C
31	*Saccharum spontaneum*	Kans / Sirkanda	Poaceae	C
32	*Setaria tomentosa*	Reshmi Ghaas	Poaceae	C
33	*Setaria verticillata*	Jangli Kangni	Poaceae	L
34	*Sorghum bicolor*	Jowar / Baru	Poaceae	C
35	*Sporobolus indicus*	Jangli Ghaas / Smut Ghaas	Poaceae	L
36	*Spodiopogon rhizophorus*	Jaddar Ghaas	Poaceae	L
37	*Tetrapogon tenellus*	Char-bali Ghaas	Poaceae	L
38	*Themeda triandra*	Ratad Ghaas / Lal Ghaas	Poaceae	L
39	*Urochloa panicoides*	--	Poaceae	L
40	*Vetiveria zizanioides*	Khas	Poaceae	L

PARASITES

S. No	Botanical Name	Hindi Common Name (in English)	Family	Status
1	*Cuscuta reflexa*	Amar Bel	Convolvulaceae	C
2	*Cuscuta hyalina*	Amar Bel	Convolvulaceae	C
3	*Dendrophthoe falcata*	Banda / Vahi Hankal	Loranthaceae	C

PTERIDOPHYTES

S. No	Botanical Name	Hindi Common Name (in English)	Family	Status
1	*Equisetum sp.*	Ashwaghaas (Horsetail)	Equisetaceae	R
2	*Marsilea sp.*	Sunaina / Water Clover	Marsileaceae	C
3	*Ophioglossum costatum*	Sanpatri (Snake-tongue Fern)	Ophioglossaceae	R
4	*Cheilanthes tenuifolia*	Patharchatta Fern	Pteridaceae	C
5	*Adiantum caudatum*	Hansraj	Pteridaceae	C
6	*Ampelopteris prolifera*	Lata Fern	Thelypteridaceae	R
7	*Actinopteris radiata*	Morpankhi Fern	Pteridaceae	A

Annexure- 6

LIST OF FAUNA MHTR

Index A = Abundant, C= Common L = Less common R = Rare

S. No.	Local Name	English Name	Scientific Name	Status
1	Bagh	Tiger	*Panthera tigris*	R
2	Bhund	Wild Pig	*Sus scrofa*	C
3	Cheetra	Leopard	*Panthera pardus*	L
4	Boot	Ratel	*Mellivora capensis*	R
5	Vandra	Hanuman Langur	*Semnopithecus entellus*	C
6	Jharakh	Striped Hyena	*Hyaena hyaena*	L
7	Jungli minki	Jungle Cat	*Felis chaus*	L
8	Noliyo	Indian grey mongoose	*Herpestes edwardsi*	C
9	Rinchh	Sloth Bear	*Melursus ursinus*	L
10	Roj / Neelgai	Blue Bull	*Boselaphus tragocamelus*	C
11	Hanhan	Indian Hare	*Lepus nigricollis*	C
12	Heli	Indian Porcupine	*Hystrix indica*	C
13	Shiyal	Golden jackal	*Canis aureus*	C
14	Viju	Small indian civet	*Viverricula indica*	L
15	Bhedal	Four-horned Antelope	*Tetracerus quadricornis*	R
16	Sambar	Sambar	*Cervus unicolor*	L
17	Chital	Spotted Deer	*Axis axis*	–

LIST OF MAMMALS

S.No.	Local Name	English Name	Scientific Name	Status
1.	Bagh	Tiger	*Panthera tigris*	R
2.	Bhund	Wild pig	*Sus scrofa*	C
3.	Cheetra	Leopard	*Panthera pardus*	L
4.	Boot	Ratel	*Malivora capensis*	R
5.	Vandra	Hanuman Langur	*Semnopithecus entellus*	C
6.	Jharakh	Striped hyena	*Hyaena hyaena*	L
7.	Jungli minki	Jungle cat	*Felis chaus*	L
8.	Noliyo	Indian grey mongoose	*Herpestes edwardsi*	C
9.	Rinchh	Sloth bear	*Mehursus ursinus*	L
10.	Roj, Neelgai	Blue bull	*Boselaphum tragocamelus*	C
11.	Hanhan	Indian hare	*Lepus nigricollis*	C

12.	Heli	Indian procupine	*Hystrix indica*	C
13.	Shiyal	Golden jackal	*Canis aureus*	C
14.	Viju	Small indian civet	*Vivaricula indica*	L
15.	Bhedal	Four horned antelope	*Tetracerus quadricornis*	R
16.	Sambar	Sambar	*Cervus unicolor*	L
17.	Chital	Spotted deer	*Axis axis*	

LIST OF BIRDS

Group	English Name	Latin Name	Local
Partridges & Francolins	1. Painted Francolin 2. Grey Francolin	*Francolinus pictus* *Ortygornis pondicerianus*	L R
Quails & Button quails	1. Common Quail 2. Rain Quail 3. Rock Quail	*Coturnix coturnix* *Coturnix coromandelica* *Perdicula argoundha*	C C C
Pheasants	1. Indian Peafowl	*Pavo cristatus*	R
Geese, Whistling ducks shelduck, ducks	1.Ruddy Shelduck 2.Gadwal 3.Eurasian wigeon 4.Spot billed duck 5.Common Teal	*Tadorna ferruginea* *Mareca strepera* *Mareca Penelope* *Anas poecilorhyncha* *A. creeca*	R R R R R
	6. Garganey 7. Northern Shoveler 8. Common Pochard	*Spatula querquedula* *Spatula clypeata* *Aythya ferina*	R R R L
Woodpeckers	1. Yellow Crowned Wood peacker 2. Black Rumped Flameback	*Leiopicus mahrattensis* *Dinopium benghalense*	L C
Bardet's	1. Brown –headed Bardet 2. Coppersmith Barbet	*Psilopogon zeylanicus* *Psilopogon haemacephalus*	L C
Hornbill	1. Indian Grey Hornbill	*Ocyceros birostris*	R
Hoopoe	1. Common Hoopoe	*Upupa epops*	L
Rollers	1. Indian Roller 2. European Roller	*Coracias benghalensis* *Coracias garrulus*	R L
Kingfisher	1. Common Kingfisher 2. White –throated kingfisher 3. Pied kingfisher	*Alcedo athis* *Halcyon smyrnensis ceryle rudis*	L C L

Bee eater	1. Asian Green Bee-eater	*Merops orientalis*	C
Cuckoos	1. Jacobin Cuckoo 2. Common Hawk Cuckoo 3. Eurasian Cuckoo 4. Western Koel 5. Sirkeer Malkoha 6. Greater coucal	*Clamator jacobinus* *Hierococcyx varius* *Cuculus canorus* *Eudynamys scolopacea* *Phaenicophaeus leschenaultii* *Centropus sinensis*	C L L C R C
Parakeets	1. Alexandrine Parakeet 2. Rose ringed Parkeet 3. Plum headed Parkeet	*Psittacula eupatria* *Psittacula krameri* *Himalayapsitta cyanocephala*	R C C
Swift	1. Little swift	*Apus affinis*	R
Owl	1. Barn Owl 2. Collared Scops Owl 3. Spotted owlet	*Tyto alba* *Otus bakkamoena* *Athene brama*	R R R C
Nightjar	1.Indian Nightjar 2. Savanna Nightjar	*Caprimulgus asiaticus* *Caprimulgus affinis*	C R
Pigeon	1. Rock Dove 2. Yellow –footed Green Pigeon	*Columba livia* *Treron phoenicopterus*	C R
Doves	1. Laughing Dove 2. Spotted Dove	*Streptopelia senegalensis* *Streptopelia decaocto*	A A R
Rallids	1. Common Moorhen 2. Eurasian Coot	*Gallinula chloropus* *Fulica atra*	R C
Waders	1. Common Redshank 2. Green Sandpiper 3. Wood sandpiper 4. Common sandpiper	*Tringa tetanus* *Tringa ochropus* *Tringa glareola* *Actitis hypoleucos*	L L L C
Thick Knees	1. Europian Thick knee	*Burhinus oedicnemus*	L
Plovers & Lapwings	Little Ringed Plover Red-wattled Lapwing	*Charadrius dubius* *Vanellus indicus*	L A
Terns	River Tern	*Sterna aurantia*	L
Kites	Black-winged Kite (Black-shouldered)	*Elanus caeruleus*	C
	Black Kite	*Milvus migrans*	C
Vultures	Egyptian Vulture	*Neophron percnopterus*	C
	White-rumped Vulture	*Gyps bengalensis*	R

	Indian Vulture	*Gyps indicus*	R
Eagles & Hawk-Eagles	Crested Serpent Eagle	*Spilornis cheela*	R
	Changeable Hawk-Eagle	*Nisaetus cirrhatus*	R
Accipiters	Shikra	*Accipiter badius*	C
Buzzards	White-eyed Buzzard	*Butastur teesa*	C
Falcons	Red-necked Falcon	*Falco chicquera*	R
Grebes	Little Grebe	*Tachybaptus ruficollis*	C
Darter & Cormorants	Oriental Darter	*Anhinga melanogaster*	L
	Little Cormorant	*Microcarbo niger*	C
	Great Cormorant	*Phalacrocorax carbo*	L
Egrets & Herons	Little Egret	*Egretta garzetta*	A
	Intermediate Egret	*Ardea intermedia*	L
	Cattle Egret	*Bubulcus ibis*	A
	Indian Pond Heron	*Ardeola grayii*	A
	Grey Heron	*Ardea cinerea*	L
Ibises & Storks	Black-headed Ibis	*Threskiornis melanocephalus*	L
	Asian Openbill	*Anastomus oscitans*	C
	Woolly-necked Stork	*Ciconia episcopus*	L
	Painted Stork	*Mycteria leucocephala*	L
Pittas	Indian Pitta	*Pitta brachyura*	C
Shrikes	Long-tailed Shrike	*Lanius schach*	A
	Great Grey Shrike	*Lanius excubitor* (≡ *Lanius borealis/excubitor* complex)	R
Treepies & Crows	Rufous Treepie	*Dendrocitta vagabunda*	A
	House Crow	*Corvus splendens*	A
	Large-billed Crow	*Corvus macrorhynchos*	A
Orioles	Eurasian Golden Oriole	*Oriolus oriolus* (in Rajasthan often *Oriolus kundoo*)	A
Minivets	Small Minivet	*Pericrocotus cinnamomeus*	C
Fantails	White-throated Fantail	*Rhipidura albicollis*	L
	White-browed Fantail	*Rhipidura aureola*	L
Drongos	Black Drongo	*Dicrurus macrocercus*	C
	White-bellied Drongo	*Dicrurus caerulescens*	L
Flycatchers	Asian Paradise Flycatcher	*Terpsiphone paradisi*	L
	Red-breasted Flycatcher	*Ficedula parva*	C

	Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*	C
Ioras	Common Iora	*Aegithina tiphia*	C
Chats, Robins & Wheatears	Oriental Magpie Robin	*Copsychus saularis*	C
	Indian Robin	*Saxicoloides fulicatus*	C
	Black Redstart	*Phoenicurus ochruros*	C
	Common Stonechat	*Saxicola rubicola* (earlier *torquatus*)	C
	Pied Bushchat	*Saxicola caprata*	C
	Variable Wheatear	*Oenanthe picata*	R
Starlings & Myenas	Brahminy Starling	*Sturnia pagodarum*	C
	Common Myna	*Acridotheres tristis*	A
Bulbuls	Red-vented Bulbul	*Pycnonotus cafer*	A
White-eyes	Oriental White-eye	*Zosterops palpebrosus*	A
Babblers	Common Babbler	*Argya caudata*	R
	Large Grey Babbler	*Argya malcolmi*	R
	Jungle Babbler	*Argya striata*	A
Larks	Indian Bushlark	*Mirafra erythroptera*	L
	Ashy-crowned Sparrow-Lark	*Eremopterix griseus*	C
Sunbirds	Purple Sunbird	*Cinnyris asiaticus*	C
Sparrows, Weavers & Munias	House Sparrow	*Passer domesticus*	A
	Chestnut-shouldered Petronia	*Gymnoris xanthocollis*	A
	Baya Weaver	*Ploceus philippinus*	A
	Scaly-breasted Munia	*Lonchura punctulata*	C
	Indian Silver bill	*Euodice malabarica*	C
Wagtails	White Wagtail	*Motacilla alba*	C
	White-browed Wagtail	*Motacilla maderaspatensis*	L
	Yellow Wagtail	*Motacilla flava*	L
	Citrine Wagtail	*Motacilla citreola*	L
Pipits	Paddyfield Pipit	*Anthus rufulus*	A
Buntings	Crested Bunting	*Emberiza lathami*	C

LIST OF REPTILES

S. No	Common Name	Scientific Name	Status (National)	Status (Local)
1	Indian Rock Python	*Python molurus*	-	R
2	John's Sand Boa	*Eryx johnii*	-	L
3	Keeled Indian Skink	*Eutropis carinata*	-	C
4	Checkered Keelback	*Xenochrophis piscator*	-	C
5	Buff-striped Keelback	*Amphiesma stolatum*	-	R
6	Indian Rat Snake	*Ptyas mucosa*	-	C
7	Common House Gecko	*Hemidactylus flaviviridis*	-	A
8	Indian Star Tortoise	*Geochelone elegans*	-	R
9	Oriental Garden Lizard	*Calotes versicolor*	-	A
10	Common Indian Krait	*Bungarus caeruleus*	-	R
11	Russell's Viper	*Daboia russelii*	-	R
12	Indian Chameleon	*Chamaeleo zeylanicus*	-	R
13	Mugger Crocodile	*Crocodylus palustris*	-	R
14	Indian Cobra	*Naja naja*	-	R
15	Indian Flapshell Turtle	*Lissemys punctata*	-	R
16	Fan-throated Lizard	*Sitana ponticeriana*	-	C
17	Bengal Monitor	*Varanus bengalensis*	-	C
18	Common Bronzeback Tree Snake	*Dendrelaphis tristis*	-	R

Aquatic

Sl. No.	Scientific name	Common name
1	*Gavialis gangeticus*	Gharial
2	*Crocodylus palustris*	Mugger
3	*Aspideretes gangeticus*	
4	*Chitra indica*	Sintar
5	*Lissemys punctata*	Sundari
6	*Kachuga kachunga*	Saal
7	*Kachuga dhongoka*	Dhond
8	*Kachuga tentoria*	Pacheda
9	*Hardell thurqii*	Bhina
10	*Plantanista gangetica*	Susu
11	*lutrogale perspicillata*	Udbilav

Terrestrial

Sl. No	Scientific name	Common name
1.	*Canis aureus*	Lomadi (Jackal)
2.	*Hyaena hyaena*	Lakadbagga
3.	*Canis pardus*	Bhediya
4.	*Vulpes bengalensis*	Lomadi (fox)
5.	*Panthera pardus*	Tendua
6.	*Felis chaus*	Jungli billi
7.	*Felis caracal*	Caracal
8.	*Mellivora capensis*	
9.	*Melursus ursinus*	Bhaalu
10.	*Viverricula indica*	
11.	*Herpestes edwardsi*	Nevala
12.	*Herpestes auropunctatus*	Nevala
13.	*Funambulus pennanti*	
14.	*Hystrix indica*	Sehi
15.	*Bandicota indica*	
16.	*Rattus rattus*	
17.	*Mus musculus*	
18.	*Pyeropus giganteus*	
19.	*Rousttus leschenaultia*	
20.	*Lepus nigricollis*	
21.	*Gazella gazella*	Chinkara
22.	*Antilope cervicapra*	Kala Hiran
23.	*Boselaphus tragocamelus*	Neelgai
24.	*Axis axis*	Chital

25.	*Cervus unicolor*	Sambar
26.	*Sus scorfa*	Jungli sar
27.	*Macaca mullata*	Lal much ka bandar
28.	*Presbytis entellus*	Langoor
29.	*Manis crassicaudata*	

List of Fishes

S. No	Scientific name of the species	Common name
1	*Dasyatis sephen*	Sukchi
2	*Hilsa hisha*	Hika
3	*Gadusia chapra*	Phulua
4	*Notopterus notopterus*	Patola
5	*Notopterus chittala*	Chital, Moye
6	*Chela laubuca*	Chal
7.	*Oxygaster bacaila*	Chilua
8.	*Barilus bola*	Galar
9.	*Barilius bendelisis*	Phulua
10.	*Barilius barna*	Galar
11	*Danio Devario*	
12	*Esomus denrica*	
13.	*Rasbora daniconius*	Zhanzhara
14	*Amblypharyngodon mola*	
15.	*Tor tor*	Mahaseer, Badas
16.	*Tor putitora*	Mahaseer
17.	*Puntinus conchonius*	Khadia
18.	*Puntinus sarana*	Soerni, Puthia
19.	*Puntius sophore*	Khadia
20.	*Puntius ticto*	Khaia
21.	*Catla catla*	Bhakur, Babas, Catla
22.	*Cirrhina mrigala*	Mrigal, Naren
23.	*Cirrhina rebu*	Reba
24.	*Crenopharyugodon idella*	Grass carap
25.	*Cyprinus carpio*	Common carp
26.	*Hypophthalmichthys molitrix*	Silver carp
27.	*Garra gotyla*	
28.	*Labeo bata*	Bata
29.	*Labeo baga*	Boga
30.	*Labeo bogguj*	
31.	*Labeo calbasu*	Kriya, Calbasu

32.	*Labeo gouius*	Kursa
33.	*Labeo rohita*	Rohu

34.	*Labeo fimbriatus*	Dogala rohu
35.	*Labeo dyocheilus*	Kharont
36.	*Osteobrama cotio*	Gudgudi
37.	*Carassius carassius*	Gold fish
38.	*Nemacheilus botia*	
39.	*Ompok bimaculatus*	Pauda, papda
40	*Wallago attu*	
41.	*Clupisoma garua*	
42.	*Earropuchthys yacha*	Bachua
43	*Pangasius paneasius*	
44	*Salonia Silondra*	Silund
45	*Heteropnustes fossillis*	Singhi
46	*Clarias batrachus*	Mongura
47	*Mysius aop*	Tengana
48	*Mystus bleekeri*	Kitua
49	*Mytus cavasius*	Kitua
50	*Mytus seenghala*	Singhara
51	*Mystus vittatus*	Tengana
52	*Rita rita*	Gangara
53	*Bagarius bagarius*	Lamra, Andhos, Andhmachh
54	*Zenentodon cancila*	Sooja
55	*Gambusia affinil*	Guppy
56	*Moll neista formosa*	Black Moily
57	*Rhinomugil carsula*	Natera
58	*Ophicephalus guchua*	Sola
59	*Ophicephalus marulius*	Sol
60	*Ophicephalus punctatus*	gilgoncha
61	*Ophicephalus striatus*	Durkasol
62	*Ophicephalus leucopunctatus*	Sol
63	*Amphipnous cuchta*	
64	*Chanda nama*	Chanda
65	*Chanda ranga*	Anzhara
66	*Nandus nandus*	Chaman
67	*Trichogaster asciatus*	
68	*Glossogobius giuris*	Patharchita, Boda

69	*Mastacembelus armatus*	Baam
70	*Mastacembelus puncalus*	Baam

Annexure-7

Cheetal Translocation Information

S. No.	Date	Name of wildlife	No. of Translocated	Translocated from	Translocated to
1	18-01-2017 to 17-03-2017	Cheetal	67	Jaipur Zoo	Selzer Area
2	10.04.2017 to 12.07.2017	Cheetal	13	Jaipur Zoo	Selzer Area
3	20-04-2017 to 02.07.2017	Cheetal	42	Ashok Vihar Jaipur	Selzer Area
4	07-03-2017 to 31-03-2017	Cheetal	30	Sanjay Van Shahpura	Selzer Area
5	12-07-2017 to 08-10-2017	Cheetal	223	Jodhpur Zoo	Selzer Area
6	25-02-2018 to 01-03-2018	Cheetal	22	Sanjay Van Shahpura	Selzer Area
7	09-04-2018 to 18-04-2018	Cheetal	105	Rashtrapati Bhawan Delhi	Darrah Enclosure
8	23-10-2018	Cheetal	11	Kota Zoo	Enclosure
9	30-10-2018	Cheetal	14	Kota Zoo	Selzer Area
10	26-10-2019	Cheetal	31	National Zoological Park New Delhi	Darrah Enclosure
11	06-12-2019	Cheetal	17	National Zoological Park New Delhi	Darrah Enclosure
12	09-03-2022	Cheetal	6	KNP Bharatpur	Darrah Enclosure
13	16-03-2022	Cheetal	13	KNP Bharatpur	Selzer Area
14	21-03-2022	Cheetal	14	KNP Bharatpur	Selzer Area
15	25-03-2022	Cheetal	15	KNP Bharatpur	Selzer Area
16	29-03-2022	Cheetal	15	KNP Bharatpur	Selzer Area
17	04-04-2022	Cheetal	16	KNP Bharatpur	Selzer Area
18	10-04-2022	Cheetal	11	KNP Bharatpur	Selzer Area
19	17-04-2022	Cheetal	28	KNP Bharatpur	Selzer Area
20	24-04-2022	Cheetal	11	KNP Bharatpur	Selzer Area
21	30-04-2022	Cheetal	22	KNP Bharatpur	Selzer Area
22	05-05-2022	Cheetal	16	KNP Bharatpur	Selzer Area
23	30-05-2022	Cheetal	3	Abheda Biological Park kota	Darrah
24	01-06-2022	Cheetal	13	Abheda Biological Park kota	Darrah
25	20-12-2022	Cheetal	11	KNP Bharatpur	Borabas
26	23-12-2022	Cheetal	17	Machiya Biological Park Jodhpur	Darrah
27	12-01-2023	Cheetal	19	Machiya Biological Park Jodhpur	Darrah

28	13-01-2023	Cheetal	22	KNP Bharatpur	Borabas
29	21-01-2023	Cheetal	18	KNP Bharatpur	Borabas
30	15-02-2023	Cheetal	27	KNP Bharatpur	Borabas
31	29-04-2023	Cheetal	9	KNP Bharatpur	Borabas
32	24-05-2023	Cheetal	13	KNP Bharatpur	Borabas
33	19-09-2023	Cheetal	23	A.N. Jha Deer Park New Delhi	Darrah
34	20-10-2023	Cheetal	18	A.N. Jha Deer Park New Delhi	Darrah
35	03-11-2023	Cheetal	28	A.N. Jha Deer Park New Delhi	Darrah
36	10-11-2023	Cheetal	51	A.N. Jha Deer Park New Delhi	Darrah
37	19-01-2024	Cheetal	18	KNP Bharatpur	Jawahar Sagar
38	04-02-2024	Cheetal	8	KNP Bharatpur	Jawahar Sagar
39	09-04-2024	Cheetal	13	KNP Bharatpur	Darrah
40	10-04-2024	Cheetal	22	KNP Bharatpur	Darrah
		Total	1075		

Vehicle List

S.No.	Detail of vehicle		
	Four-Wheeler	**Vehicle No.**	**Purchase**
1	Jeep	RJ-20-UA-1954	2009
2	Bolero Camper	RJ-20-GC-2395	2023
3	Jeep Thar	RJ-20-UA-6247	2014
4	Bolero Camper Rescue	RJ20GC2822	2023
5	Bolero	RJ-20-UA-3975	2012
6	Bolero	RJ-20-UA-3976	2012
7	Bolero	RJ-20-UA-5870	2014
8	Bolero Camper	RJ-20-GA-9309	2014
9	Canter	RJ-20-GA-9522	2014
10	Bolero	RJ-20-UA-8799	2017
11	Gypsy	RJ-20-UB-0693	2018
12	Gypsy	RJ-25-UA-2909	2018
13	Scorpio Gateway	RJ-25-CA-5283	2018
14	Bolero Camper	RJ-20-CA-5462	2018
15	Scorpio	RJ-25-UA-2977	2019
16	Jeep	RJ-14-UA-3276	2006
17	Bolero Invender	RJ-20-U-0539	2005
18	Bolero Camper	RJ14GR0055	2023
19	Bolero Camper	RJ20GC3680	2024
20	ISUZU	RJ45CY4416	2023
21	Bolero Camper	RJ20 GC 3981	2024
22	Bolero Camper	RJ20 GC 3982	2024

S.No.	Two-Wheeler	No. of vehicle
1	Motorcycle	43

ANNEXURE-9

Wireless & Handset List

Sr. No.	Name of Office	Fix/Base Station	Mobile Station	Hand Set
1.	Mukandra National Park, Kota	15	14	22
2.	Range Forest office, Darrah	1	2	25
	Naka Darrah Gaon	1		
	Naka Danta	1		
	Naka Sawanbhado	1		
	Gadde Ka Mala Chouki	1		
	Ghati Mata Chouki	1		
3.	Range Forest office, Ranvtha	1	0	7
	Naka Ranvtha	1		
	Naka Chanbawari	1		
	Naka Damodarpura	1		
	Chouki Ghatoli	1		
4.	Range Forest office, Gagron	1	1	11
	Watch Tower, Gagron	1		
	Naka Nolav	1		
	Naka Mashalpura	1		
	Chouki Kanpura	1		
5.	Range Forest office, Borabas	1	1	9
	Watch Tower Naya Gaon	1		
	Nahar Singh Mata Chouki	1		
6.	Range Forest office, Kolipura	1	1	11
	Naka Girdharpura	1		
	Chouki Teen Manzil	1		
	Nagni Chouki	1		
7.	Range Forest office, Jawahar Sagar	1	0	8
	Naka Kheda	1		
	Naka Shripura	1		
	Chouki Borkui	1		
8.	Range Forest office, Flying	0	1	1
	Total	**42**	**20**	**94**

ANNEXURE-10

Tourist Information of last five year in MHTR

Sr. No.	Year	Type of Tourists				Earning	Surcharge Fees
		Indian	Foreigner	Students	Total		
1	2	3	4	5	6	7	8
1	2019-20	48715	166	23498	72379	3630383	4913187
2	2020-21	28346	11	7855	36212	1407120	2621272
3	2021-22	51657	4	18135	69796	3810842	6211557
4	2022-23	65918	78	28552	94548	5270136	7938383
5	2023-24	51583	110	25789	77482	5351223	7332788
Total		**246219**	**369**	**103829**	**350417**	**19469704**	**29017187**

Tourist Information In Bhainsroadgarh Sanctury

S.no.	Year	No. of Tourist	Amount
1	2019-20	3452	268800
2	2020-21	2316	195900
3	2021-22	1487	158280
4	2022-23	2135	231825
5	2023-24	2008	328665
	Total	**11398**	**1183470**

कार्यालय उप वन सरं क्षक (वन्यजीव) मुकन्दरा राष्ट्रीय उद्यान, कोटा

एम.एच.टी.आर. रिसर्च/ अध्ययन 05 वर्ष (2019 से 2023 तक)

क्र.सं .	अनुमति प्रदानकर्ता	रिसर्च/अध्ययन का विवरण	अध्ययन करने वाले का नाम व पता	अध्ययन की अवधि
		वर्ष 2019–20		
1	1445/30.06.19	Icon Animal (mnfcyko) Smooth Coated other Population Estimation and Behavior Study.	Mrs. Urvashi Sharma University of Kota	फरवरी से जनू 2019 (जनू 2019 से अक्टूबर 2019 तक)
2	1875/28.01.2020	Distribution and Habitat use of Smooth Coated other(Lutrogale perspicillat) along chambal river.	Soun Meena Uviversity kota	जनवरी 2020 से अप्रैल 2020 तक
		वर्ष 2020–21		
1	5460/08.12.2020	Biodiversity of Fish Species Assessment in River Chambal in Kota	Mrs. Urvashi Sharma University of Kota	10.12.2020 से 4 माह तक
2	2603–05/06.01.2021	Geographical Study of Mukandra	Ayushi Jain University of Kota	5 वर्ष जनवरी 2021 से 2025 तक
3	2602/06.01.2021	Geographical Study MHTR	Ajay Vikram Soni Govt, Arts College Kota	जनवरी 2021 से मार्च 2025 तक
4	2865–71/15.02.2021	Permission to Rapid assessment and site visit of Bhaisroadgarh W/L Sanctuary and Chittorgarh	Dr. Y.U. Jhala	15.02.2021 से सर्वे तक
5	2903–05–01.03.2021	Under Water Ludeography by ROU of Kota Barrage	M.L. Meena	20.02.2021 की मार्च 2021
		वर्ष 2021–22		
1	1678/27.09.2021	Spatial ecology and ecosystem Services of striped hyeena in relation to land use pattounin	Randeep Singh	अक्टूबर 2019 से अक्टूबर 2021 तक
2	5501–03/ 30.09. 2021	Ethnabotany and Phytochemical Studies of Selected medicinal plants	Divya Soni	सितम्बर 2021 से दिसम्बर 2023 तक
3	6729/14.09.2021	Breeding Ecology of long billed vulture manal around Chambal River Kota Dissertation work	Dr. Surbhi Shrivastva	
4	5814–15/29.10.2021	Breeding Ecology of long billed vulture manal around Chambal River Kota	Bhanu Pratap Singh	नवम्बर 2021 से जनवरी 2022 तक
5	5465–66/22.12.2021	Bacterial Population dynamic of MHTR	Mona Singh	अप्रले 2022 से जनवरी 2024 तक
6	6324–26/16.03.2022	Suitability of MHTR and Escploring possible W/L Carridore Geo Scientific Attributer	Dr. Jay Gardner Mukesh Kumar Bairwa	मार्च 2022 से जनवरी 2024 तक 2 वर्ष

7	5326 / 21.09.2021	Permission for Reservior Sedimentation Studies Using Hydrographic Surueey of Reserviors in India under national	Executive Enigneer Chanbal Project New delhi	lssue date to One Month
8	5507 / 01.10.2021	Permission for Survey field visit in National Park and Sanctuary for the FGR Project duration 2020 to 2025	And Forest Research Institute Jodhpur	जारी दिनाकं से दिसम्बर 2025 तक

वर्ष 2022–23				
1	8162 / 01.12.2022	राजस्थान मे टोपोग्रफिकल / ज्योडिटिक / ड्राने सर्वे / तलक्षेण कायर्क म्र 2022–23 कें सम्बन्ध में	Mahesh Chand Gaur Survey of India Jaipur	दिसम्बर 2022 से फरवरी 2023 तक
2	6352 / 16.01.2023	Permission to Carry out Gravity, Magnetic and DGPS Survey in MHTR	Rameshwar lal jhalana Doongri	16.01.2023 से 31.03. 2023 तक
वर्ष 2023–24				
1	9172 / 09.06.2023	Willife Institute of india Dehradun	S. Sathya Kumar Dehradun	जारी दिनाकं से 1 वर्ष जून 2024 तक
2	CCF (WL) Kota NO. 3265/26-07-2023	Permission required to do Hydrography Topography Survey from Jawahar Sagar	Executive Engineer RPS Store Divison Rawtbhata	जारी दिनाकं से 1 माह तक
3	CCF (WL) Kota NO. 3503/14-08-2023	Medicinal plants survey of Darrah Ghati MHTR	Nikita Nagar	जारी दिनाकं से दिसम्बर तक
4	CCF (WL) Kota NO. 3566/18-08-2023	Intimation regarding national Geolphysical mapping of Geological survey of India (Minister of Mines) in Parts of Kota district (5401& 5402 Toposheet)	K.S. Benhur	जारी दिनाकं से 10 दिन
5	CCF (WL) Kota NO. 3967/21-09-2023	Status Distribution and Occupancy of Stripped Heyena	Ms. Rukhsar Bano	जारी दिनाकं से 3 वर्ष
6	4361–62 / 30.10.2023	Capacity building of the front line staff for Raptor Survey and Vulture nest Monitoring at Selected location.	Abhishek Bhatnagar WWF-india secretariat Pirojsha Godrej National Conservation Centrel 172 B lodi Estate New Delhi	जारी दिनाकं से 03 वर्ष
7	1169 / 26.03.2024	Permission for conservation research project in the National Gharial (Chambal) Sanctuary, Rajasthan	Tarun Nair 3/15 a Block , BDA MIG Flats, Domlur, Banglore	जारी दिनाकं से जून 2026 तक

Annexure-12

Villages to get re-located on priority basis in MHTR Core

S.No.	Village	No. of Families	Relocated Families	Remarks
1	Lakshmipura	30	29	Complete
2	Kherli bawdi	24	18	Partially Complete
3	Ghati Jagir	58	21	Partially Complete
4	Mashalpura	301	156	Partially Complete
5	Girdharpura	641	0	-
6	Damodarpura	190	0	-
7	Darra gaon	87	0	-
8	Narayanpura	20	0	-
9	Kolipura	72	0	-
10	Rooppura	27	0	-
11	Akhawa	111	0	-
12	Roja ka talab	80	0	-
13	Ambarani	80	0	-
14	Nausera	42	0	-
Total		**1726**	**224**	-

Villages to get re-located on priority basis in Wildlife Sanctuary Bhainsrodgarh

S. No	Name of Revenue Village	Gram panchayat	Panchayat Samiti	Tehsil	District	According to 2011 census Data	
						House Holds	Populat-ion of the Village
1	Prempura	Bassi	Bhainsrodgarh	Rawatbhata	Chittorgarh	70	334
2	Dariba	Bassi	Bhainsrodgarh	Rawatbhata	Chittorgarh	84	372
Total						**154**	**706**

Annexure-13

List of Villages in Core of MHTR

S.No.	Village	Panchayat	Tehsil	District
1	Lakshmipura	Bhanwariya	Ladpura	Kota
2	Kharlibawdi	Bhanwariya	Ladpura	Kota
3	Ghati jagir	Kukdakhurd	Ramganjmandi	Kota
4	Girdharpura	Doliya	Ladpura	Kota
5	Damodarpura	Bhanwriya	Ladpura	Kota
6	Darrah Gaon	Pipalda	Ramganjmandi	Kota
7	Kolipura	Borabas	Ladpura	Kota
8	Rooppura	Bhanwariya	Ladpura	Kota
9	Akhawa(Bhukhi)	Bhanwariya	Ladpura	Kota
10	Mashalpura	Gagron	Jhalarapatan	Jhalawar
11	Narayanpura	Gagron	Jhalarapatan	Jhalawar
12	Jawahar Sagar	Jawahar Sagar	Taleda	Bundi
13	Roja ka	Dhaneswar	Taleda	Bundi
14	Ambarani	Bhaisroargarh	Rawatbhata	Chittorgarh
15	Nausera	Sreepura	Rawatbhata	Chittorgarh
16	Bhaisoadgarh	Bhaisroadgarh	Rawatbhata	Chittorgarh

Villages situated inside the Bhainsroadgarh Sanctuary

SN	नाका	गांव	पंचायत	किस्म	जी.पी.एस	वि.वि
1	आगरा	प्रेमपुरा	बस्सी	राजस्व	N 24°46’36” E 75°22’19”	
2		दरीबा	बस्सी	राजस्व	N 24°45’45” E 75°23’02”	
3		भैरूजी का माल	राजपुरा	राजस्व	N 24°46’50” E 75°25’08”	
4	लुहारिया	उदपुरिया	सणीता	राजस्व	N 24°56’34” E 75°32’29”	
5		भवानीपुरा	सणीता	राजस्व	N 24°57’16” E 75°32’02”	
6		सुठाला	लुहारिया	राजस्व	N 24°57’14” E 75°29’28”	
7		लुहारिया	लुहारिया	राजस्व	N 24°55’46” E 75°30’36”	

8		बख्तपुरा	लुहारिया	राजस्व	N 24°56’25” E 75°30’03”	
9		मोरटुका	लुहारिया	राजस्व	N 24°55’27” E 75°30’55”	
10		हाथौली	लुहारिया	राजस्व	N 24°54’29” E 75°29’55”	
11		रतनपुरा	मण्डेसरा	राजस्व	N 24°53’38” E 75°29’56”	
12		बीड कालाखेत	लुहारिया	राजस्व	N 24°55’36” E 75°32’37”	

SN	नाका	गांव	पंचायत	किस्म	जी.पी.एस	वि.वि
13	गणेशपुरा	जैपर	राजपुरा	राजस्व	N 24°47’53” E 75°28’19”	
14		सादडा	राजपुरा	राजस्व	N 24°48’12” E 75°28’46”	
15		अरेणाकलां	कुशलगढ	राजस्व	N 24°48’46” E 75°28’30”	
16		माताखेडा	कुशलगढ	वन विभाग	N 24°49’59” E 75°29’43”	
17		नली	कुशलगढ	राजस्व	N 24°50’11” E 75°30’00”	
18		कांटीराम नगर	कुशलगढ	वन विभाग	N 24°49’32” E 75°30’31”	
19		लाडपुरा	कुशलगढ	वन विभाग	N 24°49’46” E 75°30’52”	
20		खेडा	कुशलगढ	राजस्व	N 24°50’27” E 75°30’18”	
21		कुशलगढ	कुशलगढ	राजस्व	N 24°51’02” E 75°30’45”	
22		खालगावं	मण्डेसरा	राजस्व	N 24°52’18” E 75°29’22”	
23	सैडलडेम	पाडाझर खुर्द	लुहारिया	राजस्व	N 24°54’36” E 75°33’07”	
24		सैडलडेम	लुहारिया	राजस्व	N 24°53’30” E 75°33’46”	
25		चेनपुरा	कुशलगढ	राजस्व	N 24°52’42” E 75°31’37”	
26		हेमपुरा	कुशलगढ	राजस्व	N 24°52’26” E 75°32’02”	

27		लसाणा	कुशलगढ	राजस्व	N 24°52’09” E 75°31’53”	
28		झुंझला	कुशलगढ	राजस्व	N 24°50’57” E 75°32’13”	
29		बहेलिया	कुशलगढ	राजस्व	N 24°50’16” E 75°32’41”	

Annexure 14

Compensation Details of Last 5 Years

कार्यालय उप वन संरक्षक (वन्यजीव) मुकन्दरा राष्ट्रीय उद्यान, कोटा

वर्ष 2019–20						
S. No.	**Name of Range**	**Forest Block**	**Name of the Person**	**Hunting by wildlife**	**Date of Application**	**Amount**
1	गागरोन	नोलाव	श्री विष्णु कुमार पुत्र श्री सुल्तान सिंह निवासी नोलाव	गाय के बछडे का शिकार	03-05-2019	4,000.00
2	गागरोन	नोलाव	कालुलाल पुत्र श्री कानासी भील	गाय के बछडे का शिकार	20-05-2019	4,000.00
3	दरा	घाटी माता वन क्षेत्र अमझार नदी के पास	श्री मुकेश कुमार पुत्र श्री जगन्नाथ धोबी	बैल का शिकार	30-05-2019	20,000.00
4	गागरोन	मशालपुरा	रघुराज सिंह पुत्र जसंवत सिंह	गाय के बछडे का शिकार	03-06-2019	4,000.00
5	गागरोन	लक्ष्मीपुरा से 100 मीटर उपर	श्री भंवरलाल गुर्जर पुत्र श्री मांगीलाल	भैस का शिकार	11-11-2019	20,000.00
6	गागरोन	मशालपुरा	रामचन्द्र पुत्र भैरूलाल	बकरी का शिकार	25-10-2019	2,000.00
7	गागरोन	मण्डीवारा से घाटी माता जी वाली पहाडी पर	श्री रमेशचन्द्र पुत्र श्री भॅवरलाल निवासी मशालपुरा	बकरी का शिकार	25-10-2019	2,000.00
8	गागरोन	मण्डीवारा से घाटी माता जी वाली पहाडी पर	श्री राजेन्द्र सिंह पुत्र श्री भैरू सिंह निवासी मशालपुरा	1 बकरा व 1 बकरी का शिकार	25-10-2019	4,000.00
9	गागरोन	मण्डीवारा से घाटी माता जी वाली पहाडी पर	श्री भैरूलाल पुत्र श्री भंवरलाल निवासी मशालपुरा	2 बकरी का शिकार	25-10-2019	4,000.00
10	गागरोन	लक्ष्मीपुरा	श्री रामश्वेर पुत्र श्री कनीराम गुर्जर निवासी लक्ष्मीपुरा	1 पाडे का शिकार	05-09-2019	20,000.00
11	गागरोन	लक्ष्मीपुरा	श्री सियाराम गुर्जर निवासी लक्ष्मीपुरा	गाय के बछडे का शिकार	14-11-2019	4,000.00
12	गागरोन	लक्ष्मीपुरा	श्री सियाराम गुर्जर निवासी लक्ष्मीपुरा	गाय का शिकार	14-11-2019	10,000.00
13	गागरोन	मशालपुरा	श्री दौलतराम पुत्र रामदयाल गुर्जर मशालपुरा	गाय का शिकार	22-11-2019	10,000.00

14	गागरोन	मशालपुरा	कालूलाल पुत्र भंवर लाल	भैस का शिकार	09-07-2019	20,000.00
15	गागरोन	दरा ग्राम घाटी माता	श्री जुगराज सिंह पुत्र श्री भीमसिह निवासी घाटी माता	गाय का शिकार	18-11-2019	10,000.00
16	गागरोन	मशालपुरा वन क्षेत्र	श्री रमेशचन्द्र पुत्र श्री भॅवरलाल निवासी मशालपुरा	गाय का शिकार	20-11-2019	10,000.00
17	गागरोन	मशालपुरा वन क्षेत्र	श्री सुखराम पुत्र श्री रामदयाल गुर्जर निवासी मशालपुरा	गाय का शिकार	01-01-2020	10,000.00
18	गागरोन	लक्ष्मीपुरा प्रेमपुरा वन क्षेत्र	श्रीमती कस्तूरी बाई जाति गुर्जर निवासी लक्ष्मीपुरा झालावाड	गाय के बछडे का शिकार	13-02-2020	4,000.00
19	गागरोन	लक्ष्मीपुरा प्रेमपुरा वन क्षेत्र	श्रीमती संजू पत्नी श्री रामचन्द्र निवासी लक्ष्मीपुरा	गाय के बछडे का शिकार	04-03-2020	4,000.00

वर्ष 2020–21

S.No.	Name of Range	Forest Block	Name of the Person	Hunting by wildlife	Date of Application	Amount
1	गागरोन	मशालपुरा	श्री राजूलाल पुत्र श्री रूपचन्द्र जाति भील निवासी गागरोन	गाय का शिकार	27-04-2020	10,000.00
2	गागरोन	मशालपुरा	श्री रघुराज सिंह पुत्र जसंवत सिंह झालरापाटन	बैल का शिकार	25-01-2020	20,000.00
3	गागरोन	प्रेमपुरा पहाडी वन क्षेत्र	श्री नाथूराम पुत्र श्री बालाराम निवासी सहरिया बस्ती प्रेमपुरा	बकरी का शिकार	22-06-2020	2,000.00
4	गागरोन	लक्ष्मीपुरा	श्री पप्पूलाल पुत्र श्री किशोर निवासी लक्ष्मीपुरा	गाय का शिकार	10-08-2020	10,000.00
5	जवाहर सागर	श्री पुरा	श्री गोपाल पुत्र श्री किशन लाल निवासी भैसरोडगढ	1 गर्भवती गाय का शिकार	01-01-2021	10,000.00

वर्ष 2021–22

S.No.	Name of Range	Forest Block	Name of the Person	Hunting by wildlife	Date of Application	Amount
1	निल	निल	निल	निल	निल	निल

वर्ष 2022–23

S.No.	Name of Range	Forest Block	Name of the Person	Hunting by wildlife	Date of Application	Amount

1	रावठां	दामोदपुरा	मोडूलाल पुत्र बालाजी दामोदपुरा तह0 लाडपुरा कोटा	भैस की पाडी का शिकार	25-11-2022	5,000.00
2	रावठां	दामोदपुरा	देवकरण पुत्र जगन्नाथ दामोदपुरा	भैंस के पाडे का शिकार	21-12-2022	5,000.00
3	रावठां	दामोदपुरा	भोजराज पुत्र श्री जगन्नाथ गुर्जर दामोदपुरा	गाय के बछडे का शिकार	20-12-2022	5,000.00
4	कोलीपुरा	कोलीपुरा	तेजमल पुत्र श्री प्रभूलाल मीणा	गाय का शिकार	08-08-2022	12,500.00
वर्ष 2023–24						
S.No.	**Name of Range**	**Forest Block**	**Name of the Person**	**Hunting by wildlife**	**Date of Application**	**Amount**
1	रावठां	दामोदपुरा	बनवारी पुत्र मोहनलाल	गाय का शिकार	21-10-2023	12,500.00
2	गागरोन	झिलारा	श्रीमती रोडी बाई पत्नी स्व0 सोहन लाल	गाय का शिकार	17-03-2024	12,500.00
3	रावठां	हरिपुरा	राधेश्याम पुत्र देवीलाल भील	बैल का शिकार	02-02-2024	25,000.00

Annexure 15

Naka & Chowki Information

Name of the Range	Naka	Chowki
Borabas	Borabas	Choki Borabas
		Choki Near Barrier Borabas
		Chowki Nahar Singh Mata
	Rath Kaankra	Choki Ratkankra
	Bandha Dharampura	
	Nayagaon	Ghariyal Check-Post Kishorepura
Darrah	Darrah Station (Morukalan)	Watch Tower Kalya Kui
		Chowki Padampura
	Sawan Bhado Dam	Chowki Patpadiyo
		Chowki Simliya Gate
	Daanta	Chowki Data
	Darrah Gaon	Chowki Gadde Ki Mala
		Chowki Manoharpura
		Chowki Kukda
		Chowki Ghati Mata
Gagron	Mashalpura	Jhir choki
		Mandi Bara
	Naulav	Forest Guard Choki - Range
		Laxmipura
		Barrier Gate - Nolav
	Rajpura	Kanpura
Jawahar Sagar	Jawahar Sagar	Chowki Borkui do Manjil
		Teen Manjil - Watch Tower
		Chowki Garadiya
		Chowki Jawahar Sagar
	Sripura	
	Khera	Chowki Nousera
		Ambarani
Kolipura	Kolipura	Teen Manjil - Selzar
		Chowki Kolipura
		Chowki Selzar

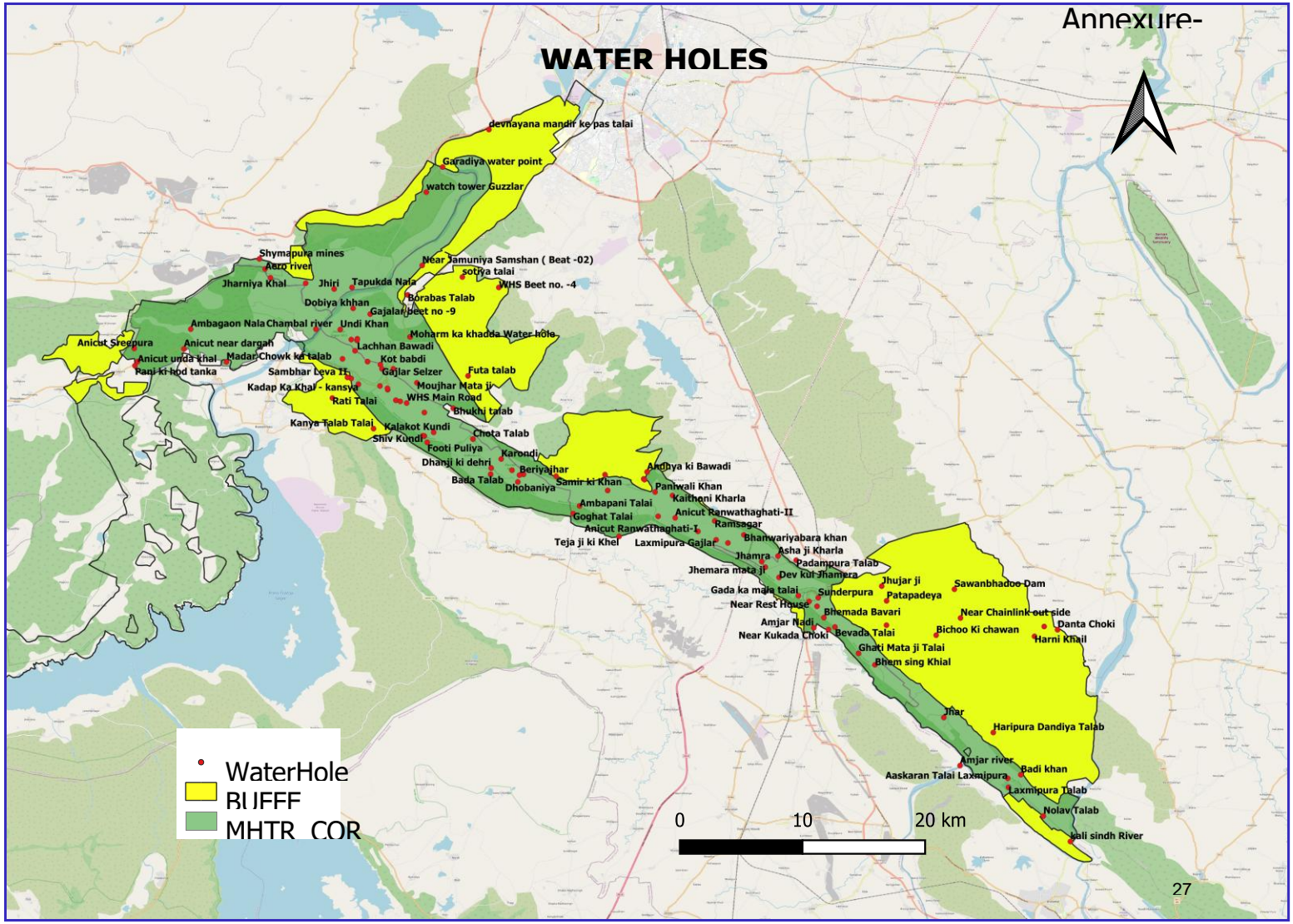
	Girdharpura	Chowki Girdharpura
	Kaniya Talaab	Chowki Nagni
Ranwatha	Ranwatha	Chowki Laxmipura
	Mandargarh	Chowki Mandergarh
	Chandbaori	Chowki Chandbaori
	Damodarpura	Chowki Ghatoli

Antipoching Camps

	Beat	Naka	Lat	Long
Jawahar Sagar				
shreepura	JS-2	Shrepura	24°58'45.00"N	75°29'33.75"E
Kheda	JS-10	Kheda	25° 3'52.43"N	75°34'40.16"E
Borkui Teen Manjil	JS-14	Jawahar Sagar	25° 4'53.62"N	75°41'26.46"E
Borabas				
Banda	B-8	Bandha	25° 0'35.56"N	75°47'1.96"E
Rath Kankara	B-2	Rath Kankara	25° 3'15.55"N	75°43'31.81"E
Nahar Singh Mata Ji	B-13	Borabas	24°58'55.51"N	75°40'56.07"E
Kolipura				
Kanya Talab	K-9	Kanya Talab	24°57'23.28"N	75°36'13.49"E
Selzer Chowki	K-1	Kolipura	24°58'24.80"N	75°40'40.97"E
Girdharpura	K-6	Girdharpura	24°54'43.73"N	75°44'40.12"E
Rawatha				
Chand Bawari	R-12	Chand Bawari	24°56'0.64"N	75°44'49.00"E
Mandar Garh	R-10	Mandar Garh	24°53'40.48"N	75°51'24.05"E
Ghatoli	R-8	Damodarpura	24°50'38.00"N	75°50'08.00"E
Laxmipura	R-5	Ranvatha	24°51'9.58"N	75°55'8.76"E
Darrah				
Gaddhe Ka mala	D-4	Darrah Gaon	24°48'45.74"N	75°58'42.51"E
Simliya	D-2,3	Darrah Station	24°49'50.59"N	76° 7'32.02"E
Sawanbhadho Dam	D-10	Sawanbhadho Dam	24°48'28.19"N	76° 5'34.45"E
Danta	D-13	Danta	24°47'19.50"N	76°10'9.43"E
Ghati Mataji	D-7	Darrah Gaon	24°46'4.32"N	76° 1'27.50"E
Gagron				
Kanpura	G-8	Rajpura	24°44'41.29"N	76°11'31.10"E

Nolav	G-6	Nolav	24°39'10.93"N	76° 9'13.13"E
Mandi Baran	G-1	Mashalpura	24°42'25.99"N	76° 5'29.83"E
Mashalpura	G-2	Mashalpura	24°43'6.54"N	76° 5'11.54"E

Annexure-


WATER HOLES
devnayana mandir ke pas talai
Garadiya water point
watch tower Guzzlar
Shymapura mines
Aaro river
Near Jamuniya Samshan (Beat -02)
sotiya talai
Jharniya Khal
Jhiri
Tapukda Nala
WHS Beet no. -4
Borabas Talab
Dobiya khhan
Gajalar beet no -9
Ambagaon Nala
Chambal river
Undi Khan
Moharm ka khadda Water hole
Anicut Sreepura
Anicut near dargah
Lachhan Bawadi
Anicut unda khal
Madar Chowk ka talab
Kot babdi
Rani ki hod tanka
Sambhar Deva II
Gajlar Selzer
Futa talab
Kadap Ka Khal - kansya
Moujhar Mata ji
Rati Talai
WHS Main Road
Bhukhi talab
Kanya Talab Talai
Kalakot Kundi
Chota Talab
Shiv Kundi
Footi Puliya
Karondi
Dhanji ki dehri
Beriyajhar
Andhya ki Bawadi
Bada Talab
Dhobaniya
Samir ki Khan
Paniwali Khan
Kaithoni Kharla
Ambapani Talai
Goghat Talai
Anicut Ranwathaghati-II
Ramsagar
Anicut Ranwathaghati-I
Teja ji ki Khel
Laxmipura Gajlar
Bhanwariyabara khan
Asha ji Kharla
Jhamra
Padampura Talab
Jhemara mata ji
Dev kul Jhamera
Jhujar ji
Sawanbhadoo Dam
Gada ka maja talai
Sunderpura
Patapadeya
Near Rest House
Bhemada Bavari
Near Chainlink out side
Amjar Nadi
Danta Choki
Near Kukada Choki
Bevada Talai
Bichoo Ki chawan
Harni Khail
Ghati Mata ji Talai
Bhem sing Khial
Jhar
Haripura Dandiya Talab
Amjar river
Badi khan
Aaskaran Talai Laxmipura
Laxmipura Talab
Nolav Talab
kali sindh River
WaterHole
BLJFFF
MHTR_COR
0
10
20 km
27

Annexure-17

Water Hole Information in MHTR

S.No.	Division	Range	Naka	Name of Waterhole	Type (Natural/Artificial)
1	MHTR	Rawatha	Darrah	Ramsagar	Natural
2	MHTR			Kaithoni Kharla	Natural
3	MHTR			Paniwali Khan	Natural
4	MHTR			Bhanwariyabara khan	Artificial
5	MHTR			Jhamra	Artificial
6	MHTR			Laxmipura Gajlar	Artificial
7	MHTR			Nagfani Tirahe ke Pass	Artificial
8	MHTR		Madergarh	Gauraji ki Bawadi	Natural
9	MHTR			Andhya ki Bawadi	Natural
10	MHTR			Padam jain ki Bawadi	Natural
11	MHTR			Mandergarh Talab	Natural
12	MHTR			Bhimadhar ki Khan	Natural
13	MHTR		Chandbawdi	Samir ki Khan	Natural
14	MHTR		Damodarpura	Teja ji ki Khel	Artificial
15	MHTR			Damodarpura Talai	Artificial
16	MHTR			Kharlibawadi Anicut	Artificial
17	MHTR			Anicut Ranwathaghati-I	Artificial
18	MHTR			Anicut Ranwathaghati-II	Artificial
19	MHTR			Ambapani Talai	Artificial
20	MHTR			Goghat Talai	Natural
21	MHTR	Gagron	Nolav	Nolav Talab	Natural
22	MHTR			Laxmipura Talab	Natural
23	MHTR			Aaskaran Talai Laxmipura	Artificial
24	MHTR		Rajpura	kali sindh River	Natural
25	MHTR			Badi khan	Natural
26	MHTR		Mashalpura	Haripura Dandiya Talab	Natural
27	MHTR			Gadari Kui	Artificial
28	MHTR			Narayanpura Kharla	Artificial
29	MHTR			Jhar	Natural
30	MHTR			Amjar river	Natural
31	MHTR	Borawas	Borawas	Bhukhi talab	Natural
32	MHTR			Borabas Talab	Natural
33	MHTR			Kot babdi	Natural
34	MHTR			Lachhan Bawadi	Natural
35	MHTR			Moujhar Mata ji	Natural

S.No.	Division			Name of Waterhole	Type (Natural/Artificial)
36	MHTR			Undi Khan	Natural
37	MHTR			Lachhan Bawadi ke pas Anicut	Artificial
38	MHTR			Sardar Ki Khan Selzar	Natural
39	MHTR			Dobiya khan	Natural
40	MHTR			Gajalar beet no -9	Artificial
41	MHTR			Moharm ka khadda Water hole	Artificial
42	MHTR			Nahar singh mataji Water hole	Artificial
43	MHTR			Nahar singh mataji Anicut	Artificial
44	MHTR			Tiger enclosure ke pas Selzer Anicut	Artificial
45	MHTR		Bandha	WHS Beet no. -4	Artificial
46	MHTR			Futa talab	Artificial
47	MHTR		Ratkankra	Near Jamuniya Samshan (Beat -02)	Artificial
48	MHTR		Nayagaon	devnayana mandir ke pas talai	Natural
49	MHTR			sotiya talai	Natural
50	MHTR		Kolipura	Sambar Leva I	Natural
51	MHTR			Sambar Leva II	Natural
52	MHTR			Kadap Ka Khal - kansya	Natural
53	MHTR			Mashan Ke pas	Natural
54	MHTR			Ratan ke khet ke paas	Natural
55	MHTR			Borkui	Natural
56	MHTR			Rooppura Talab	Natural
57	MHTR			WHS Rooppura	Artificial
58	MHTR			WHS Bahtada ka Nala	Artificial
59	MHTR			WHS Aadha khal	Artificial
60	MHTR			WHS Main Road	Artificial
61	MHTR			Gajlar Kolipura	Artificial
62	MHTR			Gajlar Selzer	Artificial
63	MHTR			Gajlar cheetal bada	Artificial
64	MHTR	Kolipura		Fire Watch tower tiraha Water hole	Artificial
65	MHTR		Girdharpura	Karondi	Natural
66	MHTR			Kanjhar	Natural
67	MHTR			Padajhar	Natural
68	MHTR			Beriyajhar	Natural
69	MHTR			Dhobaniya	Natural
70	MHTR			Shiv Kundi	Natural
71	MHTR			Kalakot Kundi	Natural
72	MHTR			Bada Talab	Natural
73	MHTR			Chota Talab	Natural
74	MHTR			Footi Puliya	Natural
75	MHTR			Dhanji ki dehri	Natural
76	MHTR		Kanya Talab	Kanya Talab Talai	Artificial
77	MHTR			Singhada Talai	Artificial
78	MHTR			Rati Talai	Artificial

S.No.	Division			Name of Waterhole	Type (Natural/Artificial)
79	MHTR			Sambar NAla	Artificial
80	MHTR	Darrah	Darrah Gaon	Bhemada Bavari	Natural
81	MHTR			Zig Zag water point	Artificial
82	MHTR			Near Rest House	Artificial
83	MHTR			Bevada Talai	Natural
84	MHTR			Near Kukada Choki	Artificial
85	MHTR			Jhemara mata ji	Natural
86	MHTR			Dev kui Jhamera	Natural
87	MHTR			Amjar Nadi	Natural
88	MHTR			Gada ka mala talai	Natural
89	MHTR			Bhem sing Khial	Artificial
90	MHTR			Ghati Mata ji Talai	Artificial
91	MHTR		Darrah Station	Asha ji Kharla	Natural
92	MHTR			Padampura Talab	Natural
93	MHTR			Jhujar ji	Natural
94	MHTR			Kala leva	Artificial
95	MHTR			Sunderpura	Artificial
96	MHTR		Sawan Bhado	Bichoo Ki chawan	Artificial
97	MHTR			Alaiya kui	Artificial
98	MHTR			Patapadeya	Artificial
99	MHTR			Ratiya talai	Artificial
100	MHTR			Sawanbhadoo Dam	Natural
101	MHTR			Near Chainlink out side	Artificial
102	MHTR		Danta	Harni Khail	Artificial
103	MHTR			Footi Talai	Artificial
104	MHTR			Danta Choki	Artificial
105	MHTR	Jawahar Sagar	Jawahar Sagar	Jhiri	Natural
106	MHTR			Tapukda Nala	Natural
107	MHTR			Ambarani Mataji	Natural
108	MHTR			Shymapura mines	Natural
109	MHTR			watch tower Guzzlar	Artificial
110	MHTR			Garadiya water point	Artificial
111	MHTR			Borkui water point	Artificial
112	MHTR		Kheda	Aero river	Natural
113	MHTR			Jharniya Khal	Natural
114	MHTR			Chambal river	Natural
115	MHTR		Sreepura	Madar Chowk ka talab	Natural
116	MHTR			Ambagaon Nala	Natural
117	MHTR			Balapura	Natural
118	MHTR			Pani ki hod tanka	Artificial
119	MHTR			Anicut unda khal	Artificial
120	MHTR			Anicut near dargah	Artificial
121	MHTR			Anicut Sreepura	Artificial

Water Hole Information in Bhainsroadgarh Sanctuary

क्र.स.	नाम नाका	वनखण्ड	वाटर पाईण्ट	जी0पी0एस0	प्राकृतिक / कृत्रिम	विवि
1	सडे लडेम	पाडाझर	वाटर हॉल–1 आर0सी	N-24º53.861 E-075º34.965	कृत्रिम	मोटर द्वारा फायर वाचर लगा कर
2	–	पाडाझर	वाटर हॉल–2 आर0सी	N-24º53.698 E-075º34.519	कृत्रिम	मोटर द्वारा फायर वाचर लगा कर
3	–	पाडाझर	कोबरा पाईण्ट आर0सी	N-24º53.857 E-075º34.265	कृत्रिम	टेंकर द्वारा
4	–	पाडाझर	कोकोडाईल पाईण्ट	N-24º53.531 E-075º34.847	प्राकृतिक	पानी उपलब्ध है
5	–	पाडाझर	नानकीया कुण्ड	N-24º54.218 E-075º32.375	प्राकृतिक	पानी उपलब्ध है
6	–	पाडाझर	मेगजीन वाटर हॉल	N-24º55.861 E075º34.263	कृत्रिम	टेंकर द्वारा
7	–	कोलगढ़	फार्म पाउन्ड झुंझला 2 प्लान्टेशन	N 24º51'34" E 75º32'24"	प्राकृतिक	पानी उपलब्ध है
8	–	कोलगढ़	एनिकट झझुंला	N 24º51'45" E 75º29'00"	कृत्रिम	टेंकर द्वारा
9	गणे ापुरा	मामोरगढ़	मोरडी महादवे	N-24º49.200 E-075º49.638	प्राकृतिक	पानी उपलब्ध है
10	–	कोलगढ़	कांटीराम नगर वृक्षा0–2	N-24º49.914 E-075º31.489	कृत्रिम	टेंकर द्वारा
11	–	धूी तलाई	रेवाझर नाला	N-24º47.914 E-075º27.810	प्राकृतिक	पानी उपलब्ध है
12	–	कोलगढ़	फुटपाल तालाब	N-24º51.486 E-075º28.267	प्राकृतिक	पानी उपलब्ध है
13	–	कोलगढ़	सगरिया का नाला एनिकट	N-24°56'01" E-75°28'45"	कृत्रिम	टेंकर द्वारा
14	आगरा	नीमडी़	कलसिया महादेव, वाटर हॉल एवं गजलर नया	N-24º51.577 E-075º22.849	कृत्रिम	टेंकर द्वारा
15	–	–	काला अम्बा	N-24º47.046 E-075º21.621	कृत्रिम	टेंकर द्वारा
16	–	–	प्रेमपुरा की नाल	N-24º47.275 E-075º21.414	प्राकृतिक	पानी उपलब्ध है
17	–	–	वन चौकी कोटडा बालाजी	N-24º47.050 E-075º19.484	कृत्रिम	हैडपम्प द्वारा फायर वाचर लगा कर
18	लुहारिया	कालाखेत	कन्या खाल	N-24º55.514 E-075º33.127	प्राकृतिक	पानी उपलब्ध है
19	–	कालाखेत	कालाखेत द्वितीय वृक्षा0 वाटर होल	N-24º55.132 E-075º31.544	कृत्रिम	टेंकर द्वारा
20	–	बान्दरमूथा	हथौली तालाब	N-24º55.054 E-075º29.793	प्राकृतिक	पानी उपलब्ध है
21	–	कालाखेत	नया वाटर होल कालाखेत	N-24º56.218 E-075º31.405	प्राकृतिक	पानी उपलब्ध है
22	–	कालाखेत	भवानीपुरा तालाब	N-24º57.266 E-075º31.653	प्राकृतिक	पानी उपलब्ध है
23	–	कालाखेत	ब्रिजसाईड	N-24º56.823 E-075º31.066	प्राकृतिक	पानी उपलब्ध है

MUKANDRA HILLS TIGER RESERVE-KOTA

MAP OF PILGRIMAGE

GIS Center, Information Technology Wing
2013
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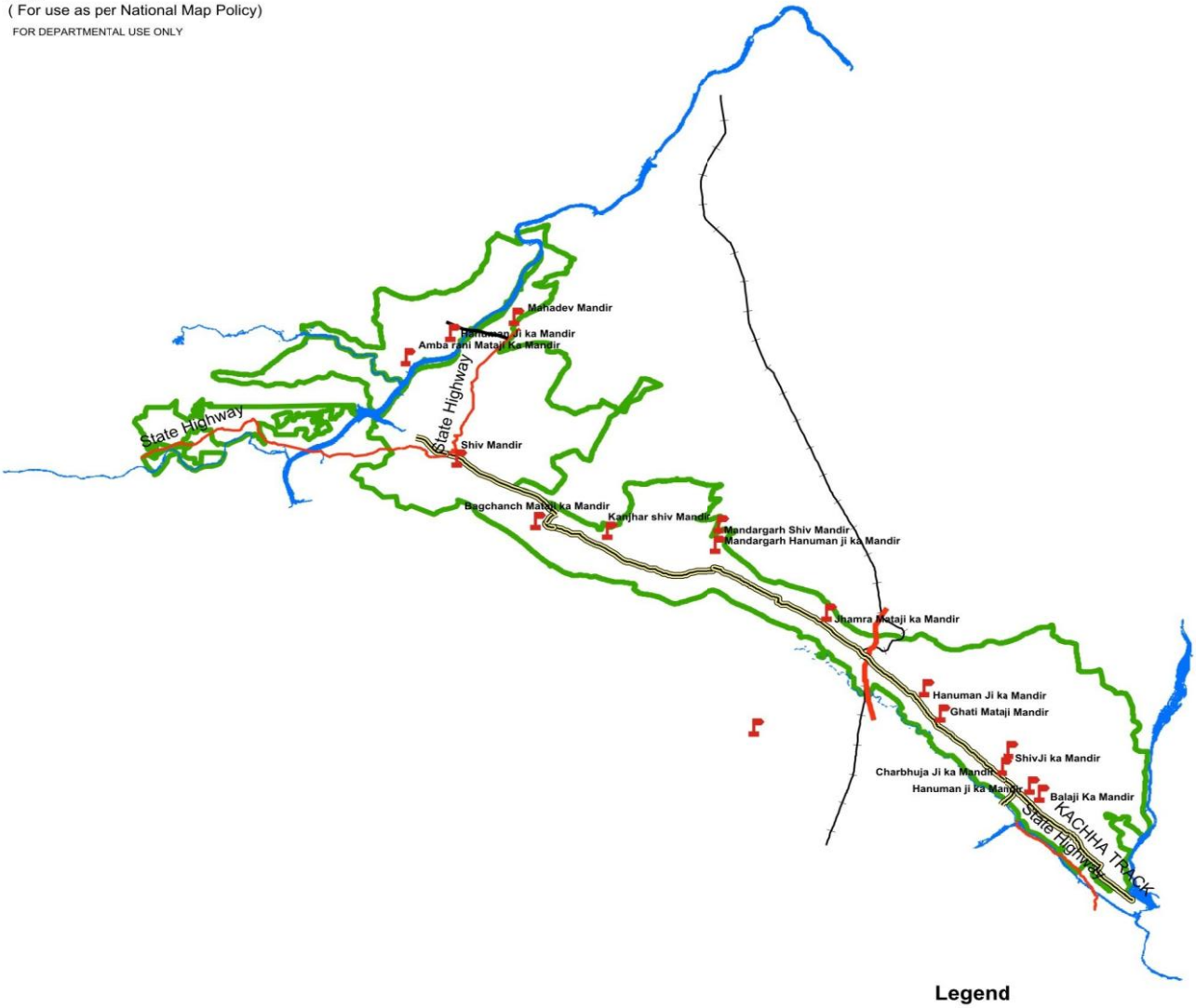

Legend

- DISTRICT ROAD
- KACHHA TRACK
- NATIONAL HIGHWAY
- STATE HIGHWAY
- RAILWAY
- RIVER
- PILGRIMS
- CTH_BUFFER_PARIPHERY

THIS MAP HAS BEEN PREPARED FOR MANAGEMENT PURPOSES ONLY. FOR LEGAL PURPOSES, FOREST LAND RECORDS SHOULD BE CONSULTED FOREST DEPARTMENT, RAJASTHAN

1 0 2

NOT TO SCALE

कार्यालय उप वन सरं क्षक (वन्यजीव) मुकन्दरा राष्ट्रीय उद्यान, कोटा

एम.एच.टी.आर. रिसर्च / अध्ययन 05 वर्ष (2019 से 2023 तक)

क्र.सं .	अनुमति प्रदानकर्ता	रिसर्च / अध्ययन का विवरण	अध्ययन करने वाले का नाम व पता	अध्ययन की अवधि
		वर्ष 2019–20		
1	1445 / 30.06.19	Icon Animal (mnfcyko) Smooth Coated other Population Estimation and Behavior Study.	Mrs. Urvashi Sharma University of Kota	फरवरी से जनू 2019 (जनू 2019 से अक्टूबर 2019 तक)
2	1875 / 28.01.2020	Distribution and Habitat use of Smooth Coated other(Lutrogale perspicillat) along chambal river.	Soun Meena Uviversity kota	जनवरी 2020 से अप्रैल 2020 तक
		वर्ष 2020–21		
1	5460 / 08.12.2020	Biodiversity of Fish Species Assessment in River Chambal in Kota	Mrs. Urvashi Sharma University of Kota	10.12.2020 से 4 माह तक
2	2603–05 / 06.01.2021	Geographical Study of Mukandra	Ayushi Jain University of Kota	5 वर्ष जनवरी 2021 से 2025 तक
3	2602 / 06.01.2021	Geographical Study MHTR	Ajay Vikram Soni Govt, Arts College Kota	जनवरी 2021 से माचर्ं 2025 तक
4	2865–71 / 15.02.2021	Permission to Rapid assessment and site visit of Bhaisroadgarh W/L Sanctuary and Chittorgarh	Dr. Y.U. Jhala	15.02.2021 से सर्वे तक
5	2903–05–01.03.2021	Under Water Ludeography by ROU of Kota Barrage	M.L. Meena	20.02.2021 की मार्च 2021
		वर्ष 2021–22		
1	1678 / 27.09.2021	Spatial ecology and ecosystem Services of striped hyeena in relation to land use pattounin	Randeep Singh	अक्टूबर 2019 से अक्टूबर 2021 तक
2	5501–03 / 30.09. 2021	Ethnabotany and Phytochemical Studies of Selected medicinal plants	Divya Soni	सितम्बर 2021 से दिसम्बर 2023 तक
3	6729 / 14.09.2021	Breeding Ecology of long billed vulture manal around Chambal River Kota Dissertation work	Dr. Surbhi Shrivastva	
4	5814–15 / 29.10.2021	Breeding Ecology of long billed vulture manal around Chambal River Kota	Bhanu Pratap Singh	नवम्बर 2021 से जनवरी 2022 तक
5	5465–66 / 22.12.2021	Bacterial Population dynamic of MHTR	Mona Singh	अप्रले 2022 से जनवरी 2024 तक
6	6324–26 / 16.03.2022	Suitability of MHTR and Escploring possible W/L Carridore Geo Scientific Attributer	Dr. Jay Gardner Mukesh Kumar Bairwa	मार्च 2022 से जनवरी 2024 तक 2 वर्ष

7	5326 / 21.09.2021	Permission for Reservior Sedimentation Studies Using Hydrographic Surueey of Reserviors in India under national	Executive Enigneer Chanbal Project New delhi	lssue date to One Month
8	5507 / 01.10.2021	Permission for Survey field visit in National Park and Sanctuary for the FGR Project duration 2020 to 2025	And Forest Research Institute Jodhpur	जारी दिनाकं से दिसम्बर 2025 तक

वर्ष 2022–23				
1	8162 / 01.12.2022	राजस्थान मे टोपोग्रफिकल / ज्यॉडिटिक / ड्राने सर्वे / तलक्षेण कायर्क म्र 2022–23 कें सम्बन्ध में	Mahesh Chand Gaur Survey of India Jaipur	दिसम्बर 2022 से फरवरी 2023 तक
2	6352 / 16.01.2023	Permission to Carry out Gravity, Magnetic and DGPS Survey in MHTR	Rameshwar lal jhalana Doongri	16.01.2023 से 31.03. 2023 तक
वर्ष 2023–24				
1	9172 / 09.06.2023	Willife Institute of india Dehradun	S. Sathya Kumar Dehradun	जारी दिनाकं से 1 वर्ष जून 2024 तक
2	CCF (WL) Kota NO. 3265/26-07-2023	Permission required to do Hydrography Topography Survey from Jawahar Sagar	Executive Engineer RPS Store Divison Rawtbhata	जारी दिनाकं से 1 माह तक
3	CCF (WL) Kota NO. 3503/14-08-2023	Medicinal plants survey of Darrah Ghati MHTR	Nikita Nagar	जारी दिनाकं से दिसम्बर तक
4	CCF (WL) Kota NO. 3566/18-08-2023	Intimation regarding national Geolphysical mapping of Geological survey of India (Minister of Mines) in Parts of Kota district (5401& 5402 Toposheet)	K.S. Benhur	जारी दिनाकं से 10 दिन
5	CCF (WL) Kota NO. 3967/21-09-2023	Status Distribution and Occupancy of Stripped Heyena	Ms. Rukhsar Bano	जारी दिनाकं से 3 वर्ष
6	4361–62 / 30.10.2023	Capacity building of the front line staff for Raptor Survey and Vulture nest Monitoring at Selected location.	Abhishek Bhatnagar WWF-india secretariat Pirojsha Godrej National Conservation Centrel 172 B lodi Estate New Delhi	जारी दिनाकं से 03 वर्ष
7	1169 / 26.03.2024	Permission for conservation research project in the National Gharial (Chambal) Sanctuary, Rajasthan	Tarun Nair 3/15 a Block , BDA MIG Flats, Domlur, Banglore	जारी दिनाकं से जून 2026 तक

Annexure-20

ट्रेकिग टीम द्वारा मुकन्दरा हिल्स टाईगर रिजर्व में बाघ की मोनिटरिंग डाटा शीट

ट्रेकिग टीम विवरण

क्र. स.	दिनाकं	समय	रेंज	बीट	स्थान का नाम जहा से सिग्नल लिया जा रहा है	बाघ की पहचान	बाघ संबंधी साक्ष्य	जीपीएस लोकेशन (अक्षांश देशान्तर)	कम्पास एंगल	भौतिकी	वि0वि0	Checked by
1	2	3	4	5	6	7	8	9	10	11	12	13

* बाघ सबंधी साक्ष्य – 1. रेडियो सिग्नल 2. पगमार्क 3. प्रत्यक्ष देखना 4. मल 5. खरोच निशान 6. आवाज व सिग्नल

** वन के प्रकार – 1. धोंक वन 2. सालर वन 3. बेर वन 4. खेर व रोंझ का वन 5. छीला वन 6. नाला वाला वन 7. झाडी वन ‘’’

भौतिकी – 1. समतल 2. सामान्य ढाल 3. तीव्र ढाल 4. नाला

Annexure-21

Mukandra Tiger Reserve - Phase III Camera trapping 2018

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
1	Borabas	25	0	32	75	38	15
2	Borabas	25	0	32	75	38	15
3	Borabas	25	0	56	75	38	56
4	Borabas	25	0	56	75	38	56
5	Borabas	25	1	27	75	39	41
6	Borabas	25	1	27	75	39	41
7	Borabas	25	1	37	75	40	38
8	Borabas	25	1	37	75	40	38
9	Borabas	25	3	12.54	75	42	21.2
10	Borabas	25	3	12.54	75	42	21.2
11	Borabas	25	4	1.6	75	43	15.12
12	Borabas	25	4	1.6	75	43	15.12
13	Borabas	25	5	4.99	75	43	43.18
14	Borabas	25	5	4.99	75	43	43.18
15	Borabas	25	5	56.88	75	44	26.8
16	Borabas	25	5	56.88	75	44	26.8
17	Borabas	24	59	49	75	39	59
18	Borabas	24	59	49	75	39	59
19	Borabas	25	0	54	75	39	59
20	Borabas	25	0	54	75	39	59
21	Borabas	25	1	7	75	40	39
22	Borabas	25	1	7	75	40	39
23	Borabas	25	2	38.91	75	42	1.34
24	Borabas	25	2	38.91	75	42	1.34
25	Borabas	25	0	14	75	39	27
26	Borabas	25	0	14	75	39	27
27	Borabas	24	59	54	75	41	2
28	Borabas	24	59	54	75	41	2
29	Borabas	24	59	37	75	39	59
30	Borabas	24	59	37	75	39	59
31	Borabas	24	59	8	75	40	34
32	Borabas	24	59	8	75	40	34
33	Borabas	24	58	39	75	41	2
34	Borabas	24	58	39	75	41	2
35	Borabas	24	59	30	75	41	22
36	Borabas	24	59	30	75	41	22
37	Borabas	25	0	5.78	75	42	26.64
38	Borabas	25	0	5.78	75	42	26.64
39	Borabas	25	1	0	75	44	10

40	Borabas	25	1	0	75	44	10
41	Borabas	25	0	52.21	75	45	4.82
42	Borabas	25	0	52.21	75	45	4.82
43	Borabas	24	58	44.35	75	41	25.13
44	Borabas	24	58	44.35	75	41	25.13
45	Borabas	24	59	20.3	75	42	29.57
46	Borabas	24	59	20.3	75	42	29.57
47	Borabas	25	0	25.67	75	43	22.57
48	Borabas	25	0	25.67	75	43	22.57
49	Borabas	25	0	21.02	75	43	59.07

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
50	Borabas	25	0	21.02	75	43	59.07
51	Borabas	25	0	3.66	75	45	7.36
52	Borabas	25	0	3.66	75	45	7.36
53	Borabas	24	58	29	75	42	32.09
54	Borabas	24	58	29	75	42	32.09
55	Borabas	24	59	24.21	75	43	15.34
56	Borabas	24	59	24.21	75	43	15.34
57	Borabas	24	57	55.63	75	42	20.82
58	Borabas	24	57	55.63	75	42	20.82
59	Borabas	24	58	44.87	75	43	23.53
60	Borabas	24	58	44.87	75	43	23.53
61	Borabas	24	59	48.34	75	44	11.11
62	Borabas	24	59	48.34	75	44	11.11
63	Borabas	24	58	21	75	43	52.04
64	Borabas	24	58	21	75	43	52.04
65	Borabas	24	59	34.04	75	45	1.03
66	Borabas	24	59	34.04	75	45	1.03
67	Borabas	24	58	4.28	75	43	49.91
68	Borabas	24	58	4.28	75	43	49.91
69	Borabas	24	58	36.92	75	45	12.86
70	Borabas	24	58	36.92	75	45	12.86
71	Borabas	24	57	8.55	75	44	26.86
72	Borabas	24	57	8.55	75	44	26.86
73	Borabas	24	58	49.37	75	46	5.63
74	Borabas	24	58	49.37	75	46	5.63
75	Kolipura	24	59	0.04	75	38	4.16
76	Kolipura	24	59	0.04	75	38	4.16
77	Kolipura	24	59	9.19	75	39	22.66
78	Kolipura	24	59	9.19	75	39	22.66
79	Kolipura	24	57	30.59	75	37	33.56

80	Kolipura	24	57	30.59	75	37	33.56
81	Kolipura	24	58	28.15	75	38	59.04
82	Kolipura	24	58	28.15	75	38	59.04
83	Kolipura	24	57	40.02	75	38	53.8
84	Kolipura	24	57	40.02	75	38	53.8
85	Kolipura	24	58	27.05	75	40	0.19
86	Kolipura	24	58	27.05	75	40	0.19
87	Kolipura	24	56	57.83	75	38	28.08
88	Kolipura	24	56	57.83	75	38	28.08
89	Kolipura	24	56	56.08	75	40	3.06
90	Kolipura	24	56	56.08	75	40	3.06
91	Kolipura	24	57	58.16	75	40	57.12
92	Kolipura	24	57	58.16	75	40	57.12
93	Kolipura	24	57	12.38	75	41	6.69
94	Kolipura	24	57	12.38	75	41	6.69
95	Kolipura	24	57	37.31	75	41	26.66
96	Kolipura	24	57	37.31	75	41	26.66
97	Kolipura	24	57	3.95	75	41	35.64
98	Kolipura	24	57	3.95	75	41	35.64
99	Kolipura	24	56	13.5	75	42	4.92
100	Kolipura	24	56	13.5	75	42	4.92
101	Kolipura	24	55	37.4	75	42	8.85

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
102	Kolipura	24	55	37.4	75	42	8.85
103	Kolipura	24	56	14.1	75	42	30.89
104	Kolipura	24	56	14.1	75	42	30.89
105	Kolipura	24	55	19.11	75	42	34.23
106	Kolipura	24	55	19.11	75	42	34.23
107	Kolipura	24	56	16.25	75	43	26.74
108	Kolipura	24	56	16.25	75	43	26.74
109	Kolipura	24	55	41.52	75	44	7.35
110	Kolipura	24	55	41.52	75	44	7.35
111	Kolipura	24	54	56.48	75	45	32.27
112	Kolipura	24	54	56.48	75	45	32.27
113	Kolipura	24	54	6.16	75	46	10.96
114	Kolipura	24	54	6.16	75	46	10.96
115	Kolipura	24	53	9.1	75	46	9.8
116	Kolipura	24	53	9.1	75	46	9.8
117	Kolipura	24	53	55.12	75	47	14.85
118	Kolipura	24	53	55.12	75	47	14.85
119	Kolipura	24	53	11.51	75	47	52.98

120	Kolipura	24	53	11.51	75	47	52.98
121	Rawatha	24	55	31.8	75	45	12.54
122	Rawatha	24	55	31.8	75	45	12.54
123	Rawatha	24	54	47.95	75	46	14.12
124	Rawatha	24	54	47.95	75	46	14.12
125	Rawatha	24	54	13.62	75	47	10.86
126	Rawatha	24	54	13.62	75	47	10.86
127	Rawatha	24	55	4.4	75	48	15.32
128	Rawatha	24	55	4.4	75	48	15.32
129	Rawatha	24	56	31.81	75	51	75.7
130	Rawatha	24	56	31.81	75	51	75.7
131	Rawatha	24	55	43.11	75	49	5.26
132	Rawatha	24	55	43.11	75	49	5.26
133	Rawatha	24	55	47.28	75	50	34.8
134	Rawatha	24	55	47.28	75	50	34.8
135	Rawatha	24	55	51.6	75	51	20.88
136	Rawatha	24	55	51.6	75	51	20.88
137	Rawatha	24	55	57.36	75	52	9.48
138	Rawatha	24	55	57.36	75	52	9.48
139	Rawatha	24	54	11.88	75	48	26.69
140	Rawatha	24	54	11.88	75	48	26.69
141	Rawatha	24	54	54.09	75	49	44.53
142	Rawatha	24	54	54.09	75	49	44.53
143	Rawatha	24	54	50.17	75	50	20.2
144	Rawatha	24	54	50.17	75	50	20.2
145	Rawatha	24	55	3.51	75	51	22.46
146	Rawatha	24	55	3.51	75	51	22.46
147	Rawatha	24	54	7.22	75	48	37.82
148	Rawatha	24	54	7.22	75	48	37.82
149	Rawatha	24	54	38.69	75	50	46.54
150	Rawatha	24	54	38.69	75	50	46.54
151	Rawatha	24	54	21.94	75	51	9.14
152	Rawatha	24	54	21.94	75	51	9.14
153	Rawatha	24	53	32.07	75	49	10.65

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
154	Rawatha	24	53	32.07	75	49	10.65
155	Rawatha	24	53	33.89	75	49	37.07
156	Rawatha	24	53	33.89	75	49	37.07
157	Rawatha	24	53	20	75	50	44
158	Rawatha	24	53	20	75	50	44
159	Rawatha	24	52	41	75	49	9

160	Rawatha	24	52	41	75	49	9
161	Rawatha	24	52	34	75	48	41
162	Rawatha	24	52	34	75	48	41
163	Rawatha	24	53	0	75	50	45
164	Rawatha	24	53	0	75	50	45
165	Rawatha	24	52	21	75	50	44
166	Rawatha	24	52	21	75	50	44
167	Rawatha	24	51	28	75	54	38
168	Rawatha	24	51	28	75	54	38
169	Rawatha	24	54	47.22	75	53	7.74
170	Rawatha	24	54	47.22	75	53	7.74
171	Rawatha	24	52	30.92	75	53	48.31
172	Rawatha	24	52	30.92	75	53	48.31
173	Rawatha	24	51	44	75	51	41
174	Rawatha	24	51	44	75	51	41
175	Rawatha	24	51	60	75	52	21
176	Rawatha	24	51	60	75	52	21
177	Rawatha	24	51	55	75	53	52
178	Rawatha	24	51	55	75	53	52
179	Rawatha	24	51	8	75	54	2
180	Rawatha	24	51	8	75	54	2
181	Rawatha	24	51	13	75	55	7
182	Rawatha	24	51	13	75	55	7
183	Rawatha	24	51	10.14	75	56	6.12
184	Rawatha	24	51	10.14	75	56	6.12
185	Rawatha	24	51	10.97	75	56	32.82
186	Rawatha	24	51	10.97	75	56	32.82
187	Rawatha	24	50	16.48	75	56	48.04
188	Rawatha	24	50	16.48	75	56	48.04
189	Rawatha	24	50	34.05	75	57	38.94
190	Rawatha	24	50	34.05	75	57	38.94
191	Rawatha	24	50	47.61	75	55	49.49
192	Rawatha	24	50	47.61	75	55	49.49
193	Darrah	24	49	40.25	75	57	37.11
194	Darrah	24	49	40.25	75	57	37.11
195	Darrah	24	48	42	75	58	43
196	Darrah	24	48	42	75	58	43
197	Darrah	24	49	96	75	59	6.01
198	Darrah	24	49	96	75	59	6.01
199	Darrah	24	49	31.2	75	59	32.1
200	Darrah	24	49	31.2	75	59	32.1
201	Darrah	24	49	20.3	75	59	54.3
202	Darrah	24	49	20.3	75	59	54.3

203	Darrah	24	49	45.9	76	1	34.4
204	Darrah	24	49	45.9	76	1	34.4
205	Darrah	24	48	98.4	76	2	45.2

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
206	Darrah	24	48	98.4	76	2	45.2
207	Darrah	24	48	60.6	76	2	34.7
208	Darrah	24	48	60.6	76	2	34.7
209	Darrah	24	48	6.55	75	58	46.14
210	Darrah	24	48	6.55	75	58	46.14
211	Darrah	24	48	8.17	75	59	31.83
212	Darrah	24	48	8.17	75	59	31.83
213	Darrah	24	48	56	76	2	20.2
214	Darrah	24	48	56	76	2	20.2
215	Darrah	24	48	32.09	76	3	12.96
216	Darrah	24	48	32.09	76	3	12.96
217	Darrah	24	48	18.9	76	3	37.93
218	Darrah	24	48	18.9	76	3	37.93
219	Darrah	24	48	20.12	76	4	49.14
220	Darrah	24	48	20.12	76	4	49.14
221	Darrah	24	48	23.41	76	5	34.94
222	Darrah	24	48	23.41	76	5	34.94
223	Darrah	24	49	7.01	76	6	28.48
224	Darrah	24	49	7.01	76	6	28.48
225	Darrah	24	50	6.08	76	7	27.9
226	Darrah	24	50	6.08	76	7	27.9
227	Darrah	24	49	9.4	76	7	26.28
228	Darrah	24	49	9.4	76	7	26.28
229	Darrah	24	49	14.34	76	7	57.44
230	Darrah	24	49	14.34	76	7	57.44
231	Darrah	24	48	19.38	76	6	17.73
232	Darrah	24	48	19.38	76	6	17.73
233	Darrah	24	47	18.6	76	1	59.7
234	Darrah	24	47	18.6	76	1	59.7
235	Darrah	24	47	21.85	76	3	35.88
236	Darrah	24	47	21.85	76	3	35.88
237	Darrah	24	47	49	76	4	31.23
238	Darrah	24	47	49	76	4	31.23
239	Darrah	24	47	46.32	76	8	7.44
240	Darrah	24	47	46.32	76	8	7.44
241	Darrah	24	46	42.88	76	1	18.9
242	Darrah	24	46	42.88	76	1	18.9

243	Darrah	24	46	47.96	76	2	28.75
244	Darrah	24	46	47.96	76	2	28.75
245	Darrah	24	46	55.22	76	3	38.14
246	Darrah	24	46	55.22	76	3	38.14
247	Darrah	24	46	59.28	76	9	0.72
248	Darrah	24	46	59.28	76	9	0.72
249	Darrah	24	46	56.71	76	9	54.29
250	Darrah	24	46	56.71	76	9	54.29
251	Darrah	24	46	3.19	76	1	35.42
252	Darrah	24	46	3.19	76	1	35.42
253	Darrah	24	45	47.92	76	2	10.45
254	Darrah	24	45	47.92	76	2	10.45
255	Darrah	24	46	11.69	76	8	13.85
256	Darrah	24	46	11.69	76	8	13.85
257	Darrah	24	46	13.68	76	9	21.51

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
258	Darrah	24	46	13.68	76	9	21.51
259	Darrah	24	46	12.79	76	9	56
260	Darrah	24	46	12.79	76	9	56
261	Darrah	24	47	1	76	0	23.06
262	Darrah	24	47	1	76	0	23.06
263	Darrah	24	45	1.52	76	2	56.51
264	Darrah	24	45	1.52	76	2	56.51
265	Darrah	24	45	35.41	76	8	20
266	Darrah	24	45	35.41	76	8	20
267	Darrah	24	45	36.16	76	8	58.36
268	Darrah	24	45	36.16	76	8	58.36
269	Darrah	24	45	38.53	76	10	4.18
270	Darrah	24	45	38.53	76	10	4.18
271	Darrah	24	44	36.93	76	3	21.73
272	Darrah	24	44	36.93	76	3	21.73
273	Gagron	24	45	41.18	76	2	47.71
274	Gagron	24	45	41.18	76	2	47.71
275	Gagron	24	46	9.38	76	4	10.5
276	Gagron	24	46	9.38	76	4	10.5
277	Gagron	24	46	1.56	76	5	0.79
278	Gagron	24	46	1.56	76	5	0.79
279	Gagron	24	45	35.55	76	3	42.87
280	Gagron	24	45	35.55	76	3	42.87
281	Gagron	24	45	37.81	76	5	10.04
282	Gagron	24	45	37.81	76	5	10.04

283	Gagron	24	45	23.72	76	5	27.84
284	Gagron	24	45	23.72	76	5	27.84
285	Gagron	24	43	29	76	5	17
286	Gagron	24	43	29	76	5	17
287	Gagron	24	44	6.41	76	4	9.73
288	Gagron	24	44	6.41	76	4	9.73
289	Gagron	24	44	13.75	76	4	37.33
290	Gagron	24	44	13.75	76	4	37.33
291	Gagron	24	44	32.09	76	5	55.02
292	Gagron	24	44	32.09	76	5	55.02
293	Gagron	24	44	54.41	76	6	17.94
294	Gagron	24	44	54.41	76	6	17.94
295	Gagron	24	44	36.57	76	8	16.49
296	Gagron	24	44	36.57	76	8	16.49
297	Gagron	24	45	17.39	76	10	50.71
298	Gagron	24	45	17.39	76	10	50.71
299	Gagron	24	44	32.35	76	9	1.67
300	Gagron	24	44	32.35	76	9	1.67
301	Gagron	24	44	41.57	76	10	55.28
302	Gagron	24	44	41.57	76	10	55.28
303	Gagron	24	43	25.46	76	4	19.91
304	Gagron	24	43	25.46	76	4	19.91
305	Gagron	24	43	33.53	76	5	8.04
306	Gagron	24	43	33.53	76	5	8.04
307	Gagron	24	43	26.8	76	5	44.28
308	Gagron	24	43	26.8	76	5	44.28
309	Gagron	24	43	57.08	76	10	0.39

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
310	Gagron	24	43	57.08	76	10	0.39
311	Gagron	24	44	0.31	76	10	52.38
312	Gagron	24	44	0.31	76	10	52.38
313	Gagron	24	43	54.7	76	11	44.36
314	Gagron	24	43	54.7	76	11	44.36
315	Gagron	24	43	10.18	76	6	38.79
316	Gagron	24	43	10.18	76	6	38.79
317	Gagron	24	43	11.92	76	10	59.85
318	Gagron	24	43	11.92	76	10	59.85
319	Gagron	24	42	20.25	76	6	3.23
320	Gagron	24	42	20.25	76	6	3.23
321	Gagron	24	42	11.22	76	6	48.65
322	Gagron	24	42	11.22	76	6	48.65

323	Gagron	24	42	13.58	76	7	31.37
324	Gagron	24	42	13.58	76	7	31.37
325	Gagron	24	42	16.33	76	8	29.54
326	Gagron	24	42	16.33	76	8	29.54
327	Gagron	24	42	15.74	76	9	9.24
328	Gagron	24	42	15.74	76	9	9.24
329	Gagron	24	42	21.6	76	10	9.25
330	Gagron	24	42	21.6	76	10	9.25
331	Gagron	24	42	28.09	76	11	13.39
332	Gagron	24	42	28.09	76	11	13.39
333	Gagron	24	41	20.51	76	6	44.18
334	Gagron	24	41	20.51	76	6	44.18
335	Gagron	24	41	12.93	76	7	29.26
336	Gagron	24	41	12.93	76	7	29.26
337	Gagron	24	41	20.4	76	8	18.52
338	Gagron	24	41	20.4	76	8	18.52
339	Gagron	24	41	32.92	76	11	11.81
340	Gagron	24	41	32.92	76	11	11.81
341	Gagron	24	40	53.41	76	7	18.77
342	Gagron	24	40	53.41	76	7	18.77
343	Gagron	24	40	45.77	76	8	34.42
344	Gagron	24	40	45.77	76	8	34.42
345	Gagron	24	40	45.08	76	9	17.8
346	Gagron	24	40	45.08	76	9	17.8
347	Gagron	24	39	51.21	76	9	37.1
348	Gagron	24	39	51.21	76	9	37.1
349	Gagron	24	39	49.83	76	10	13.46
350	Gagron	24	39	49.83	76	10	13.46
351	Gagron	24	38	59.33	76	9	38.96
352	Gagron	24	38	59.33	76	9	38.96
353	Gagron	24	39	1.65	76	10	7.72
354	Gagron	24	39	1.65	76	10	7.72
355	Gagron	24	38	43.73	76	10	18.03
356	Gagron	24	38	43.73	76	10	18.03
357	JawaharSagar	24	59	23.06	75	27	56.39
358	JawaharSagar	24	59	23.06	75	27	56.39
359	JawaharSagar	24	59	4.24	75	27	47.44
360	JawaharSagar	24	59	4.24	75	27	47.44
361	JawaharSagar	24	59	11.73	75	28	39.54

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
362	JawaharSagar	24	59	11.73	75	28	39.54

363	JawaharSagar	24	58	28.9	75	29	53.39
364	JawaharSagar	24	58	28.9	75	29	53.39
365	JawaharSagar	25	0	26.58	75	29	4.88
366	JawaharSagar	25	0	26.58	75	29	4.88
367	JawaharSagar	24	59	35.77	75	29	38.05
368	JawaharSagar	24	59	35.77	75	29	38.05
369	JawaharSagar	24	59	34.43	75	27	33.5
370	JawaharSagar	24	59	34.43	75	27	33.5
371	JawaharSagar	24	59	4.51	75	27	27.46
372	JawaharSagar	24	59	4.51	75	27	27.46
373	JawaharSagar	25	1	7.38	75	31	14.84
374	JawaharSagar	25	1	7.38	75	31	14.84
375	JawaharSagar	24	59	41.53	75	31	11.33
376	JawaharSagar	24	59	41.53	75	31	11.33
377	JawaharSagar	24	59	3.25	75	31	11.83
378	JawaharSagar	24	59	3.25	75	31	11.83
379	JawaharSagar	25	1	18.56	75	31	59.83
380	JawaharSagar	25	1	18.56	75	31	59.83
381	JawaharSagar	24	59	48	75	32	5.03
382	JawaharSagar	24	59	48	75	32	5.03
383	JawaharSagar	25	0	37.3	75	32	48.4
384	JawaharSagar	25	0	37.3	75	32	48.4
385	JawaharSagar	24	59	53.8	75	32	57.6
386	JawaharSagar	24	59	53.8	75	32	57.6
387	JawaharSagar	24	59	0.8	75	33	1.2
388	JawaharSagar	24	59	0.8	75	33	1.2
389	JawaharSagar	25	1	13.35	75	33	45.35
390	JawaharSagar	25	1	13.35	75	33	45.35
391	JawaharSagar	25	0	32	75	33	58.8
392	JawaharSagar	25	0	32	75	33	58.8
393	JawaharSagar	25	0	2.29	75	33	52.98
394	JawaharSagar	25	0	2.29	75	33	52.98
395	JawaharSagar	25	2	7.2	75	34	29.65
396	JawaharSagar	25	2	7.2	75	34	29.65
397	JawaharSagar	25	1	24.96	75	34	33.96
398	JawaharSagar	25	1	24.96	75	34	33.96
399	JawaharSagar	25	0	43.3	75	34	35
400	JawaharSagar	25	0	43.3	75	34	35
401	JawaharSagar	24	59	53.5	75	34	30.54
402	JawaharSagar	24	59	53.5	75	34	30.54
403	JawaharSagar	25	3	2.66	75	35	29.5
404	JawaharSagar	25	3	2.66	75	35	29.5
405	JawaharSagar	25	2	12.12	75	35	9.27

406	JawaharSagar	25	2	12.12	75	35	9.27
407	JawaharSagar	25	1	32.59	75	35	25.08
408	JawaharSagar	25	1	32.59	75	35	25.08
409	JawaharSagar	25	0	45.7	75	38	19.6
410	JawaharSagar	25	0	45.7	75	38	19.6
411	JawaharSagar	25	2	27.93	75	36	16.35
412	JawaharSagar	25	2	27.93	75	36	16.35
413	JawaharSagar	25	1	23.29	75	36	18.33

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
414	JawaharSagar	25	1	23.29	75	36	18.33
415	JawaharSagar	25	0	30.2	75	36	14
416	JawaharSagar	25	0	30.2	75	36	14
417	JawaharSagar	24	59	59.6	75	36	26.1
418	JawaharSagar	24	59	59.6	75	36	26.1
419	JawaharSagar	25	2	5.45	75	37	9.84
420	JawaharSagar	25	2	5.45	75	37	9.84
421	JawaharSagar	25	1	33.96	75	37	13.44
422	JawaharSagar	25	1	33.96	75	37	13.44
423	JawaharSagar	25	1	0.45	75	36	49.41
424	JawaharSagar	25	1	0.45	75	36	49.41
425	JawaharSagar	25	2	55.71	75	37	49.7
426	JawaharSagar	25	2	55.71	75	37	49.7
427	JawaharSagar	25	1	43.66	75	37	53.32
428	JawaharSagar	25	1	43.66	75	37	53.32
429	JawaharSagar	25	3	54.89	75	38	50.07
430	JawaharSagar	25	3	54.89	75	38	50.07
431	JawaharSagar	25	3	12.2	75	38	37
432	JawaharSagar	25	3	12.2	75	38	37
433	JawaharSagar	25	2	21.44	75	38	34.2
434	JawaharSagar	25	2	21.44	75	38	34.2
435	JawaharSagar	25	1	53.8	75	38	33.67
436	JawaharSagar	25	1	53.8	75	38	33.67
437	JawaharSagar	25	4	0.13	75	39	37.18
438	JawaharSagar	25	4	0.13	75	39	37.18
439	JawaharSagar	25	3	19.3	75	39	38.8
440	JawaharSagar	25	3	19.3	75	39	38.8
441	JawaharSagar	25	2	9.07	75	39	36.15
442	JawaharSagar	25	2	9.07	75	39	36.15
443	JawaharSagar	25	4	4.08	75	40	32.88
444	JawaharSagar	25	4	4.08	75	40	32.88
445	JawaharSagar	25	3	12.28	75	40	32.09

446	JawaharSagar	25	3	12.28	75	40	32.09
447	JawaharSagar	25	4	36.04	75	40	40.85
448	JawaharSagar	25	4	36.04	75	40	40.85
449	JawaharSagar	25	4	10.31	75	41	21.69
450	JawaharSagar	25	4	10.31	75	41	21.69
451	JawaharSagar	25	3	28.41	75	41	59.14
452	JawaharSagar	25	3	28.41	75	41	59.14
453	JawaharSagar	25	6	32.12	75	42	25.03
454	JawaharSagar	25	6	32.12	75	42	25.03
455	JawaharSagar	25	4	53.46	75	42	8.86
456	JawaharSagar	25	4	53.46	75	42	8.86
457	JawaharSagar	25	4	17.4	75	42	8.64
458	JawaharSagar	25	4	17.4	75	42	8.64
459	JawaharSagar	25	6	32.12	75	42	55.88
460	JawaharSagar	25	6	32.12	75	42	55.88
461	JawaharSagar	25	5	6.73	75	42	57.66
462	JawaharSagar	25	5	6.73	75	42	57.66
463	JawaharSagar	25	7	24	75	43	27.06
464	JawaharSagar	25	7	24	75	43	27.06

Annexure-22

Details of barriers, watch towers and wireless stations

Range	Gate / Barrier / Watch Tower	Name of Asset	Latitude	Longitude
Borabas	Barrier	Borabas Barrier	25° 0' 59.93"	75° 41' 25.25"
Borabas	Watch Tower	Watch Tower Selzer	25° 0' 33.96"	75° 38' 10.62"
Borabas	Barrier	Ratkankra Barrier	25° 3' 16.03"	75° 43' 32.25"
Borabas	Watch Tower	Watch Tower Ratkankra	25° 3' 30.37"	75° 43' 47.59"
Borabas	Watch Tower	Watch Tower Nayagaon	25° 8' 27.33"	75° 47' 49.98"
Borabas	Control Room Wireless	Kota MNP Division	25° 8' 15.30"	75° 48' 40.71"
Darrah	Watch Tower	Watch Tower Kalya kui	24° 49' 12.07"	76° 3' 9.090"
Gagron	Barrier	Nolav Barrier	24° 39' 6.800"	76° 9' 16.99"
Gagron	Gate	Mandibara Gate	24° 42' 26.28"	76° 5' 29.85"
Gagron	Watch Tower	Watch Tower Rajpura	24° 40' 46.49"	76° 11' 11.10"
Gagron	Barrier cum Guard choki	Range Gagron	24° 37' 53.33"	76° 10' 39.97"
Jawahar Sagar	Barrier	Garadiya Barrier	25° 7' 17"	75° 43' 0.29"
Jawahar Sagar	Watch Tower	Teen Manjil	25° 6' 22.19"	75° 42' 20.3"
Jawahar Sagar	Gate-Check Post	Amba Rani	25° 3' 23.94"	75° 35' 10.22"
Kolipura	Barrier Cum. Check post	Barrier Kolipura	24° 57' 49.03"	75° 40' 19.40"
Kolipura	Fire watch tower	Selzer	24° 59' 18.29"	75° 38' 7.696"
Kolipura	Watch tower	Deeeppura Ghata	24° 55' 48.56"	75° 40' 40.38"

Kolipura	Selzer Gate	Selzer	24° 58' 24.95"	75° 40' 42.4"
Kolipura	Inspection hut	Kolipura	24° 57' 49.69"	75° 40' 20.80"
Ranwatha	Barrier	Barrier Ranwatha	24° 52' 13.00"	75° 55' 20.99"
Ranwatha	Barrier	Barrier Mandergarh	24° 54' 17.82"	75° 52' 37.20"
Ranwatha	Barrier	Barrier Chandbawri	24° 56' 2.280"	75° 44' 49.59"

Fire incidents in MHTR

Annexure-23

Sr. No.	Name of Range	Name of Forest Block	Date of fire incident	Cause of fire	Area affected put off (ha)	Loss due to fire
Year 2018-19						
1.	Borabas	Nayagaon	21-01-2018	Unkown	12	Grasses and Bushes
2.	Borabas	Nayagaon	03-05-2018	Unkown	1	Grasses and Bushes
3.	Kolipura	Kanya Talab	22-04-2018	Unkown	2	Grasses and Bushes
4.	Kolipura	Kanya Talab	03-05-2018	Unkown	1	Grasses and Bushes
5.	Kolipura	Kanya Talab	14-05-2018	Unkown	0.8	Grasses and Bushes
6.	Kolipura	Kolipura	18-05-2018	Unkown	0.33	Grasses and Bushes
7.	Kolipura	Kolipura	18-05-2018	Unkown	0.08	Grasses and Bushes
8.	Kolipura	Kolipura	25-05-2018	Unkown	0.01	Grasses and Bushes
9.	Kolipura	Kolipura	24-05-2018	Unkown	0.02	Grasses and Bushes
10.	Kolipura	Kanya Talab	14-06-2018	Unkown	0.0084	Grasses and Bushes
11.	Gagron	Rajpura	14-06-2018	Unkown	50	Grasses and Bushes
12.	Gagron	Nolav	14-06-2018	Unkown	5	Grasses and Bushes
13.	Darrah	Darrah gaon		Unkown	0.2	Grasses and Bushes
14.	Darrah	Sawan Bhadho		Unkown	50	Grasses and Bushes
Year 2019-20						
1.	Borabas	Rathkankra	13-04-2019	Unkown	8	Grasses and Bushes
2.	Borabas	Borabas	30-04-2019	Unkown	6	Grasses and Bushes
3.	Borabas	Nayagoan	16-04-2019	Unkown	20	Grasses and Bushes
4.	Borabas	Nayagaon	07-12-2019	Unkown	25	Grasses and Bushes
5.	Gagron	Nolav		Unkown	2.5	Grasses and Bushes
6.	Gagron	Nolav		Unkown	2.5	Grasses and Bushes
7.	Darrah	Sawan Bhadho		Unkown	300	Grasses and Bushes
8.	Darrah	Sawan Bhadho		Unkown	2.5	Grasses and Bushes
9.	Jawahar Nagar	Shreepura	06-04-2019	Unkown	35	Grasses and Bushes
10.	Jawahar Nagar	Shreepura	24-04-2019	Unkown	40	Grasses and Bushes
11.	Jawahar Nagar	Shreepura	02-05-2019	Unkown	4	Grasses and Bushes
12.	Jawahar Nagar	Shreepura	31-05-2019	Unkown	10	Grasses and Bushes

Year 2020-21						
1.	Borabas	Borabas	02-05-2020	Unkown	2	Grasses and Bushes
2.	Borabas	Rathkankra	06-05-2020	Unkown	7	Grasses and Bushes
3.	Borabas	Nayagaon	08-10-2020	Unkown	80	Grasses and Bushes
4.	Borabas	Nayagaon	04-11-2020	Unkown	60	Grasses and Bushes
5.	Kolipura	Kolipura	04-04-2020	Unkown	1	Grasses and Bushes
6.	Gagron	Nolav	04-04-2020	Unkown	1	Grasses and Bushes
7.	Darrah	Darrah Station	04-04-2020	Unkown	4	Grasses and Bushes
8.	Darrah	Sawan Bhadho	04-04-2020	Unkown	2	Grasses and Bushes
9.	Jawahar Nagar	Sawan Bhadho	04-04-2020	Unkown	0.25	Grasses and Bushes
10.	Jawahar Nagar	Khera	01-05-2020	Unkown	10	Grasses and Bushes

Sr. No.	**Name of Range**	**Name of Forest Block**	**Date of fire incident**	**Cause of fire**	**Area affected put off (ha)**	**Loss due to fire**
Year 2021-22						
1.	Kolipura	Girdharpura	05-04-2020	Unkown	4	Grasses and Bushes
2.	Kolipura	Kolipura	10-04-2020	Unkown	0.015	Grasses and Bushes
3.	Darrah Station	Mashalpura	27-03-2022	Unkown	0.1	Grasses and Bushes
4.	Darrah	Darrah Gaon	11-04-2021	Unkown	50	Grasses and Bushes
5.	Darrah	Darrah Gaon	17-04-2021	Unkown	25	Grasses and Bushes
6.	Darrah	Darrah	27-03-2022	Unkown	10	Grasses and Bushes
7.	Gagron	Nolav	03-03-2021	Unkown	1	Grasses and Bushes
8.	Gagron	Rajpura	13-01-2021	Unkown	1.5	Grasses and Bushes
9.	Gagron	Nolav	23-04-2021	Unkown	1	Grasses and Bushes
10.	Jawahar Sagar	Shripura	29-04-2021	Unkown	7	Grasses and Bushes
11.	Jawahar Sagar	Shripura	17-04-2021		0	
12.	Jawahar Sagar	Shripura	16-05-2022		7	
Year 2022-23						
1.	Gagron	Nolav	12-05-2022	Unkown	1	Grasses and Bushes
2.	Darrah	Darrah Station	05-05-2022	Unkown	5 Ha,	Grasses and Bushes
3.	Darrah	Darrah gaon	27-03-2022	Unkown	0.1	Grasses and Bushes
4.	Darrah	Darrah gaon	14-05-2022	Unkown	10	Grasses and Bushes
5.	Kolipura	Kanya Talab	04-05-2022	Unkown	100 Mtr. 0.01	Grasses and Bushes
6.	Jawahar Sagar	Shripura	15-05-2022	Unkown	7	Grasses and Bushes
7.	Borabas	Nayagaon	26-02-2023	Unkown	125	Grasses and Bushes
8.	Gagron	Masalpura	03-01-2023	Unkown	2	Grasses and Bushes
9.	Gagron	Masalpura	04-01-2023	Unkown	1.5	Grasses and Bushes
10.	Kolipura	Ghirdharpura	14-03-2023	Unkown	0.04	Grasses and Bushes

Year 2023-24						
1.	Gagron	Mashalpura B	18-04-2023	Unkown	1	Grasses and Bushes
2.	Gagron	Mashalpura	21-04-2023	Unkown	1	Grasses and Bushes
3.	Jawahar Sagar	Shripura	19-04-2023	Unkown	277	Grasses and Bushes
4.	Borabas	Borabas	09-05-2023	Unkown	80	Grasses and Bushes
5.	Borabas	Nayagaon	25-11-2023	Unkown	9	Grasses and Bushes
6.	Darrah	Darrah gaon	24-03-2024	Unkown	0.5	Grasses and Bushes

ANNEXURE-24

OFFICERS INFORMATION

I. Tenure of Chief Conservator of Forests (Wildlife) & Field Director in Mukandra Hills Tiger Reserve, Kota.

S.No.	Name of the Officer	From	To
1	Mr. Anurag Bhardwaj (IFS)	09-08-2011	08-02-2014
2	Mr. Mohanlal Meena (IFS)	09-02-2014	04-03-2014
3	Mr. Pawan Kumar Upadhyay (IFS)	05-03-2014	16-05-2017
4	Mr. Ghanshyam Prasad Sharma (IFS)	17-05-2017	24-02-2019
5	Mr. Anand Mohan (IFS)	25-02-2019	04-08-2020
6.	Mr. Sedu Ram Yadav (IFS)	07-08-2020	06-07-2022
7.	Mr. S. P. Singh (IFS)	07-07-2022	16-06-2023
8.	Mr. Bijo Joy (IFS)	26-06-2023	12-02-2024
9.	Mr. Ram Karan Khairwa (IFS)	12-02-2024	05-02-2025
10.	Mr. Sugna Ram Jat (IFS)	05-02-2025	Continue…

II. Tenure of Deputy Conservator of Forests (Deputy Field Director) in Mukandra National Park, Kota

S.No.	Name of the Officer	From	To
1	Mr. Ramlal Bishnoi (RFS)	11-06-2012	29-10-2012
2	Dr. Sunil chidri (IFS)	30-10-2012	01-10-2014
3	Mr. S.R. Yadav (RFS)	27-10-2014	31-05-2016
4	Mr. S.R. Yadav (IFS)	31-05-2016	05-02-2018
5	Dr. T. Mohan Raj (IFS)	05-02-2018	03-08-2020
6	Mr. Bijo Joy (IFS)	03-08-2020	12-02-2024
7	Mr. Abhimanyu Saharan (IFS)	20-02-2024	23-08-2024
8	Mr. Muthu S (IFS)	23-08-2024	Continue…

A. PROTECTION SYSTEM:

S.No.	PARTICULARS	Details	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	TOTAL
1	DGPS Survey of the Sanctuary Outer boundary & interior line survey	Survey will be done in alternate years	10.00	-	10.00	-	10.00	-	10.00	-	10.00	-	**50.00 lakh**
2	Demarcation of Boundary Pillars & interior line pillars	500 pillars				@12000 per pillar							**60.00 lakh**
			25 pillars	25 pillars	75 pillars	75 pillars	50 pillars	50 pillars	50 pillars	50 pillars	50 pillars	50 pillars	
3	Maintenance of old pillars & interior line pillars also	LS	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**20.00 lakh**
4	FRA (Forest Right Act, 2006) Construction of pillars around Vanadhikar Patra Land	1000 pillars	@12000 per pillar										**120.00 lakh**
			100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	
5	Creation of Physical Barrier Pucca Wall	6 feet height	50 km.			@ 40 laks/km.							**2000.00 lakh**
A.	Along the outer boundary of the Sanctuary		5 km.	5 km.	5 km.	5 km.	5 km.	5 km.	5 km.	5 km.	5 km.	5 km	
B.	Along the village boundary or agriculture field boundary in special cases so as to check encroachment on forest land and to save crops from wild animals like wild boar & blue bull	6 feet height	@ 40.00 lakh/km.										**600.00 lakh**
			1 km.	1 km.	1 km.	1 km.	1 km.	2 km.	2 km.	2 km..	2 km.	2 km.	

6.	Hiring of BHG, Police Home Guards, Fire Watchers, local volunteers to	10 BHG/month	4.00 lakh Every month	**480.00 lakh**
	protect the sanctuary from different sort of crimes	5 HG	3.00 lakh Every month	**360.00 lakh**
		10 FW & Volunteers	1.00 lakh Every month	**120.00 lakh**
7.	Motor Boat to patrol in the river	10 seater	least with life jackets & jetty (fibre)	**30.00 lakh**
8.	Purchase of vehicle			**40.00 lakh**
A.	Bolero for A.C.F.	1 No.	15.00 lakh	
B.	Jeep (Thar) for R.O.	1 No.	15.00 lakh	
C.	Motor Cycles for Naka In-charge	10 No.	10.00 lakh	
D.	Fuel & Maintenance of Vehicles		**30 lakh/year with 10% increase every year**	
9.	Fire Line Creation & maintenance	30 km.	@ 1.5 lakh/year	**30.00 lakh**
			5 km. | 5 km. | 5 km. | 5 km. | 10 km. | 5 km. | 5 km. | 5 km. | 5 km. | 5 km.	
10.	Forest Road Creation & maintenance	290 km.	@ 1.00 lakh/km	**290.00 lakh**
			30 km. | 30 km. | 30 km. | 30 km. | 25 km. | 30 km. | 30 km. | 30 km. | 30 km. | 25 km.	
11	Purchase of tranquilizing gun			**8.00 lakh**

12.	Medicine for gun & maintenance charges		@ 1.00 lakh/year									**12.00 lakh/yr.**
13.	Purchase of search lights, torches, sticks for FGs, Helmets, Shields etc. for protection workers		2.00 lakh	2.00 lakh	2.00 lakh	4.00 lakh	3.00 lakh	2.00 lakh	2.00 lakh	2.00 lakh	4.00 lakh	3.00 lakh	**26.00 lakh**

14.	Legal support for defending court cases		@ 1.00 lakh/yr.	**12.00 lakh/yr.**
15.	Reward to informer/excellent staff		@ 1.00 lakh/yr.	**12.00 lakh/yr.**
16.	Compensation for man-animal conflict		@ 5.00 lakh/yr.	**60.00 lakh/yr.**
	TOTAL			**4330.00 lakh**

B. ANTI-POACHING ACTIVITIES & INFRA STRUCTURE DEVELOPMENT:

S.No.	PARTICULARS	DETAILS		TOTAL
1.	Construction of R.O. Quarter at Bridge Side (including all amenities)	1 No.	25 lakh each	**25.00 lakh**
2.	Construction of A.C.F. Quarter at Saddle Dam (including all amenities)	1 No.	30 lakh each	**30.00 lakh**
3.	Construction of Rest House at Saddle Dam (including all amenities)	1 No.	50 lakh each	**50.00 lakh**
4.	Construction of interpretation centre at Saddle Dam	1 No.	100 lakh each	**100.00 lakh**
5.	Anti-poaching Camp at Bheem Chauraha	1 No.	20 lakh each	**20.00 lakh**
6.	Barrack at Saddle Dam, Bridge Side, Agra, Ganeshpura, Bandarmutha	5 No.	10.00 lakh each	**50.00 lakh**
7.	Forest Guard Chauki at Bandarmutha, Agra, Ganeshpura, Bridge Side	4 No.	15.00 lakh each	**60.00 lakh**
8.	Maintenance of old quarters & buildings	5 lakh/yr. for 10 yrs.	5.00 lakh x 10 year	**50.00 lakh**
9.	Watch Towers at	4 No.	15.00 lakh each	**60.00 lakh**
A	Agra (Neemdi FB)			
B	Bridge Side (on top of Padajhar FB)			
C	Dudhi Talai Gorge			
D	Richa Khoh Gorge			
10.	Water storage tanks (to use water for water holes in pinch period & by controlling fire)	4 No.	@ 10.00 lakh each	**40.00 lakh**
A	FB Padajhar			
B	Neemdi			
C	Bandarmootha			
D	Kolgarh			
11.	Maintenance of old Pucca wall	@ 2 lakh/year	with 10% increase each year	**20.00 lakh**
12.	Development & maintenance of Nature Trails	20 km.	1 lakh/km.	**20.00 lakh**

13.	Wildlife Veterinary Camps	5 camps	@ 0.50 lakh/camp/yr.	**25.00 lakh**

A.	Vet. Camps	@ 0.50 lakh/camp/yr.		**5.00 lakh**
B.	Translocation of chital, sambar etc. & rehabilitation of Wildlife	@ 05.00 lakh/yr.		**50.00 lakh**
C.	Visit of senior veterinary officer to the sanctuary & submission of report, interns stipend etc.	@ 2 lakh/yr.		**20.00 lakh**
14.	Medical Camps for villagers & staff	5 camps in a yr.	@ 0.50 lakh/camp/yr.	**25.00 lakh**
	TOTAL			**650.00 lakh**

C. HABITAT DEVELOPMENT:

S.No.	PARTICULARS	DETAILS	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	TOTAL
1.	Grassland Development	1750 ha. @ 25 lakh/50 ha.	150 ha.	150 ha.	150 ha.	150 ha.	150 ha.	150 ha.	150 ha.	150 ha.	150 ha.	400 ha.	**875.00 lakh**
A.	Bandarmootha FB												
B.	Padajhar FB												
C.	Kolgarh FB												
D.	Neemdi FB												
E.	Kalakhet FB												
2.	Closure development with indigenous tree planting & seed sowing Selected compartments of all blocks of sanctuary	1100 ha. @ 30 lakh/50 ha.	100 ha.	100 ha.	100 ha.	100 ha.	100 ha.	100 ha.	100 ha.	100 ha.	100 ha.	200 ha.	**660.00 lakh**
3.	Maintenance of Grasslands for 10 yrs.	2.5 lakh/yr.											**25.00 lakh**
4.	Maintenance of closures for 10 yrs.	2 lakh/yr.											**20.00 lakh**
5.	Bio-diversity Conservation in gorges	750 ha. @ 15 lakh/50 ha.	100 ha.	50 ha.	50 ha.	50 ha.	50 ha.	50 ha.	50 ha.	50 ha.	50 ha.	250 ha	**225.00 lakh**
A.	Padajhar Khoh												
B.	Sankhal Khoh												
C.	Kalsiya Khoh												
D.	Richa Khoh												
6.	Pasture land development on community land	200 ha. @ 10.00 lakh/50 ha.											**40.00 lakh**
7.	Development of Re-location centre at Bheem Chauraha	@ 100.00 lakh.											**100.00 lakh**
A.	Sprinkler System & creation of ponds to attract avian life	20.00 lakh											**20.00 lakh**

B.	Maintenance of tracks in Relocation Centre	@ 5.00 lakh/yr..	**50.00 lakh**
C.	Maintenance of old nadis & water bodies	20.00 lakh	**20.00 lakh**

D	Maintenance of old watch towers & rising the heights of towers including IGWT	4 towers	**20.00 lakh**
E.	Maintenance of outer boundary wall & rising the height of this wall if needed	20.00 lakh	**20.00 lakh**
8.	Eradication of weeds like *Lantana, Parthenium, Prosopis juliflora*	50.00 lakh/yr.	**500.00 lakh**
	TOTAL		**2,575.00 lakh**

D. ECO-DEVELOPMENT:

S.No.	PARTICULARS	DETAILS	TOTAL
1.	Micro planning of villages inside the sanctuary and nearby places	30 villages @ 0.50 lakh/village	**15.00 lakh**
2.	Human Resource Development	10 yrs.	
A.	Nature Awareness Camps	5 camps/yr. @ 2.50 lakh/yr.	**25.00 lakh**
B.	Formation of New EDCs & reconstitution of old EDCs (All villages inside the sanctuary & nearby villages should have an EDC)	15 EDC/yr. (till all EDCs covered) @10 yrs.	**7.50 lakh**
C.	Hand pumps repair & in special case, digging of new hand pump	20.00	**20.00 lakh**
D.	Establishment of improved Chula, electric crematoria, solar cockers & distribution of LPG connections	1.50	**50.00 lakh**
E.	Women empowerment through SHG & other schemes	1.50	**50.00 lakh**
	TOTAL		**167.50 lakh**

E. ECO-TOURISM & INTERPRETATION CENTRE:

S.No.	PARTICULARS	DETAIL	TOTAL
1.	Development of Camp Sites	15 lakh for each site	**15.00 lakh**
A.	At Re-location centre, Saddle Dam	15 lakh for each site	**15.00 lakh**
B.	At Agra	15 lakh for each site	**15.00 lakh**
C.	At Padajhar, Chuliya Fall, heem Chauraha	15 lakh for each site	**15.00 lakh**
2.	Printing & Awareness Material	05.00 lakh each year	**5.00 lakh**
3.	Purchase of tents & accessories	05.00 lakh each year	**5.00 lakh**
4.	Construction of rest house	05.00 lakh each year	**5.00 lakh**
5.	Purchase of:		

A.	Projector	3	**10.00 lakh**
B.	Camera	2	**5.00 lakh**

C.	Binoculars	20	**4.00 lakh**
D.	Wildlife Study Material	1 Year	**10.00 lakh**
E.	Firefighting Equipments	1.5	**7.50 lakh**
F.	Rescue Equipments	1.5	**7.50 lakh**
G.	Water Tanker and Tractor	1	**10.00 lakh**
H.	Camera Traps	100 Nos. x 10	**10.00 lakh**
I.	Range Finder	25	**2.50 lakh**

J.	GPS	25	**5.00 lakh**
K.	Mobile for M-Stripe	25 x 20	**5.00 lakh**
6.	Development of Padajhar Mahadev	100.00 lakh	**100.00 lakh**
	TOTAL		**251.50akh**

F. CAPACITY BUILDING, RESEARCH, EDUCATION & NATURE AWARENESS:

S.No.	PARTICULARS	DETAILS	TOTAL
1.	Wildlife Week Celebration	1.00 lakh each year	**10.00 lakh**
2.	Wildlife & Bird Census	1.00 lakh each year	**10.00 lakh**
3.	Signage, Folder, Film etc.	2.00 lakh each year	**20.00 lakh**
4.	Celebration of important Conservation Days & Nature Awareness	12 No. each year @ 0.50 lakh each year	**5.00 lakh**
5.	Maintenance of computer & accessories	@ 0.50 lakh each year	**5.00 lakh**

6.	Strengthening of wildlife research, education through college & university students by paying them stipend	2 students each year @ 15,000 per month 10% increase every year	**3.96 lakh**
7.	Staff Training	6.00 Lakh per year	**60.00 lakh**
A.	Intrastate & Interstate training in Pas	05.00 lakh each year	**50.00 lakh**
B.	Staff Training	10 Nos. in a year @ 01.00 lakh for each training	**10.00 lakh**
	TOTAL		**173.96akh**

ANNEXURE-34

G. RE-LOCATION OF VILLAGES:

S.No.	VILLAGE NAME	DETAILS	TOTAL
1.	Dareeba	L.S	**2000.00 lakh**
2.	Prempura	L.S	**2000.00 lakh**
	TOTAL		**4000.00 lakh**

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Annexure-26

मुकन्दरा बाघ संरक्षण फाउण्डेशन

अरण्य भवन, झालानासंस्थानिक क्षेत्र, जयपुर
फोननम्बरः 0141–2700151 ई–मेलः cwlw.raj@gmail.com

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क्रमांकःएफ3(41)न्यू–47/मु.बा.सं.फा./मुवजीप्र/2018/ ५७१५ दिनांकः 24/7/23

बैठक कार्यवाही विवरण

मुकुन्दरा हिल्स बाघ संरक्षण फाउन्डेशन, के शासी निकाय की बैठक माननीय वन एवं पर्यावरण मंत्री, राजस्थान सरकार की अध्यक्षता में दिनांक 13.07.2023 को दोपहर 01:30–02.00 बजे बैठक कक्ष–1, शासन सचिवालय, जयपुर से व्यक्तिशः / विडियो कान्फ्रेन्स के माध्यम से सम्पन्न हुई। जिसमें व्यक्तिशः / विडियो कॉन्फ्रेंसिंग के माध्यम से भाग लेने वाले सदस्य गण एवं अधिकारियो की सूची **परिशिष्ट–1** पर संलग्न हैं। सदस्य सचिव द्वारा अवगत कराया गया कि राज्य में प्रत्येक टाईगर रिजर्व के लिये वन्यजीव (सुरक्षा) अधिनियम, 1972 की धारा 38 X के अंतर्गत पृथक–पृथक बाघ संरक्षण फाउण्डेशन का गठन किया जाकर सहाकारी संस्था रजिस्ट्रीकरण अधिनियम, 1958 के तहत पंजीकृत किये गये है। इन सभी बाघ संरक्षण फाण्उडेशन के स्थान पर अन्य राज्यों की भांति एक ही बाघ संरक्षण फाउण्डेशन **"राजस्थान बाघ संरक्षण फाउण्डेशन"** बनाया जाना प्रस्तावित है। इससे अलग–अलग बैठक नहीं कर एक ही बैठक में सभी टाईगर रिजर्व के लिये समरूप निर्णय लिये जा सकेंगे तथा नये गठित होने वाले टाईगर रिजर्व के लिये भी बार–बार बाघ संरक्षण फाउण्डेशन के गठन की आवश्यकता नहीं रहेगी।

बैठक में निम्नानुसार निर्णय लिये गये :–

1. बैठक में मुकुन्दरा हिल्स बाघ संरक्षण फाउण्डेशन का राज्य सरकार से प्राप्त स्वीकृति के अनुरूप राजस्थान बाघ संरक्षण फाउण्डेशन में विलय करने के निम्नानुसार प्रस्ताव का अनुमोदन किया गयाः–

"प्रस्तावः– मुकन्दरा हिल्स बाघ संरक्षण फाउण्डेशन का राज्स सरकार से प्राप्त स्वीकृति के अनुरूप राजस्थान बाघ संरक्षण फाउण्डेशन में विलय प्रस्तावित है।"

बैठक सधन्यवाद समाप्त हुई।

(अरिन्दम तोमर)
सदस्य सचिव, शासी निकाय,
मुकन्दरा बाघ संरक्षण फाउण्डेशन एवं
प्रधान मुख्य वन संरक्षक एवं
मुख्य वन्य जीव प्रतिपालक,

Signature valid
Digitally signed by Arindam Tomar
Designation: Principal Chief Conservator Of Forest
Date: 2023.07.24 16:11:46 IST
Reason: Approved

RajKaj Ref No : 4356433

Scanned with OKEN Scanner

(17)

क्रमांक: एफ.3(41)न्यू–47/मु.बा.सं.फा./मुवजीप्र/2018/4716-4737 दिनांक: 24/7/23

प्रतिलिपि निम्नांकित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है:–

I. विशिष्ट सहायक, माननीय मंत्री वन एवं पर्यावरण विभाग राजस्थान सरकार, जयपुर।
I. अति. मुख्य सचिव, वन एवं पर्यावरण विभाग, शासन सचिवालय, जयपुर।
II. प्रमुख शासन सचिव, पर्यटन विभाग, शासन सचिवालय, जयपुर।
III. प्रधान मुख्य वन संरक्षक (हॉफ) राजस्थान जयपुर।
IV. प्रधान मुख्य वन संरक्षक एवं मुख्य वन्यजीव प्रतिपालक, राजस्थान जयपुर।
V. वन संरक्षक, वन्यजीव एवं क्षेत्र निदेशक, मुकन्दरा हिल्स बाघ परियोजना, कोटा।
VI. जिला प्रमुख, कोटा/झालावाड़/बून्दी/चित्तौड़गढ़।
VII. जिला कलेक्टर, कोटा/झालावाड़/बून्दी/चित्तौड़गढ।
VIII. जिला पुलिस अधीक्षक, कोटा/झालावाड़/बून्दी/चित्तौडगढ।
IX. उप वन संरक्षक एवं उप क्षेत्रीय निदेशक मुकन्दरा हिल्स बाघ परियोजना, कोटा।
X. उप वन संरक्षक, कोटा।
XI. उप वन संरक्षक, झालावाड़।
XII. उप वन संरक्षक, बून्दी।

सदस्य सचिव, शासी निकाय,
मुकन्दरा बाघ संरक्षण फाउण्डेशन एवं
प्रधान मुख्य वन संरक्षक एवं
मुख्य वन्य जीव प्रतिपालक,
राज0, जयपुर

Signature valid
Digitally signed by Arindam Tomar
Designation: Principal Chief Conservator Of Forest
Date: 2023.07.24 16:11:46 IST
Reason: Approved

Regd. ref no. . 4356433

Government of Rajasthan

MUKANDRA HILLS TIGER RESERVE
TIGER CONSERVATION PLAN
2025-26 to 2035-36

PART – II
BUFFER AREA PLAN

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PART - I

THE EXISTING SITUATION

CHAPTER – 1

INTRODUCTION OF THE AREA

Name, Location, Constitution & Extent

1.1 Name

The name of the area is "Buffer area of Mukandra Hills Tiger Reserve"

1.2 Location

The Core Area of Mukandra Hills Tiger Reserve is surrounded mostly by revenue land and villages with some contiguous forest blocks of territorial Forest Division-Kota, Bundi, Chittorgarh and Jhalawar, Ramgarh-Vishdhari Sanctuary of Bundi and Bhainsrodgarh Sanctuary of Chittorgarh. The forest blocks of territorial divisions of Kota, Bundi and Chittorgarh were included in the buffer area so that the contiguous areas could form important conduits for prey and predators' movement. Low protection level and higher biotic pressure have also caused degradation of these areas and inclusion of these areas in the buffer area of the Tiger Reserve shall accord better level of protection with habitat improvement.

1.3 Constitution

Section 38 V (4) (II) of the amended Wildlife (protection) Act 1972 deals with the "buffer or peripheral area" consisting of area peripheral to critical tiger habitat or core area, where a lesser degree of habitat protection is required to ensure the integrity of core critical tiger habitat with adequate dispersal of tiger. Delineation and notification of the Buffer Zone for Mukandra Hills Tiger Reserve has been completed in 2013. The situation of CTH i.e. Core and Buffer in context of Mukandra Hills Tiger Reserve is peculiar in the sense that the Buffer Zone is neither peripheral to CTH nor surrounds it. The forest areas adjoining the CTH or in vicinity were notified as the Buffer Zone based on following considerations:

Forest areas adjoining the Critical Tiger Habitat of Mukandra Hills Tiger Reserve which are important habitat for Tiger and other wildlife, and which will help in reducing biotic pressure on Critical Tiger Habitat have been included in buffer zone.

1.4 Extent

The total area of the buffer is 445.07 sq. km.

Area Statement of the buffer including revenue land falling in four districts is as follows:

Table-1.1 MHTR Buffer area district wise

Sr. No.	District	Forest area (in Sq. Km.)	Revenue area (in Sq. Km.)	Total area (in Sq. Km.)
1	Kota	306.64	7.40	314.04
2	Jhalawar	68.23	9.90	78.13
3	Chittorgarh	39.85	0	39.85
4.	Bundi	13.05	0	13.05
	Total	**427.77**	**17.30**	**445.07**

Table-1.2 MHTR protected area & forest area wise

Sr. No.	Protected area/ forest area	Forest area (in Sq. Km.)	Revenue area (in Sq. Km.)	Total area (in Sq. Km.)
1	Darrah Sanctuary	213.81	13.82	227.63
2	Jawahar Sagar Sanctuary	193.10	1.49	194.59
3	Mukandra National Pak	199.55	0	199.55
4	National Chambal sanctuary	13.0	0	13.0

Table-1.3: Area Statement of Mukandra Hills Tiger Reserve (Buffer Area)

S.No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukandra National Park	Darrah Sanctuary	Jawahar sagar Sanctuary	National Gharial Sanctuary
1.	Mashalpura-A(Part) Compartment 1-24, 37-49	Reserved	Kota	7282.570	0	0	0	0
	Mashalpura-A(Part) Compartment 25-36	Reserved	Jhalawar	692.23	0	0	0	0
2.	Mashalpura-B(Part) Compartment 1-17	Reserved	Kota	4537.870	0	0	0	0
	Mashalpura-B(Part) Compartment 18-48, 51, 52, 54, 55	Reserved	Jhalawar	6027.80	0	0	0	0
3.	LohDungri(Part)	Reserved	Kota	488.800	0	0	0	0
4.	RadiDand	Protected	Kota	2593.157	0	0	0	0
5.	Foota(Part) Compartment 7, 12-22, 24-31	Reserved	Kota	3107.500	0	0	0	0
6.	Doliya(Part) Compartment 31-35, 37-43, 46-51, 57-60, 69	Reserved	Kota	3617.900	0	0	0	0
7.	Amjhar-B	Protected	Kota	116.128	0	116.128	0	0
8.	Laxmipura (Jhalawar)	Protected	Jhalawar	103.448	0	103.448	0	0
9.	KanyaTalab(Part)	Reserved	Chittorgarh	2398.000	0	0	0	0
10.	Peermagra(Part) Compartment 23, 27, 28	Reserved	Chittorgarh	320.000	0	0	320.0	0
11.	Bhainsrodgarh-B	Protected	Chittorgarh	17.000	0	0	17.00	0
12.	Shreepura-A, B, C	Protected	Chittorgarh	425.000	0	0	425.000	0

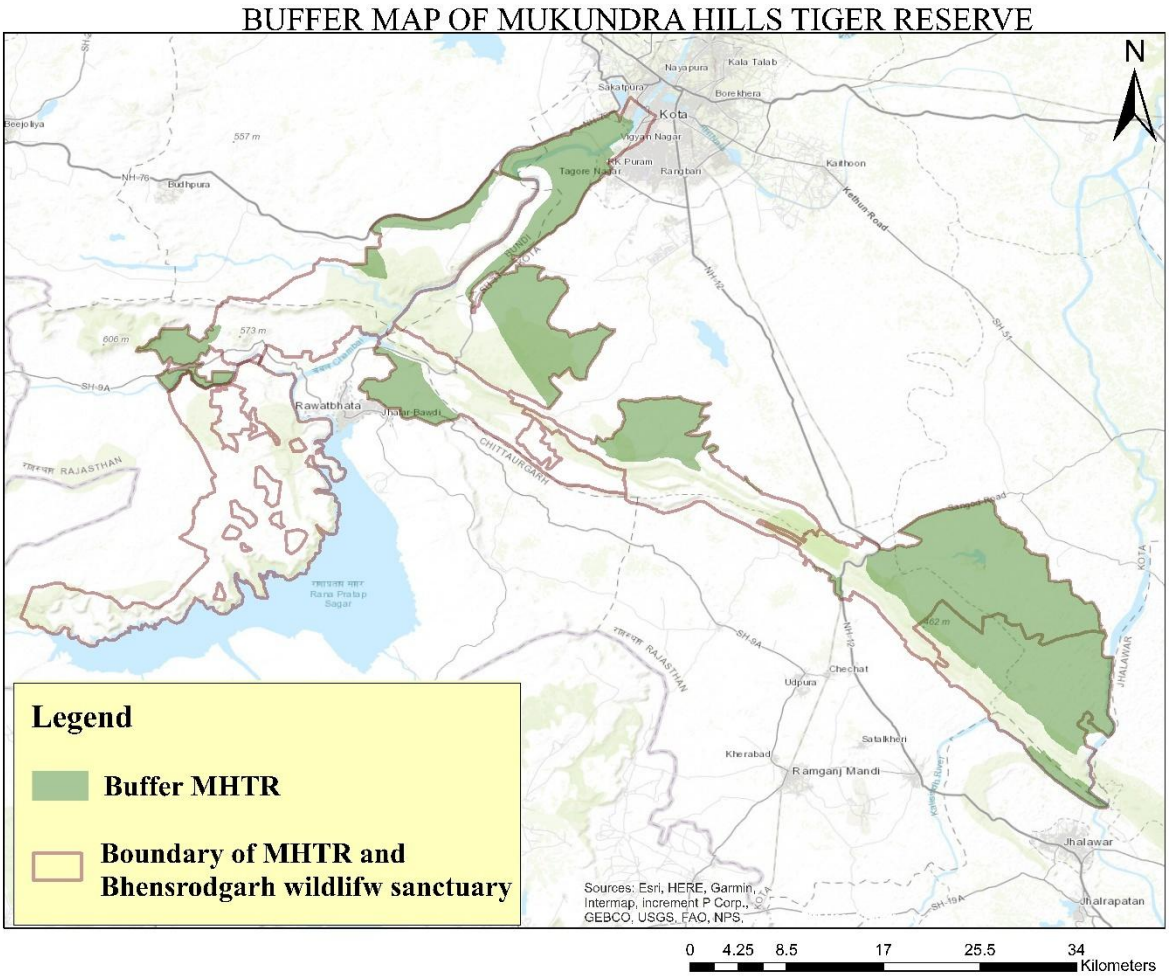
13.	Khalgaon-A, B	Protected	Chittorgarh	124.681	0	0	124.681	0
14.	Bhunjar	Reserved	Chittorgarh	700.000	0	0	700.000	0
15	Bardkalaji Kishorsagar	Protected	Kota	3066.54	0	0	0	0

S.No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukandra National Park	Darrah Sanctuary	Jawahar sagar Sanctuary	National Chambal Gharial Sanctuary
16	Berkheda	Protected	Kota	90.76	0	0	0	0
17	Borabas B	Protected	Kota	137.81	0	0	0	0
18	Akelgarh	Reserved	Kota	2784.138	0	0	0	0
19	Sakatpura Comp-17,20,21	Protected	Kota	410.35	0	0	0	0
20	Ravtha	Protected	Kota	45.35	0	0	0	0
21	National chambal Gharyal	Sancutary	Kota	2385.0	0	0	0	2385.0
22	Karondi(Comp-10 to 20)	Reserved	Bundi	856.80	0	0	0	0
23	Rampuria(Comp-9)	Reserved	Bundi	26.60	0	0	0	0
24	Dhaneswar (Comp-11)	Reserved	Bundi	67.90	0	0	0	0
25	Ambarani A	Unclass	Bundi	354.10	0	0	0	0
			Total (Buffer)	**42777.332**		**219.576**	**1586.681**	**2385.0**

Table-1.4: Area Statement of Mukandra Hills Tiger Reserve (Revenue Village)

S. No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukandra National Park	Darrah Sanctuary	Jawahar Sagar Sanctuary	National Gharial Sanctuary
1.	Chandbawri	Agriculture / Pasture	Kota	19.98	0	0	0	0
2.	Jaspura (Nayagaon)	Agriculture / Pasture	Kota	116.17	0	0	0	0
3.	Haripura (Uninhabited)	Agriculture / Pasture	Kota	86.32	0	0	0	0

4.	Keshopura	Agriculture / Pasture	Kota	26.38	0	0	0	0
5.	Mandergarh	Agriculture / Pasture	Kota	423.53	0	0	0	0
6.	Rail (Uninhabited)	Agriculture / Pasture	Kota	67.35	0	0	0	0
7.	Kailashnagri		Kota	0.00	0	0	0	0
8.	Borkua (Kanpurakamajra)	Agriculture / Pasture	Jhalawar	8.16	0	0	0	0
9.	Haripuradandiya	Agriculture / Pasture	Jhalawar	148.00	0	0	0	0
10.	Golbav		Jhalawar	0.00	0	0	0	0
11.	Gagron	Agriculture / Pasture	Jhalawar	320.00	0	0	0	0
12.	LaxmipuraPrempura	Agriculture / Pasture	Jhalawar	288.30	0	0	0	0
13.	Nolav	Agriculture / Pasture	Jhalawar	113.00	0	0	0	0
14.	KothalaGati	Agriculture / Pasture	Jhalawar	113.00	0	0	0	0
			Total (Revenue - Buffer)	**1730.19**				
	1,Total Core			**59495.068**	**19945.016**	**21162.088**	**17723.99**	
	2. Total Revenue Core			**9576.11**	**98.17**	**1381.83**	**149.28**	
	3. Total Buffer			**42777.332**	**0**	**219.576**	**1586.681**	
	4. Total Revenue Buffer			**1730.19**	**0**	**0**	**0**	
	GRAND TOTAL			**113578.70**	**20043.23**	**22763.49**	**19459.95**	
Other area under administrative control of MHTR								
	Nai ki Talai A B C	Protected	Chittorgarh	351.00				
	Total Area			**351.00**				



Map 1.1: Buffer Zone of Mukundra Hills Tiger Reserve

1.5 Approach & Access

Administrative HQ that is Kota is approachable by bus and rail from Jaipur and Delhi. Kota is 250 km from Jaipur by road and approximately 458 km from Delhi by railway. Kota is on Bombay- Delhi B.G Railway Line.

From Kota tourists can visit Darrah, Jawahar Sagar, Kolipura and Rawatha which are situated approximately 40-50 km away from district headquarter. Gagron is another tourist place situated about 90 kms from Kota and can be reached through national highway 12.

1.6 Statement of Significance

The buffer has its significance in:

- Reducing pressure on core and satisfy the needs of fodder fuel wood etc.
- Providing livelihood needs of villages and employment opportunity to them through eco development and eco-tourism.

1.7 Geology, Rock and Soil

Geologically the area comprises of sandstone, limestone and conglomerate rocks. Soil is Black or grey coloured found in patches lying upon the older formations. On slopes and plateaus the soil is murram and unfertile. The depth of soil varies from 20cm to few 2 meters. Soil is mixed with pebbles and boulders.

1.8 Hydrology and Water Sources

Many seasonal water bodies are spread across the buffer area, but they generally go dry in summer month. This becomes a great challenge for park managers to ensure water supply in summer by way of creating artificial sources.

1.9 Vegetation Types

Revenue and agricultural lands/private holdings are, by and large, devoid of good vegetation except scattered trees of Neem (*Azadirachta indica*), Ber (*Ziziphusmauritiana*), Aonla (*Emblica officinalis*), Deshi Babool (*Acacia nilotica*), Mango (*Mangifera indica*), Churel (*Holoptelia integrifolia*), Ficus spp. etc. Forest areas included in the buffer area, however, have good vegetation that corresponds to Northern tropical dry deciduous forests and Northern tropical thorn forests. *Anogeissus pendula* is the dominant tree species supported by *Boswellia serreta, Lannea coromandelica, Acacia catechu, Butea monosperma, Ziziphus mauritiana etc.*

1.10 Wild fauna and habitats

The revenue lands included in the buffer area hardly have resident wild mammal population except Nilgai *(Boselephous tragocamelus*) and Black napped hare (*Lepus nigricollis*) but are regularly visited by principal herbivores of the CTH i.e. Sambar deer (*Cervus unicolor*), spotted deer (*Axis axis*) Wild pig (*Sus scrofa*) etc. Other regular visitors to these areas are leopard (*Panthera pardus*), Hyena (*Hyena hyena*), Jungle cat (*Felis chaus*), Small Indian Civet (*Viverricula indica*), Common mongoose (*Herpestes edwardsii*), Palm Civet (*Paradoxurus hermaphroditus*), Porcupine (*Hystrix indica*), Jackal (*Canis aureus*) etc. The forest areas included in the buffer, however, support a good resident wild mammal population such as Leopard, Nilgai, Sambar deer, Wild pig, Hyena, Common Mongoose, Porcupine, Jackal, Hare etc. The movement of Tigers to buffer area is not present. The buffer area does not have good supportive habitat for wildlife except a few good patches of forests. Protection, during their migration from one area to the other, requires great attention. Most of the areas are degraded and do not provide proper shelter for wildlife. Cattle occupy most of the available natural shelter.

1.11 Major conspicuous changes in the habitat since inception

There has been regular deterioration of habitat of buffer area due to increasing population, resulting in enhanced demand of fuel wood, fodder, small timber and also land for agriculture. Animal husbandry is the main profession in this area and thus most of the forest areas/ grazing lands are overgrazed hardly leaving anything for visiting wildlife. Development of buffer area requires development of good pastures & fuel wood plantations on community/waste lands.

CHAPTER – 2

STATUS OF TIGER AND CO-PREDATORS

2.1 Introduction

The survival of the prey and the predator species, mainly Tiger and Leopard, in the Critical Tiger Habitat, will depend upon the following factors:

a. Reduction of poaching pressure from the Periphery

b. Eco development initiatives to reduce the biomass extraction pressure in the Zone of Influence

c. Involvements of the local people as primary stakeholders in the Tiger Reserve vis a vis economic benefit.

d. Conservation Education Initiatives

2.2 Distribution

Post reintroduction of the tigers, the buffer area has not been regular part of the tiger territory. However, the occurrence of leopards, characteristic of occupying even disturbed habitats is reported but population density is relatively low. The other carnivores like Hyena, Jackal. Jungle cat are present in good number. The prey base is mostly blue bull, sambar and wild pig. Due to high degree of disturbance, these areas have very low density of Prey base.

2.3 Abundance Status

No tiger movement has been reported in the buffer area owing to the high degree of disturbance. However, evidence of occurrence of leopards have been reported on the basis of kills of wild prey as well as sheep and goats. Occasional sightings of leopards have also been reported in the buffer area.

As far as prey base is concerned, blue bulls are available in abundance. Sambar and wild pig are also found in buffer area.

2.4 Prey Predator Relationship

The complexity of relations between predator, co-predator and prey is viewed as an important aspect of Wildlife Biology today. The challenge before the wildlife manager is to keep these relations undisturbed. The impact of the predator on their prey has always been a controversial

aspect of predator ecology. Information's such as how many predators and prey are there in an area, how often the predator kills, how they select prey species, sex age and condition of the prey and the contribution of mortality of prey other than predation are essentially different aspects of study of the population dynamics of the prey.

Studies show that Leopard (*Panthera pardus*) is the major mammalian predators in buffer of MHTR. Their main prey species comprise of Sambar, blue bull, Wild pig etc. The predators also prey on porcupine, black-napped hare and domestic livestock.

2.5 Assessment of threats

- Presence of hunting tribes like Kal Beliya, Mogiya, Nat, Kanjar etc in and around the buffer areas.
- Tremendous Grazing Pressure in and around villages on buffer.
- High biomass extraction from the buffer forest areas of the MHTR in form of firewood, lopped fodder, grazing etc. leading to habitat degradation.

CHAPTER 3

HISTORY OF PAST MANAGEMENT AND PRESENT PRACTICES

3.1 Conservation & Forest Management History

The buffer area included in Mukandra Hills Tiger Reserve falls in three districts of Kota, Jhalawar and Chittorgarh. These areas have been managed as per the working plan in force according to the time.

The working plan prescriptions for the areas falling in three districts have been as follows:

Kota:

The management of the buffer area falling in Kota district has been as follows:

1. Before 1948 these forests were exploited for Kattha, Coal and local needs. Only some tresses were reserved and named as *Mamnua*. As a result, these forests were ruthlessly exploited by contractors and local people. There were 65 grass beeds from which grass was distributed to local people. 7 grass beeds were under Bagar department for use of state. Kota state also made a department named Bandhat for constructing check dams to prevent soil erosion. However, success could not be achieved in this.
2. From 1948 to 1962: after merger of Kota state into Rajasthan two notifications were issued which generously gave the concessions to local people. This resulted in uncontrolled exploitation of forests. Forest areas were allotted for Adhik Anna Upjaao Yojana for agriculture. Rules for concessions in forests were revised in 1955 under which farmers and tribals were given paermission to harvest Mamnua trees too. This led to severe destruction of forests. Forest officials harvested the Khair trees for kattha from anywhere and there was no working plan. As a result, well stocked forests which were easily approachable were harvested by coppice with standard technique. The harvested coupes were not protected against grazing and fire. This created large vacant areas between forests. Only after 1956 there was a reduction in number and area of coupes to be harvested yearly.
3. The situation of Jaagir Forests was even worse. They were exploited ruthlessly from 1948 to 1950. The harvested areas were not protected from any kind of pressure like grazing and fire. In 1956 control of Jaagir Forests was vested in forest department after which proper management of these forests was started.

4. From 1962 to 1971: For the first time in the history of forests forest blocks and compartments were marked on GT sheet. Forests were managed scientifically, and seven working circles were formed. These working circles were:

   - Coppice with standard
   - Concessionist
   - Rehabilitation
   - Grass and Grazing
   - Minor Forest Produce
   - Social Forestry

   Wildlife Working Circle- this working circle had 27441 ha forest area. A complete ban on hunting of wild animals was enforced. Emphasis was laid on extension among school and colleges through movies, slides, painting competitions etc. provisions of picnic spot, viewpoints, water holes etc. were kept.

5. From 1980 to 1989: during this period forests were managed according to the working plan prescriptions of Shri P S Bhatnagar. He prescribed following working circles –

   - Kaldhi Management Circle
   - Concessionist Working Circle
   - Rehabilitation Working Circle
   - Fodder Working Circle
   - Watershed Working Circle
   - Minor Forest Produce Overlapping Working Circle
   - Social Forestry Woking Circle
   - Protection of Plateau and Badlands Improvement Working Circle
   - Wildlife Working Circle

   Wildlife Working Circle: this circle was formed to maintain the existence of wild animals in the forest. It had 27441 Ha. Restocking of forest was proposed with exotic species. Ban on entry into forest during particular season was prescribed. Emphasis was laid on extension and education. Mining was prohibited in these areas.

5. From 1998-99 to 2007-08: Shri Z A Khan wrote this working plan, and he prescribed following circles

   - Rehabilitation Working Circle
   - Grass and Fodder Working Circle
   - Watershed Improvement Working circle
   - Minor Forest Produce Overlapping Working Circle
   - Plantation Working Circle
   - Miscellaneous Working Circle

   This working plan prescribed a complete ban on hunting. It was also prescribed that small anicuts and check dams be created in nullahs to ensure water availability to animals during pinch period. However, the prescriptions of this working plan could not be implemented fully.

6. The current Tiger Conservation Plan in force is from 2015-16 to 2019-20. The areas of buffer have been kept in following working circles:

Table-3.1: Working Circles

Sl. No.	Working Circle	Block	Compartment
1.	Soil Conservation and Rehabilitation Working Circle	Futa	12-22, 24-31
		Mashalpura A	23,37-41,46,47-49
		Raadi Dand	12-17
		Loh Doongri	1,2,5,6,8,9,10
2.	Grass and Grass Beed Working Circle	Raadi Dand	1-11
		Futa	7
		Mashalpura A	43
3.	Plantation Working Circle	Dolya	31-35, 37-43, 46-51, 57, 59
		Mashalpura B	1-17
4.	Wildlife Management Overlapping Working Circle	Mashalpura A	1-24, 37-49
		Mashalpura B	1-17
		Loh Doongri	1
		Futa	7, 12-22, 24-31
		Dolya	31-35, 37-43, 46-51, 57-60, 69
5.	Forest Protection Overlapping Working Circle	Mashalpura A	1-24, 37-49
		Mashalpura B	1-17
		Loh Doongri	Partial – 3,5,6,8,10 Full- 1,2,9
		Futa	7, 12-22, 24-31
		Dolya	31-35, 37-43, 46-51, 57-60, 69
		Raadi Dand	

6	Minor Forest Produce Management Overlapping Working Circle	Mashalpura A	1-24, 37-49
		Mashalpura B	1-17
		Loh Doongri	Partial – 3,5,6,8,10 Full- 1,2,9
		Futa	7, 12-22, 24-31
		Dolya	31-35, 37-43, 46-51, 57-60, 69
		Raadi Dand	

Apart from the above the ecotourism sites have also been included in the working plan under ecotourism management overlapping working circle.

Jhalawar:

1. Prior to 1948: There was no scientific management of the forests, and they were exploited for wood kattha. Raipur, Balgarh and Kokanda Dhanwas forests were reserved for hunting.
2. 1948 to 1961: Some attention was given to the management of the forests when Sironj forest area was transferred to Madhya Pradesh. Coupe cutting continued as per the wish of DFO, hence the rules of silviculture were overlooked and coppice with standard practice of harvesting was followed. No protection was given from grazing and fire to the felled coupes resulting in their degradation. Land was also transferred for agriculture in Adhik Anna Upjao Yojana. From 1955 to 1959 plantations were carried out in 806 acres of area but were not maintained properly.
3. 1961 to 1971: Shri Harish Chandra wrote the working plan and marked blocks and compartments on the ground. The working circles proposed were:
    - Coppice with Standard Working Circle
    - Concessionist Working Circle
    - Miscellaneous Working Circle4
    - Plantation Working Circle
    - Rehabilitation Working Circle
    - Khair Overlapping Working Circle

    Wildlife Management: 15 shooting blocks were created. Every year a maximum of 14 tigers, 6 leopards, 4 bears, 12 sambar and 35 cheetals could be hunted. There was no basis for these numbers.
4. From 1976-77 to 1985-86: This working plan was written by Shri B M Agrawal. He prescribed following working circles:

- Concessionist Working Circle
- Fodder Bank Working Circle
- Miscellaneous Overlapping Working Circle
- Soil Conservation Overlapping Working Circle
- Khair Improvement Overlapping Working Circle
- Tendu Leaves Overlapping Working Circle
- Experimental Overlapping Working Circle

It was prescribed in the working plan for preservation of wild animals. It was also prescribed to attract birds on the water bodies, salt licks near water holes etc. it was also prescribed to encourage photography of wild animals and protection of forests to increase the number of wild animals.

Table-3.2 Forest Management status in past working plans

Compartment no	Plan
Forest block Mashalpura A	
25-36	Concessionist
54-55	Wildlife management
Mashalpura B	
18-19	Kaldhi van prabhandan
20-21	Wildlife Management
22-28, 39-43	Soil rehabilitation

5. 1988-89 to 1997-98: This working plan was written by Mrs Savita Anand. This was the first working plan that was written in Hindi. Following working circles were prescribed in this working plan:
   - Forest Protection Working Circle
   - Plantation and Rehabilitation Working Circle
   - Grass and Fodder Working Circle
   - Chambal River Valley Soil Conservation Working Circle
   - Non-Timber Produce Overlapping Working Circle

For wildlife management following objectives were kept:

a. Works beneficial to the wildlife were to be promoted to provide conservation and biological balance.

b. To foster conditions for conservation of wildlife and improvement in their natural habitat.

c. To enhance the ecological value of the forests

Sloping Water troughs in all the shooting blocks were prescribed. Plantations were also prescribed around the water holes. Tree felling on the banks of nullahs was banned.

Table-3.3 Forest Management status in past working plans

Forest block Laxmipura	
Compartment no	Plan
1-2	Plantation & Rehabilitation Circle
Forest block Mashalpura A	
26-27, 29-36, 54-55	Plantation & rehabilitation
Mashalpura B	
18	Grass and Grazing
40-43	Plantation & rehabilitation

7. 2013-14 to 2022-23: This working plan was written by Shri K C Meena. Following working circles were prescribed in this working plan, also mentioned is the detail of buffer area transferred to the tiger reserve.

Table-3.4 Detail of buffer area transferred to the tiger reserve

Sr. No	**Working Circle**	**Block**	**Compartment**
1.	Soil Conservation & Rehabilitation (Miscellaneous Forest Amelioration Series)	Mashalpura A Mashalpura B	25-36 30-40
2.	Grass & Grazing	Mashalpura B	18-29
3.	Plantation	-	-
4.	Forest Protection Overlapping	Mashalpura A Mashalpura B Laxmipura	25-36 18- 48,51,52,54,55
5.	Wildlife Management	-	-

6.	Non-Timber Forest Overlapping	Mashalpura A Mashalpura B Laxmipura	25-36 18- 48,51,52,54,55

In this working plan the block of Mashalpura has been mentioned in wildlife management circle as a sensitive area for wildlife.

Chittorgarh:

1. Before 1948: Udaipur estate appointed Sardar Bishan Singh as forest officer in 1880. He was given magisterial powers against forest offences. Forests were conserved primarily for hunting purpose. Felling and grazing were banned in these areas. However local people had the freedom of grazing and felling from other areas for their daily needs. Shri Ayodhya Prasad was appointed as forest conservator in 1920. After him Shri laxman Das from 1926 to 1930 and Shri Basantilal Bhurdia from 1934 to 1937. All these forest officers worked towards organizing forest management though they could not start coupe system because the Head of Udaipur State was against felling of green trees.

   From 1941 to 1944 Rao Sahib E V Padmanabham Pillai was appointed forest conservator who tried to bring discipline in to forest staff. He played a major role in formulation of Mewar Forest Act 1942. This act divided the forests into Khalsa and Jaagir Bhomaat. Mewar Forest Act further divided khalsa forests in to reserved, protected and village forests. Shikaargaahs were protected from felling and grazing. Experimental work plans were made for harvesting with 30-year rotation on simple coppice method.

   In February 1944 Sardar bahadur Singh became forest conservator and chittorgarh forest division was formed on 6th June 1944. After this work plans were prepared for the division by different officers in which coppice with standard system was followed.

   From 1948 to 1961: After the merger of princely states into Rajasthan in 1948 a notification was issued giving people liberal concessions to local people which resulted in reckless and unscientific harvesting of the forests. After constitution of state of Rajasthan tree removal ordinance was declared in 1949. In 1952 Jaageers were merged into the state and in 1953 Rajasthan Forest Act was made. Forests were demarcated and settled during this time.In 1955 Forest Concession rules were amended and made more liberal. Tribals and farmers were given concession for harvesting of trees on royalty for house making and agriculture. These areas were harvested under coppice with standard system and felling cycle was kept from 30 to 40

years. Some trees were declared Mamnua for fuelwood and kattha the harvesting of trees was on the wish of the forest officer which resulted in large scale exploitation of the forests. After 1956 the area of felling coupes was reduced, and they were also fenced. Rotation of Khair trees was enhanced to 30 years and steps were taken for the first working plan of the area.

2. 1961-1972: this working plan was written by Shri K K Kotia. This working plan was prepared for 4,54,944 acres of area in which following working circles were prescribed:
    - Dhokada Management Working Circle
    - Concessionist Working Circle
    - Teak management Circle
    - Bamboo Overlapping Working Circle
    - Khair Overlapping Working Circle
    - Protection Working Circle
    - Miscellaneous Overlapping Working Circle
    - Minor Forest Produce Overlapping Working Circle
3. 1971-72 to 1975-76: no working plan existed prescriptions of earlier working plan were followed.
4. 1976-77 to 1985-86: the working plan for this period was written by Shri S Bhuliyan. It had following ten working circles
    - Dhokada Management Working Circle
    - Teak Management Working Circle
    - Miscellaneous Working Circle
    - Concessionist Working Circle
    - Teak Local Demand Working Circle
    - Khair Overlapping Working Circle
    - Bamboo Overlapping Working Circle
    - Salar Gurjan Overlapping Working Circle
    - Soil Conservation and Rehabilitation Working Circle
    - Minor Forest Produce Overlapping Working Circle

5. 1985-86 to 1987-88: No working plan was in force.
6. 1988-89 to 1997-98: Thus, working plan was written by Shri S K Srivastava. In this working plan the area of Kaniya Talaab compartment no. 7-9 included in buffer was put in Local Demand Management Working Circle. Compartment no. 8 of Kaniya Talaab was put in felling series of 1997-98. Compartment no. 2, 5, 6, 10-18 were put in Plantation Working circle.
7. 1998-99 to 2007-08: No working plan was in force.
8. Working Plan 2008-09 to 2017-18: This working plan was written by Shri K C Meena. In this working plan the forest block of Kaniya Talab now included in the buffer area of the tiger reserve was prescribed as under:
    - Forest Protection Working Circle – Compartment No. 9
    - Soil Conservation & Rehabilitation Working Circle – Compartment No. 10-18
    - Plantation Working Circle; Compartment No. 1-8

3.2 Protection of Tiger, its Prey and Habitat

Habitat can only be improved by way of intensive eco development and also reducing people pressure on forest by way of providing alternative livelihood options and also involving them actively in forest management and sharing benefits of tourism, developmental programmes with locals.

3.3 Other Land use

Most of the inhabitants of these villages are involved in agriculture and animal husbandry activities for livelihood. Developmental programmes and tourism must involve locals and aim at reducing pressure on the buffer in the long term.

3.4 Research, Monitoring and Wildlife Health

Since the entire buffer area was never under single management control hence lot of research needs to be carried out and a great amount of baseline data needs to be collected and analyzed which can help the MHTR management to understand and plan for the integrated development of the buffer. External researchers must be encouraged for undertaking buffer area research.

3.5 Nature Education and Interpretation

Excessive publicity regarding wildlife conservation must be pursued so that people understand the importance of nature and support the working of the department. An Interpretation centre will be set up in Kota to sensitize people in wildlife conservation and its importance.

3.6 Administration and Organization

There will be no separate administration and organization for the buffer owing to the fact that buffer is neither a contiguous forest nor a separate entity and also all the proposed ranges have core and buffer jurisdiction. A separate division for buffer is neither feasible nor practical. However, for administrative convenience and effective protection post of ACF Darrah will have it headquarter at Jhalawar and ranges under him under his control will be Darrah, Gagron and Danta. A new range will have to be created in Danta.

CHAPTER 4

PRODUCTION SECTORS IN THE LANDSCAPE

4.1 Forestry

Forestry activities in buffer zone are mainly restricted to the plantation works done by the department. The operations such as planting, maintenance, thinning, etc. are carried out by the Forest Department as well as by other agencies in the Buffer areas of Mukandra Hills Tiger reserve which create livelihood to the locals as labour. The forests are not worked for timber in this division. The villagers who live adjacent to reserved/ protected forests of this division need small timber for their requirements, in small quantities, and they collect it either from the forest or from private and revenue lands.

4.2 Agriculture

Agriculture is the main occupation of the people living in the buffer and nearby area. It also provides livelihood to the people as labour also. Irrigation facilities are not properly developed. Rabi crops are grown on a small scale along natural water courses. Traditional irrigation system called 'Haran' is practiced by plugging these water courses and by constructing a water channel on contour. Water pumps are also being used for irrigation. Diverse crops like wheat, mustard, garlic, onion, etc. are cultivated. A threat of extending agriculture land to the forest and revenue area exists in the buffer zone.

4.3 Integrated Development (Eco Development, Development through District Administration)

With active co-operation of district administration and through EDC various activities are taken for development of buffer villages in consultation with the MHTR management. Various forestry and development work of the department are implemented through EDC of the buffer area villages. It provides livelihood to the local people. Different schemes of the district administration like MNREGA, Rajiv Gandhi Jal Swabhilamban Yojana, etc are implemented through department infrastructure with the help of local people in the buffer areas.

4.4 Tourism

Currently apart from local tourism in spots, there is not much tourism boom in the area. Since Kota is the educational hub of the country, people coming from different areas are visiting local spots. During monsoon locals visits the areas for enjoying the natural beauty of the area. Once tourism is developed it may support this sector to a great extent.

4.5 Fisheries

Earlier fishing contract was given in the Sawan Bhado dam in the vicinity of buffer which is currently stopped. Another spot near the buffer where fishing contract is given is the Kalisindh river located in the south of the reserve. Apart from small scale fisheries in village ponds by locals, there is no big role of this sector.

4.6 Road / Rail transport

Two main roads are passing through the reserve- one is towards Rawatbhata which touches buffer zone, and the other is towards Jhalawar which passes through the core. No railway line passes through the buffer.

4.7 Industry

Kota is fortunately a hub of industrial establishment hence a large number of local people from buffer villages depend on this sector for employment generation. There is no big industrial set up in the buffer area, but adjacent to the buffer some big industrial set up is located.

4.8 Mining

Kota is also a hub of mining industry. It is famous for Kota stone, limestone and sandstone mines. Lots of legal mines are situated in the area but none in the buffer area. But this sector provides livelihood to the local people. A large number of people from buffer area villages depend on these mines for their livelihood.

4.9 Irrigation projects

Sawan-Badho dam is located in the near area of buffer zone which gives water to many villages. Water pipelines are passing through the buffer area which provides water to the villages in the buffer.

4.10 Animal Husbandry

Animal husbandry is a major production sector in this area. Almost all of the villages depend on animal husbandry for livelihood and local use. The intensity of dependence on this sector varies with villages and caste. Mostly the man –cattle ratio is high in this area. This sector has a major support in the local economy. But this sector has negative impact on the forests and wildlife.

CHAPTER 5

LAND USE PATTERNS AND CONSERVATION-MANAGEMENT ISSUES

5.1 Land use Classification

Agriculture is the main type of land use in the buffer. The area is rain fed with meagre irrigation facilities. Villagers practice primitive agricultural methods. Erratic rains and droughts put more pressure on their economy. They have small landholdings and that too on undulating terrains which are mostly unfit for agricultural practices. The main kharif crops are maize, urad, moong, tuar etc. and where irrigation is possible wheat, gram, mustard etc. are grown as Rabi crops.

The zone of influence extends over the entire periphery of the forests. There are revenue areas within the boundary of MHTR occupied by villages. They largely influence the reserve through their agriculture and associated varied land use practices.

5.2 Socio-economic Profile of Villages

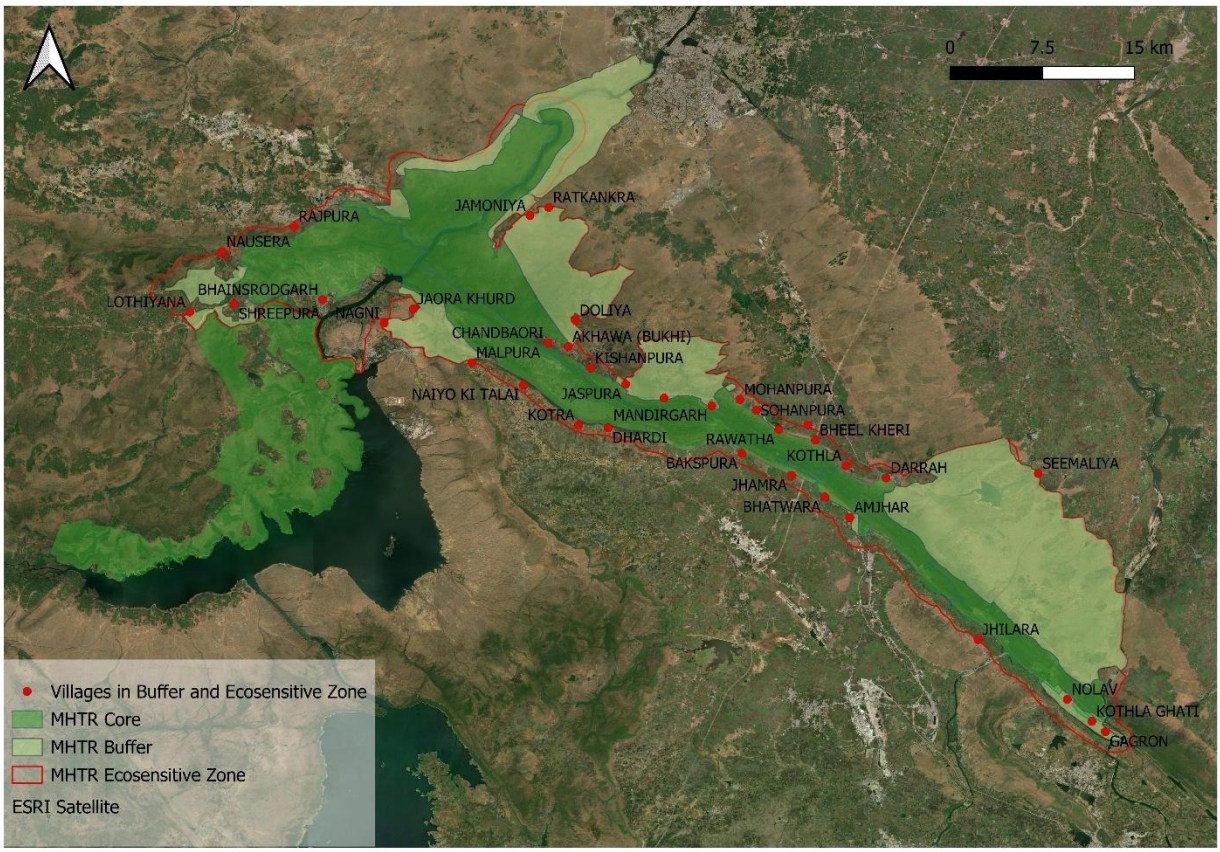
Generally, most of the villages are socially and economically very backward with low literacy rate and poorly connected. Villages lack basic infrastructure like hospital, school etc. Bhil, Bavariyas, Meena etc. are important tribals living in the reserve. Phytolatry and zoolatry are common among them. Even celestial bodies are also worshiped. Their religious places are called “Deora” generally situated either at outskirts of the village or near some hill clad with forest. They also worship the “Magra Baoji” i.e. the God of hills.

Table 5.1: Buffer Villages

List of Villages in Buffer of MHTR				
S.No.	**Village**	**Panchayat**	**Tehsil**	**District**
1	Chandbawdi	Doliya	Ladpura	Kota
2	Jaspura Nayagaon	Doliya	Ladpura	Kota
3	Haripura	Doliya	Ladpura	Kota
4	Keshopura	Doliya	Ladpura	Kota
5	Mandergarh	Bhanwriya	Ladpura	Kota
6	Rel	Bhanwriya	Ladpura	Kota
7	Kailash Nagri	Danta	Sangod	Kota
8	Borkuan	Gagron	Jhalarapatan	Jhalawar
9	Haripura	Gagron	Jhalarapatan	Jhalawar
10	Golbav	Gagron	Jhalarapatan	Jhalawar

11	Gagron	Gagron	Jhalarapatan	Jhalawar
12	Lakshmipura Prempura	Gagron	Jhalarapatan	Jhalawar
13	Nolav	Gagron	Jhalarapatan	Jhalawar
14	Kothla Ghati	Gagron	Jhalarapatan	Jhalawar

All these villages are tribal dominated. Bhils are the main tribe here. Most of the villages are purely inhabited by a single tribe but some are of mixed type. Each village has several hamlets called 'Phalas'.



Map 5.1: Buffer Zone Villages

5.2.1 Land

Land distributing is variable from village to village as per the population, crop pattern, occupation and caste wise. The Bhil has lowest landowners, as the caste is totally dependent on forest resources. On the other hang Gujjars has highest pastureland for grazing the animals. Jaat has more agricultural land as the community is dependent on farming resources. The farmers have occupied total 1190 Bigha land in the entire buffer zone of MHTR. The revenue land is 678.5

Bigha with average 57.54 Bigha per village. The total forest land occupied by farmer is 511.5 Bigha with average 42.46 Bigha per village. The village such as Haripura-dandiya, Kailash-nagri and Golbav totally dependent on agriculture forest land.

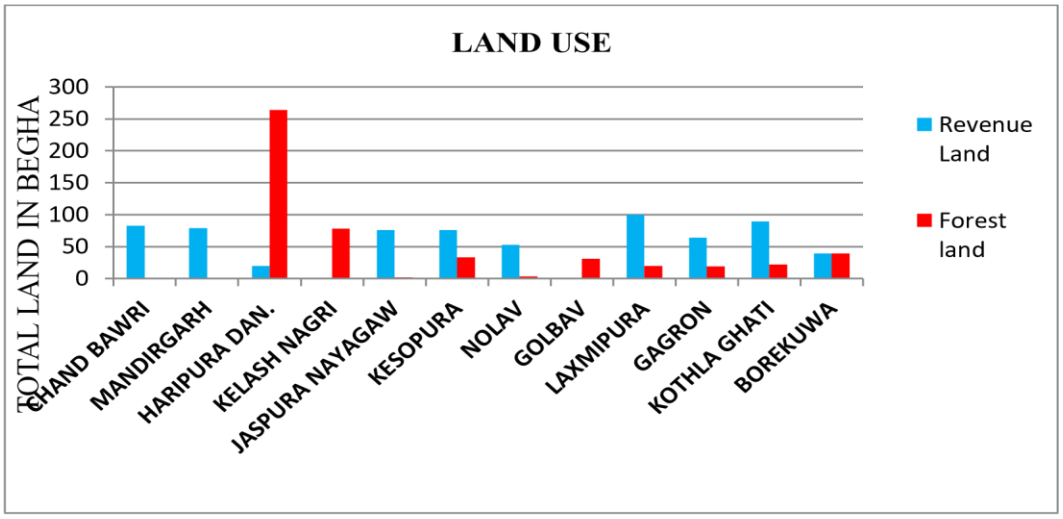


Figure-5.1 Average village wise land in Bigha

5.2.2 Fuel use

Main sources of fuel are forest wood for about 91.5% of the household and only 8.5% are using LPG. There are not any alternate fuel sources for the villagers. Wood consumption rate is high in Mandirgarh followed by Borekuwa and Gagron. Only 5 villages have LPG, which are not more than 5 connections in each village. The LPG refuelling centres are far from most of the villages. The average distance of the refuelling centres is 5-40 km.

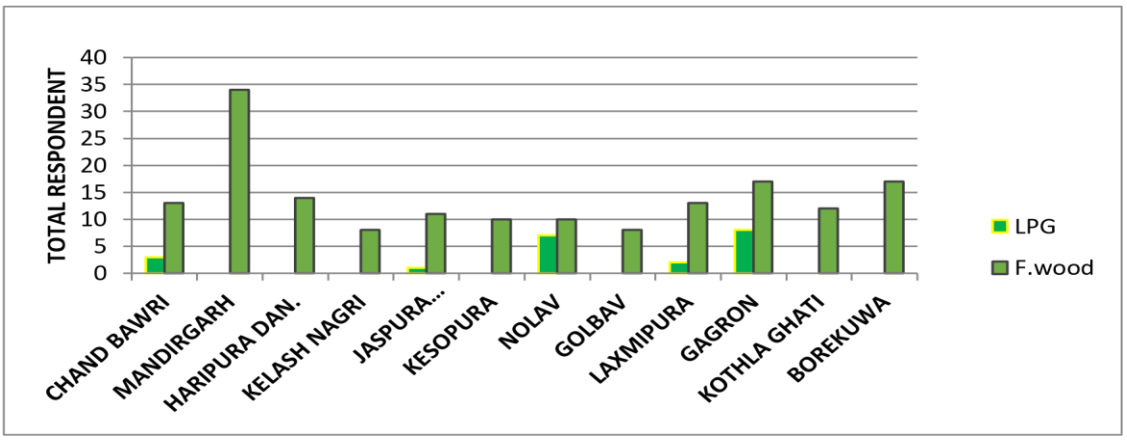


Figure-5.2: Fuel consumption, village wise

Table-5.2 Village wise LPG refuelling centres

Nearest LPG refuelling centres			
VILLAGES	NEAREST CENTRE	KM	DISTRICT
Chand- Bawri	Kota	40	Kota
Mandirgarh	Mandana	15	Kota
Haripura-Dandeya	Jhalawar	17	Jhalawar
Kelash -Nagri	Kanwas	17	Kota
Jaspura-Nayagaw	Kota	30	Kota
Kesopura	Mandana	13	Kota
Nolav	Jhalawar	10	Jhalawar
Golbav	Kanwas	12	Kota
Laxmipura	Jhalawar	12	Jhalawar
Gagron	Jhalawar	5	Jhalawar
Kothla-Ghati	Jhalawar	7	Jhalawar
Borekuwa	Kanwas	25	Kota

5.2.3 Livestock

The average Goat rearing farmers in the buffer zone are 58.58 %, Sheep 0.91%, Buffalo 34.08%, cow 69.25%, Dog 8.5%, Poultry 21.5%, Horse 0.25% and Ox 2.75%. The sum could exceed 100% as farmers also rear several kinds of animals at a time.

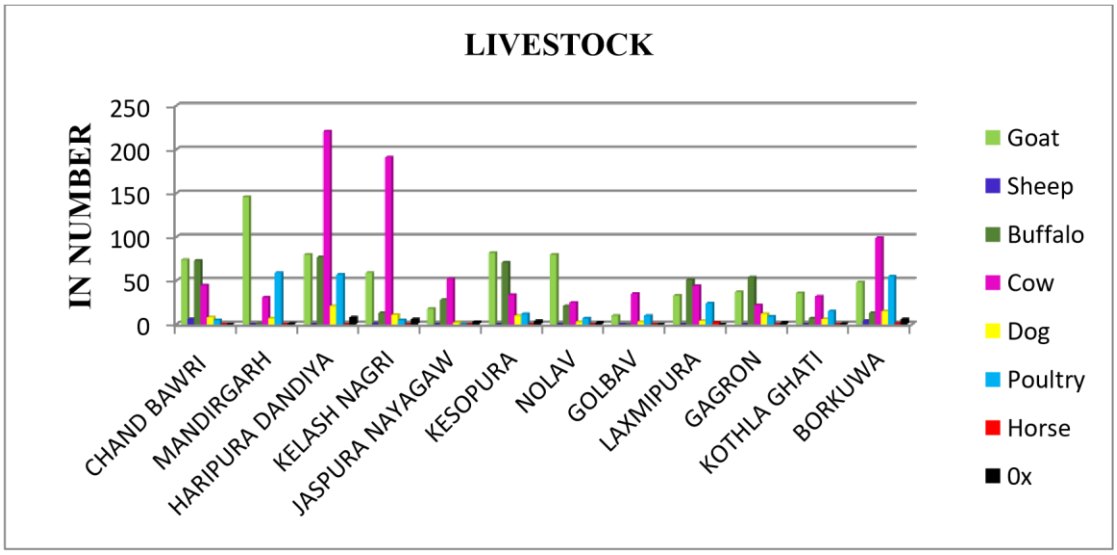


Figure-5.3: village wise livestock detail

5.2.4 Income:

In order to assess the strength and sustainability of livelihood, growth in village income are dependent on land, the primary sources of income for the rural masses. What appears to be lacking is the diversification of the workforce. The villages need for more opportunities in the non-farm sector to provide sustainable livelihood to its people. There is a large potential for such diversification. Strengthening the livelihood and sustained growth in other sector of job-oriented works may impact to change the living standard of people. Women's are contributing the income of households be it through working in MG-NERGA, and other development activates including the plantation scheme of forest department in the protected area. In the near future micro finances are a major intervention to empower women need to be implementing in a constructive way.

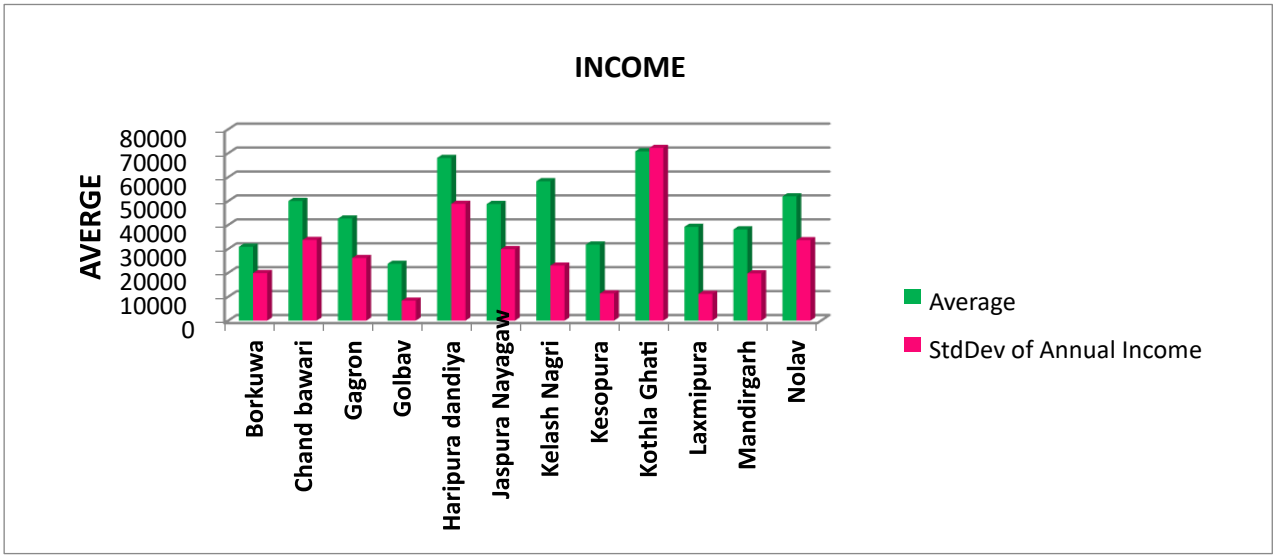


Figure-5.4: village wise average annual income (per household)

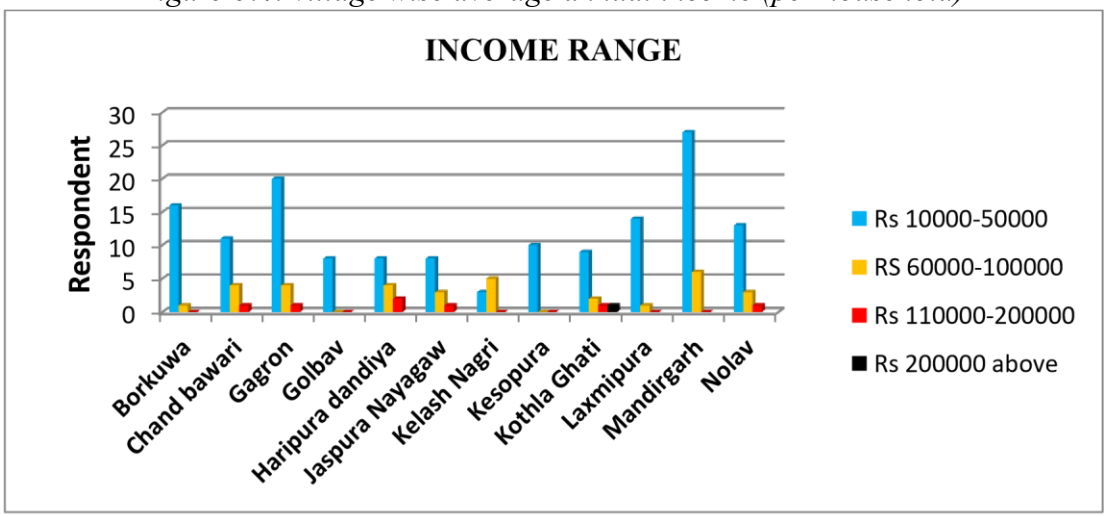


Figure-5.5: Annual income range

Income sources:

Income sources are mostly agricultural and forest even though people are dependent on day labour. The average earning sources are follows. Labour 51.09%, agriculture 24.92%, livestock 19.90%, forest 4.07%.

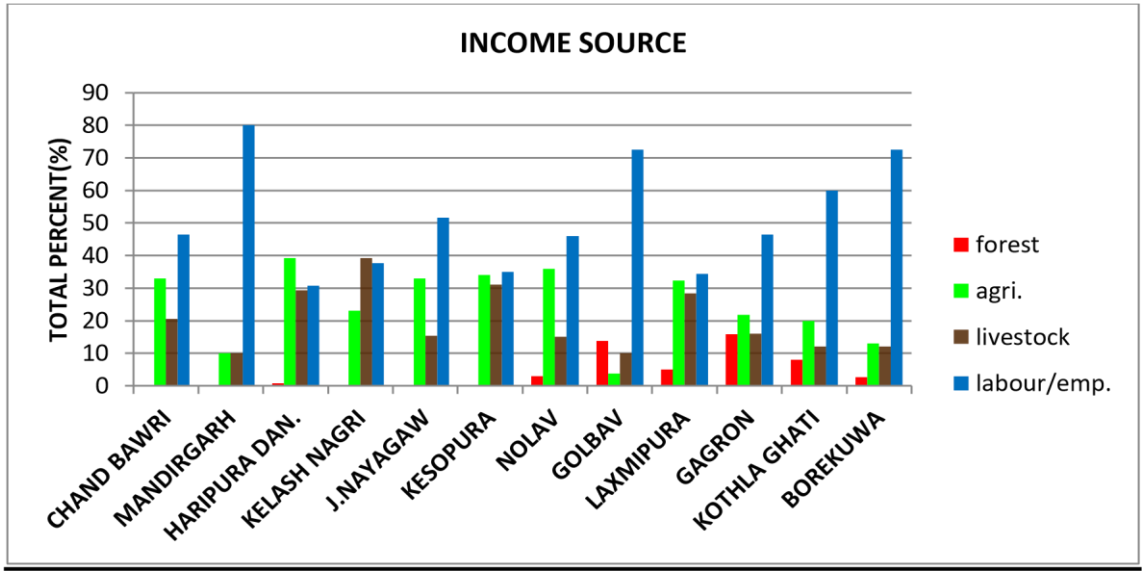


Figure-5.6: income sources

5.2.5 Forest dependency:

Forest consumption rate has very high in the buffer zone of MHTR. People are mostly dependent on all basic need of their daily survival ship on forest product inform of wood, mining, fodder, timber, fruit and many other ways. Wood has highest consumption rate with average 71.83%, Mining 10.63%, Timber 8.13%, Fruit 3.82%, other 2.46%.

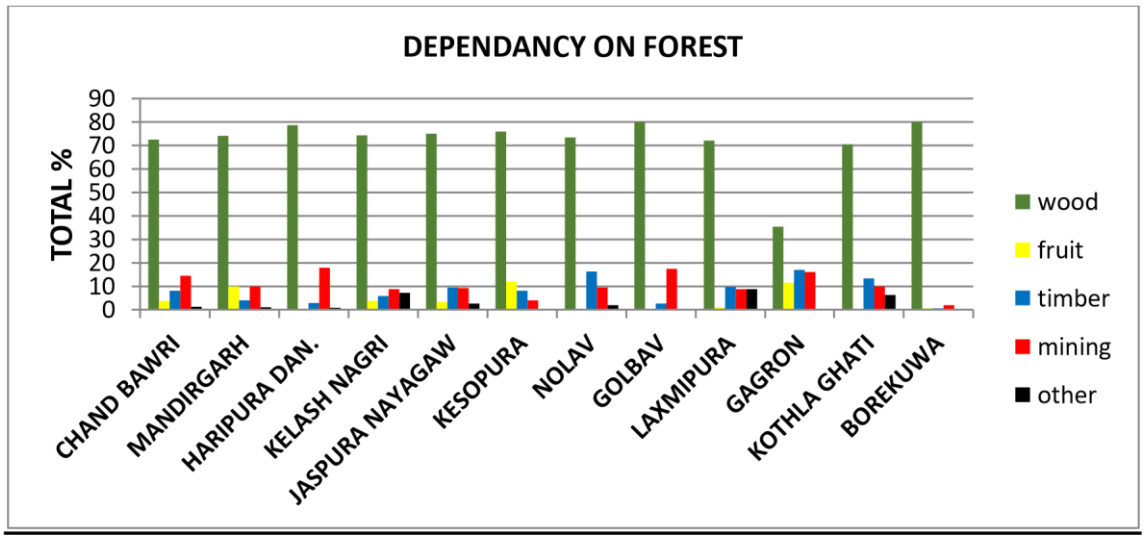


Figure-5.7: dependency on forest

5.2.6 Wildlife conflict and sighting:

Conflict:

The loss of domestic animals by diseases 46.38%, natural death rate is 22% conflict rate is **33.5%.**

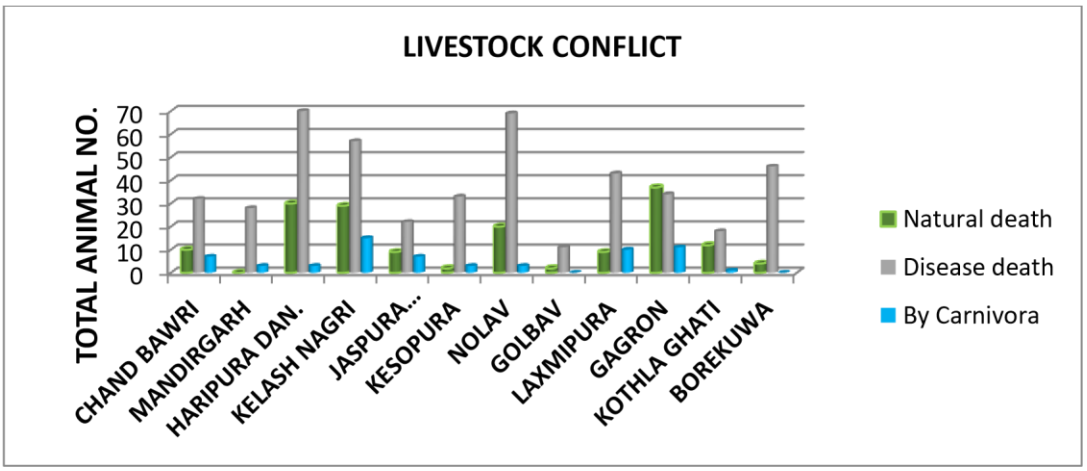


Figure-5.8: livestock conflict rate

Wildlife sighting

Although there is not any direct sighting during the study, but indirect sighting has been reported from the villagers. The maximum number of Nilgai has been reported with 41.16%, jackal 21.25%. Wild pig 18.25%, Chital 9.33%, Hyena 5.91%, Wolf 3.16%, Wild dog 2.58%, Chinkara 2.66%, Languor 2.5%, Leopard 1.25%, Sloth bear 0.83% Other 0.46%.

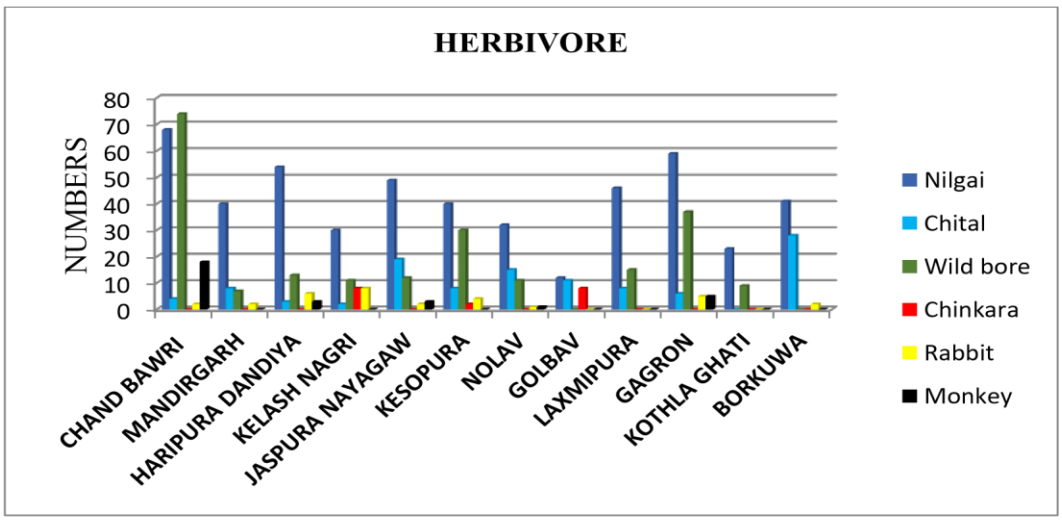


Figure-5.9 : Herbivore sighting, village wise

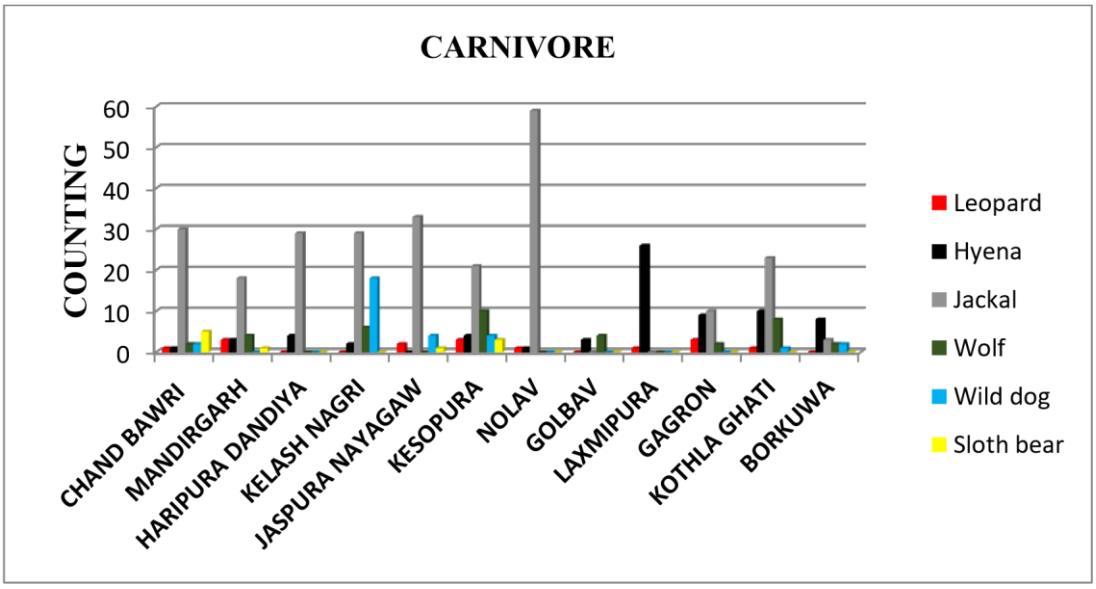


Figure-5.10: carnivore sighting (village wise)

5.3 Assessments of inputs of line agencies / other departments

Various line agencies / departments are working in the buffer zone of Mukandra Hills Tiger Reserve. These are:

1. Irrigation Department.
2. Public Works Development.
3. Electricity Distribution Corporation.
4. Rajasthan Tourism Development Corporation.
5. Police Department.
6. Transport Department.
7. Gram Panchayat and Municipality.

Part - B

The Proposed Management

CHAPTER 6

VISIONS, GOALS, OBJECTIVES AND PROBLEMS

6.1 Vision:

The buffer zone, consisting of the area peripheral to critical tiger habitat or core area will ensure the integrity of the critical tiger habitat with adequate dispersal of tiger and other key species. The area will also ensure the co-existence of wildlife and human activities. Buffer will also support the livelihood, developmental, social and cultural rights of the local people (u/s 38 V (4) (ii) of W.L.P. act). The area will also support the production sector activities intermingled with biodiversity conservation and ecosystem function values. The tourism and religious values will also be addressed here. This will be a "managed resource zone" outside the P.A. including forest patches, revenue lands & private holdings, addressing the issues of conflict, thereby reducing pressure on core area.

6.2 Management Goals:

To reduce impact of local people upon MHTR core and vice versa through active people's participation thereby improving Park–People Interface.

6.3 Management Objectives:

The following objectives have been thought to maintain the set of values of buffer area recognized and prioritized earlier.

1. To provide and protect the supplemental habitat and dispersal pathway for the spill over wildlife population specially tiger.
2. To support the social, cultural and economic well-being of the communities in the zone of influence to reduce their dependence on core area for forest-based resources through eco-development activities and conservation education.
3. To maintain and wherever necessary restore the key ecosystem functions for ecological security and economic prosperity of the region with special importance to the water shed function of the major rivers of the area.

4. To maintain the productivity of the production sectors after mainstreaming with conservation values on sustainable basis and to generate alternate livelihood options for the local communities.
5. To enhance the quality of educational, recreational and wilderness experience given to the general public.
6. To provide the opportunity of religious tourism in a sustainable manner.

6.4 Problems in achieving objectives:

6.4.1 Constraints/ problems in achieving objective no.1

1. **Disturbance due to Habitations–**

A major part of the buffer consists of human interaction zone, which includes human habitations, private estates, agricultural fields, road network etc. that creates a lot of disturbance to the wildlife dispersal. The private estates and farmlands are contiguous to the core. Many of them are abandoned and have a large number of labourers' settlements that are dependent on forest for various resources.

2. **Resource dependency of local people-**

Dependency of local people for lively hood and NTFP collection is increasing day by day. It is also a potential threat to the objective.

3. **Forestry activities –**

Forestry operations in the reserve forest area also creates disturbance to the dispersal of wildlife.

4. **Illegal activities-**

The area is having potential threat of lopping, poaching, felling etc. These are also management problems and need constant watch.

5. **Road and transmission line –**

The expanding road network and transmission lines are also threat to dispersal.

6. **Lack of data base-**

Above all, the lack of database of dispersal of wildlife is another problem in implementing any management strategy.

6.4.2 Constraints/ problems in achieving objective no.2

1. **Lack of socio-economic database –**

Only a very few studies have so far scientifically dealt with assessing the socio-economic status of adjoining villages. Not much information has been documented so as to formulate an effective eco-development plan.

2. **Low priority to eco-development in the RF areas** –

Not much work has been done earlier in the RF areas for the eco-development.

3. **Poor integration with other departments-**

Poor integration with other departments results in poor developmental activities in the area specially RF adjoining areas.

4. **Lack of infrastructure and trained staff-**

The staff especially, at the lower level, lacks in proper training regarding eco development and lack of infrastructural facilities adds more problems to it.

6.4.3 Constraints/ problems in achieving objective no.3

1. **Absence of base line data**

The base line data about the different factors affecting the water sheds like silting, soil erosion, surface runoff; chemical characteristics of water, etc. is not available till date. These data are very crucial to monitor the ecosystem functions and conserve the watersheds.

2. **Fire**

The man-made fires by grazers, poachers, NTFP collectors etc. is a problem for maintaining the watershed capacity.

3. **Activities in the estates**

Clearing of lands, use of pesticides etc. by the estate management and rich farmers reduce the quality of the ecosystem services.

4. **Potential threat- Illegal activities**

Different illegal activities like lopping & felling, NTFP & firewood collection, livestock grazing, etc are affecting the ecosystem functions and creating major threats towards the conservation of inviolate areas.

6.4.4 Constraints/ problems in achieving objective no.4

1. **More and more emphasis on conservation values**

Now-a-days more and more emphasis is given on conservation values that are impediment to fulfil the needs of this objective.

2. **Lack of database**

The knowledge regarding the actual extraction capacity without disturbing the conservation values is lacking. This is also hampering the implementation strategies of this objective.

3. **Market**

Though the market for cash crop is still very good but ups & downs in the market is a global phenomenon and problem for management.

6.4.5 Constraints/ problems in achieving objective no.5

1. Condition of already existing signage

Very few signages exist by the side of Mukandra road and other main highways and road networks. The condition of these existing signages is very poor and these are not proper. There is need to install properly designed modern signage

2. Lack of awareness campaigns

Awareness campaigning organized by the forest department for the pilgrims to protect the sanctity of the inviolate areas is not sufficient and the interpretation & publicity activities need to be augmented and made more effective.

6.5 Strengths – Weakness – Opportunities- Threats (SWOT Analysis):

Buffer of Mukandra Hills Tiger Reserve is as usual disturbed protected areas owing to several factors. The PA is open from all sides along with several villages being inside the Buffer.

STRENGTHS	Mukandra with Bhainsrodgarh sanctuary forms a link between Gandhi Sagar Sanctuary Madhya Pradesh and Ranthambhore Tiger Reserve in Chambal River tiger landscape. Vast network of Naka Chowkis where staff is stationed 24*7.

	Border home guards with arms have also been stationed with field staff given more strength to protection. Buffer also has herbivore population with chinkara and Nilgai along with Leopard and Bears. The habitat has God vegetation of Dhok along with grassland plateaus which facilitates more biodiversity.
WEAKNESSES	Linear nature of the Tiger reserve with more perimeter to area ratio leading to longer protection perimeter Mining activities next to Buffer area in Bundi, Jhalawar and Kota district for sandstone and masonry stone mining. Biotic disturbance in the PA owing to presence of huge cattle population and many villages in and around MHTR boundary. Heavy biomass extraction in peripheral areas to the impact zone of villages and zone of influence of villages situated inside the Tiger Reserve. Open from all sides resulting in illegal entry from all sides. The temples in the Mukandra are visited by devotees/visitors throughout the year creating lot of polythene and other sorts of pollution. No proper infrastructure (vehicles, Range Office staff, telephone facility) to the foresters and Range Officers. Poor water retentively in the Tiger Reserve owing to a smaller number of large water bodies. No Interpretation facility for enriching visitor's experience. Growth of Kota, Rawatbhata and Bhainsrodgarh towns and industrial areas near Buffer area.

	Inadequate strength of the foresters and forest guards and limited staff capabilities in a tough terrain.

OPPORTUNITIES	In an effort to revive Mukandra, the Tiger Reserve offers a great opportunity to reintroduce the Tiger. Corridor connectivity development by inclusion in the Tiger Reserve to serve as potential habitat to host spill over population from the Ranthambhore Tiger Reserve. The tiger reserve has lot of territorial forest area in Kota, Jhalawar and Chittorgarh division which can also further be included in tiger reserve. Readily available research support from Kota University and Wildlife Institute of India.
THREATS	Owing to a large number of entry points, especially from the peripheral areas, illegal entry of suspected person and poachers is a continuous threat. Due to high biomass extraction, habitat degradation is a big threat. Gurjars which is Cattle grazing community is occupying most of the surrounding areas with huge cattle population depending upon the tiger reserve for fodder needs.

CHAPTER 7

MANAGEMENT STRATEGIES

7.1 Delineation of Buffer Area

For the first time, the 'core' and 'buffer' areas of a tiger reserve have also been defined, in the Wildlife (Protection) Act, 1972, the former being the critical, inviolate area, and the latter the peripheral area to foster coexistence with local people for safeguarding the integrity of the core.

The buffer zone of a Tiger Reserve has twin functions, viz.:

i) To provide habitat supplement to the spill over population of wild animals from the core area, conserved with the active cooperation of stakeholder Communities, and

ii) Providing site specific, need based participatory eco development inputs to local stakeholders for reducing their resource dependency on the core zone and for eliciting their support towards conservation initiatives in the area.

Therefore, both the buffer zone and the multiple use area, if any, surrounding the buffer, should be subjected to conservation-oriented community program as a part of eco-development, taking care not to distort the village dynamics in an artificial manner resulting in the entry of market economy, which may make the whole exercise counter-productive.

Guidelines for the management of buffer Zone

(A) Communities living in the buffer zone (having the status of Sanctuary, Reserve Forest, Protected Forest or Revenue land) should be involved in the management of Tiger Reserves with reciprocal commitment as a part of overall conservation strategy.

The reciprocity would decide in the mutual *quid pro quo of*

(i) Fostering site-specific eco-development initiatives based on participatory micro level village plans to provide alternative resources to people apart from livelihoods. The eco-development inputs, interalia, may include biomass substitution (e.g. alternative fuels), biomass generation and forestry, eco-tourism, agriculture, watershed management, small irrigation, local livestock improvement, agro processing, artisan and any other site-specific item as desired by the people, not having a deleterious effect on buffer area resources.

(ii) Reciprocation by the local people through specific measurable actions as per a MOU for improving protection and conservation, which interalia, may include curtailment of illicit

grazing, reducing fuel wood and small timber collection from buffer areas, increasing participation in fire protection and anti-poaching efforts.

(B) Community involvement in the management of buffer zone, should be promoted as provided in sections 33B, 36B and 36D of the Wildlife (Protection) Act, 1972.

The general principles of management of buffer will be as follows-

1. Co-occurrence agenda (Wildlife and People).
2. A "no-go-area" for industrial development (but retrofitting safeguards required if such infrastructure already exists)
3. The wildlife status of buffer should not be elevated to that of the core and managerial interventions should be restricted to allow tiger/wildlife gene permeability and low density occupancy while facilitating the meta-population dynamics of tiger in productive patches.
4. Factoring in the landscape context and reducing resource dependency of local people on forests through sectoral integration resulting in ecologically sustainable livelihood option.
5. Using the impact of natural / managerial interventions in the core area as a guide for dealing with forestry practices and wildlife management in the buffer.
6. Identifying zones of influence vis-à-vis the various land use operating in the area.
7. Overarching focus on habitat restoration/productivity, reduction of forest resource dependency, providing ecologically sustainable livelihood options to local people, permitting ecologically sustainable land uses, avoiding intensive forms of land uses like mining or heavily used infrastructure and actively addressing human wildlife interface. In case such land uses are present or permitted appropriate mitigation measures need to be enforced so as not to compromise on the conservation objectives of the buffer.
8. Convergence of ongoing district level schemes is important to provide ecologically sustainable livelihood options for local people. This would reduce their dependency on forest resources while eliciting the much-needed public support. A sizeable portion of tourism gate receipts should be recycled and earmarked to eco development committees for village specific interventions as per the participatory micro plan, with reciprocal commitments to protect wildlife and their habitat on quid-pro-quo basis.

7.2 Zone and Theme Approaches to Management Strategies

The width of the tiger reserve area is very less. To increase the width, buffer area is to be added primarily meant to act as a shock absorber for the area. The core area serves as a breeding ground for the animals. Surplus animals from the core area will move to buffer areas. The success and sustainability of the core area depends on a healthy and well managed buffer area. On account of heavy grazing, uncontrolled felling and lopping of trees the eco system in the buffer area has deteriorated. The soil cover in the buffer is naturally very thin since most of the rocks are sandstone sheet rocks.

Table-7.1 Important sites for buffer area development are as follows –

Sl. No	Forest Blocks	Range
1.	Kaniya Talab	Kolipura
2.	Mashalpura	Darrah and Gagron
3.	Doliya	Ranwtha
4.	Futa	Borabas
5.	Akelgarh	Borabas
6.	Bandha	Borabas

General Strategy:

Buffer areas require a 'course filter' approach for maintaining a variety of plant and animal species.

- Day to day monitoring of Habitat amelioration.
- Fostering indigenous fodder and fruit species.
- Maintaining existing water points.
- No drastic habitat interventions
- Cropping pattern / harvesting to factor in cover values.
- Inherent /induced diversity indices need to be computed for maintaining the edges.
- Human – wildlife interface issues to be addressed.
- Treatment for riparian zones/unique features.
- Retention of dead tree snags.
- Restoration/protection of existing corridors.

The Scope of Managerial interventions will be as follows:

(i) Providing ecologically sustainable livelihood options to local people in collaboration with various sectors/organizations.

(ii) Incentivizing local people for protecting forests and wildlife (PES, Eco-tourism)

(iii) Ensuring retrofitting measures in sectors of development with reciprocal commitments.

(iv) Ensuring active management in areas where tiger/ Co predators / wild ungulates co-occur with people to minimize human-wildlife interface conflicts.

(v) Ensuring monitoring of tiger/wildlife on periodic basis in standardized manner, amenable to scientific inference.

(vi) Ensuring surveillance and protection of tiger and wildlife.

(vii) Building up the capacity of field staff and local people as a part of an adaptive management to ensure effective implementation.

(viii) In case the buffer comprises of protected area then managerial interventions should be inconformity with the provisions of the Wildlife (Protection) Act, 1972.

7.2.1 Zone Plans

The following zone plans are proposed for buffer of MHTR.

1. Zone Plan for Eco-Development
2. Zone Plan for tourism
3. Zone Plan for Forestry
4. Zone Plan for safeguards/retrofitting measures
5. Zone Plan for reclamation of mined areas

These zones are overlapping, and segregation has been described only for Management purposes.

7.2.1.1 Zone Plan for Eco-Development

Mukandra Hills Tiger Reserve has many peripheral villages on all sides. The problems of these peripheral villages need to be addressed property. The management practices in the past attempted to keep the villagers away. The villagers residing in the vicinity have been dependent on this protected area. It has resulted in conflicts with the villagers. In response to biotic pressures on protected (core) area, a broad-based strategy of eco development has to be adopted. The eco-

development has two main thrusts i.e. improvement of buffer management and involvement of local people in developmental activities so that the negative impact on the core could be reduced.

Eco-development activities to provide alternative fuel and fodder resource on the fringes of MHTR were executed. These also provided alternative livelihood opportunities for the local people. These schemes overlooked the participatory approach, which is fundamental philosophy of eco-development program me. At this juncture, we have to initiate the process of trust building and participation. These initiatives will generate initial trust of the local communities with the park management enhancing the understanding of the staff about the programme and generating base line information on the impact villages. The investments, so far, had been very low, sporadic & without proper micro planning. The real issues of management – conflict with people, could not be addressed.

An elaborate institutional mechanism for implementation of the eco development programme in buffer areas of MHTR will be developed. This institution will ensure participation of different stake holders; quick decision making at park management & state level and will facilitate the implementation of eco-development programme at grass root level. Whole of the buffer area will fall under Eco-development zone. As per section 18A (read with section 36A) of the Wildlife (Protection) Act, 1972, till the rights of affected persons are finally settled, the State Government should make alternative arrangement for making available fuel, fodder and other forest produce to affected persons in terms of their rights as per record.

The objectives will be:

- To improve fuel-fodder resource so that local demands can be met.
- To develop strategy based upon micro plans to meet the needs of local people.
- To motivate the local people to adopt such agricultural patterns and land use which are compatible for wildlife.
- To promote district level welfare schemes in eco development zone to benefit local people through ongoing welfare programme as well as special programme for their up liftment in various government scheme.
- To maintain natural demographic setup of the prey & predators.
- Spreading environmental education.

Strategies

The strategy of micro planning should be adopted at village level apart from: creation of EDCs with Panchayati Raj Institution representation, confederating such EDCs, ensuring benefits to local people for protecting forests on a quid-pro-rqo-basis etc. The agricultural practices (if intense) require monitoring in the context of cropping pattern and ensuing change in cover values. Likewise, sale of agricultural land resulting change in land use pattern should also be monitored so that the corridor values are not affected. Since livelihood is a big concern and dependency of local people on forests is considerable, the district level welfare schemes should be factored in the eco-development zone to benefit local people. Further, special programmes should be fostered through funding support from Finance Commission, State Plan, CAMPA etc., apart from Project Tiger.

The strategies can be summarized as follows:

- Village level micro planning for benefits to local people on quid-proquo-basis (involving EDC)
- Innovative use of Participatory Management/REDD+/recycling of tourism gate receipts to EDCs.
- Benefits from district level developmental works (convergence), interalia covering

(a) Public health and family welfare

(b) Food and nutrition security

(c) Education

(d) Natural resource management and water security

(e) Roads

(f) Energy

(g) Housing and

(h) Livelihoods

After identification of problems, specific strategies have been perceived which are as follows:

(i) **Strategy to meet fuel wood Demand:**

The strategy would be twofold:

- Immediate measures
- Long Term measures

Immediate Measures:

- Subsidized LPG distribution to the prioritized in buffer and other peripheral villages.
- Linkage with District agencies for ensuring better LPG supply by opening, LPG outlets at Ramganjmandi, kanwas, Rawathbhata and Mandana.

Long Term measures:

- Creating fuel wood and fodder plantations on charagah/ community lands with consent of Gram Sabha on silvi-pastoral model.
- The degraded forestlands to be taken up by planting indigenous species for fuel wood plantations.

(ii) Strategy to reduce grazing pressure:

Since grazing is being practiced in the buffer areas, some steps for mitigating it are proposed subject to availability of land. Wastelands/ charagah. Grazing will be regulated in the buffer area.

No grazing will be permitted in the reserve forest as these areas' potential sites for breeding of tigers. For development of herbivores also some areas have to be made free from cattle grazing.

(iii) Strategy for improving Socio-economic conditions

(a) Improvement of Agricultural productivity:

- The Government of Rajasthan has recently issued orders to provide electricity connections to villagers in the periphery on priority basis to utilize land for fodder development. This can also be utilized to improve the agricultural productivity.
- Funds can be used on watershed basis for improving the irrigation system by making dams and soil & moisture conservation works in the agriculture field.

(b)Integrated livestock development program for income enhancement of farmers increasing livestock population with increase in consumption of milk products has put a great stress on natural resources like water & vegetation. Because of low productivity of cattle, farmers always tend to rear livestock on zero cost or low-cost basis by utilizing available pastures & forest areas at no cost. This situation can be avoided by increasing the productivity of livestock through technological inputs in livestock production sector. Breed improvement techniques health care & training of farmers can help them a lot. Artificial insemination de-worming and immunization are important aspects of livestock development. Stall feeding of cattle will be promoted by breed improvement.

(c) Income Generating Activities

i) **Constitution of self-help groups**: Self-help groups will be constituted amongst the members of EDCs. Micro financing through self-help groups will help in uplifting their economic status. Various handicraft works, candle making, agarbatti making etc. activities can be initiated through self-help groups.

ii) **Employment as travel/ tourist guides**: It is mandatory for all the tourists to take a registered travel guide while visiting MHTR. The local unemployed youth of buffer area will be trained as wildlife guides and will be registered with MHTR to go with the tourists. This will not only provide employment to these youths but will also inculcate inclination towards wildlife conservation. These guides will also work as messengers amongst the rural mass & will act as connecting link between forest administration & villagers.

iii) **Tourism vehicles to EDC members**: The villages in the buffer areas will be prioritized for registering tourism vehicle to be utilized for tourism purpose and the benefit will flow to the villagers. This will spread a positive message for tiger conservation as the economic benefits are flowing to the people.

iv) **Use of Local work force/home guards in Protection and patrolling in buffer areas**: Local work force will be employed through EDCs for protection purposes in the buffer area. This will not only provide employment for the local unemployed youth but will also spread the message of benefits of forest & wildlife conservation. Home guards locally recruited will be employed to assist local staff in forest and Wildlife protection. For eco development micro plan would be prepared for villages in and around buffer forest area. The Eco development committee will be formed, and activities will be taken up in consultation with committee.

Livelihood support initiatives through village micro plans

a) Participatory micro planning and implementation processes: Micro planning support teams composed of park personnel, collaborating NGOs and villagers (each team with at least one woman and with members able to easily communicate with village woman) would assist village communities to develop and implement site specific reciprocal plan on a sustainable basis. Focused guidelines clearly determined investment criteria, supportive training programs and carefully scheduled planning will be ensured to meet the objectives of eco development and to embody the active commitment & participation of local people.

b) Methodology to be adopted for village eco-development

- Active participation of all segments of society in plan formulation and decision making through a community institutional framework of village eco-development committees that elicits the widest possible consensus.
- Participatory rural appraisal (PRA) focused on the mutual interactions and reciprocal arrangements between the management and people.

Integration of rural development programs

Various rural development programs are being implemented in the district under financial support of Govt. of India and with the plan funds of State of Rajasthan. Efforts will be made to channelize maximum funds towards the buffer area. National rural employment guarantee scheme is an important scheme flowing maximum funds to the rural areas. Focus will be to propose more & more eco-development works in buffer area under this scheme. Funds available under other social welfare & employment generation schemes will also be utilized in buffer area at optimum level.

Monitoring and evaluation

Monitoring and evaluation are two indispensable arms, which support and strengthen any management. Developing & using information base is essential step in deciding management goals & objectives. It is expected that findings of a well-organized, rigorous scientific monitoring will help park management in the following aspects:

- Status of implementation of scheme.
- Quality of works executed.
- Enhancement in benchmark knowledge.
- Improve decision-making.
- Reduce overall management costs & enhance benefits.
- Improve sustainability.
- Increase public awareness & people's participation.

An analysis of reciprocal commitments and obligations will be done to evaluate the works. The success indicators have to be evaluated whether these are in accordance with those anticipated at the time of micro planning.

7.2.1.2 Zone Plan for Eco-tourism

In MHTR, potential tourism areas are developed in the core zone only because the buffer areas are being added from the territorial divisions and need to be developed. The development of Ecotourism in buffer area will not only reduce the pressure of tourists over the core area but will also earn sizable revenue together with employment generation largely around forest areas benefiting rural population around MHTR. Zone Plan for Eco-tourism will include areas having tourism infrastructure/ tourism regulation as per the NTCA guidelines.

Eco-tourism guidelines

Eco-tourism will be based on following guidelines:

a. Facilitating wildlife eco-tourism involving local host communities.

b. Facilitating wildlife tourism on private lands in the vicinity as per the normative guidelines.

c. Obtaining contributions from private commercial tour operators and lodge owners for local community development.

d. Obtaining contributions from tour operators for maintaining tourist facilities and staff welfare.

Eco tourism objectives

a. Help visitors to minimize their negative impacts on the environment by enhancing their understanding of the fragility of the environment. This will be supported by offering literature, briefings, leading by examples and taking corrective actions.

b. Prevent both accidental and purposeful action by tourists that cause damage to environment, such as crowding, harassment of endangered species, trampling, off-road driving and improper disposal of waste.

c. Ensure that tourism revenue covers the cost of management of tourism on wild lands and protected areas. New untouched eco-tourism sites will be searched. Ban on use of plastics at eco-tourism sites will be imposed. There will be strict code of conduct for the visitors. Severe punishments will be awarded for persons violating the rules.

Detailed tourism plan for buffer areas is described in Chapter 13 - Ecotourism with detailed routes and maps.

Nature Education

It is very essential to have a proper extension network to promote education and awareness towards wildlife protection and conservation at Mukandra Hills Tiger Reserve. Following specific activities will be undertaken for this purpose.

a. Extension unit will prepare, develop and disseminate publications, pamphlets, posters & other relevant publicity material. A library will also be set up.

b. Film/Video shows, puppet shows, chaupals, exhibitions etc. for both rural and urban populace will be organized. Schools & other educational institutions will also be associated.

c. Experience sharing workshops and exchange visits will be organized and bidirectional feedback will be obtained.

d. To achieve maximum publicity, mass media will be utilized. TV programmes, radio talks, press releases etc will be organized. Environmental awareness camps will be organized for nature education to students.

7.2.1.3 Zone Plan for Forestry

Creating a zone plan for forestry in the buffer areas of Mukandra Hills Tiger Reserve involves balancing conservation objectives with sustainable forest management practices. Here's a comprehensive plan:

1. **Ecological Assessment Zone**:
   - Conduct comprehensive ecological assessments to understand the biodiversity, soil types, hydrology, and topography of the buffer areas.
   - Identify sensitive habitats, key wildlife corridors, and areas prone to erosion or habitat degradation.
   - Use GIS and remote sensing techniques to map vegetation cover, land use patterns, and forest dynamics.
2. **Zoning for Sustainable Forestry**:
   - Divide the buffer areas into zones based on ecological sensitivity, forest types, and management objectives.
   - Designate multiple-use zones for sustainable forestry activities such as selective logging, fuelwood extraction, non-timber forest products (NTFPs) collection, and agroforestry.

- Establish protection zones where no logging or extraction activities are allowed to conserve critical habitats, water sources, and wildlife corridors.
- Implement buffer strips along the boundary of the core zone to minimize human-wildlife conflicts and maintain connectivity between habitats.

3. **Silvicultural Practices Zone**:

- Implement silvicultural practices focused on enhancing forest health, biodiversity, and productivity.
- Promote sustainable harvesting techniques such as selective logging, reduced impact logging, and continuous cover forestry to minimize disturbance and maintain ecosystem functions.
- Encourage natural regeneration by protecting seedlings, saplings, and understory vegetation from grazing and browsing pressure.
- Conduct periodic thinning, pruning, and coppicing to improve tree vigor, reduce competition, and enhance habitat diversity.

4. **Wildlife Habitat Enhancement Zone**:

- Manage forests to enhance habitat quality and support wildlife populations, including tigers and their prey species.
- Maintain and restore diverse forest structures, including canopy cover, understory vegetation, and snags, to provide food, shelter, and breeding sites for wildlife.
- Identify and protect critical habitats such as denning sites, roosting trees, and feeding areas for key wildlife species.
- Implement habitat management measures such as prescribed burning, invasive species control, and waterhole development to maintain ecological processes and enhance habitat resilience.

5. **Community Forestry and Livelihood Zone**:

- Promote community-based forest management initiatives to empower local communities and improve their livelihoods.
- Facilitate participatory forest management planning, decision-making, and benefit-sharing mechanisms involving local communities, forest user groups, and relevant stakeholders.

- Provide training, capacity building, and technical support to enhance community participation in sustainable forestry practices, NTFP harvesting, and eco-tourism enterprises.
- Foster collaboration and partnerships between forest departments, NGOs, private sector entities, and local communities to promote sustainable forest management and conservation outcomes.

6. **Monitoring and Adaptive Management Zone**:

- Establish monitoring protocols to assess the impact of forestry activities on forest ecosystems, wildlife populations, and community livelihoods.
- Use adaptive management approaches to adjust forest management strategies based on monitoring data, stakeholder feedback, and changing socio-economic conditions.
- Foster research collaborations with academic institutions, research organizations, and governmental agencies to advance knowledge on forest ecology, conservation biology, and sustainable forestry practices.

By implementing this zone plan for forestry in the buffer areas of Mukandra Hills Tiger Reserve, it is possible to achieve the dual objectives of conserving biodiversity and promoting sustainable forest management for the benefit of both wildlife and local communities.

7.2.1.4 Zone Plan for safeguards and retrofitting measures

1. Human-Wildlife Conflict Management:

1.1. Early Warning Systems:

- Install and maintain early warning systems equipped with motion sensors and camera traps along the buffer area to detect wildlife movement.
- Establish protocols for timely dissemination of alerts to nearby communities to prevent human-wildlife conflicts.

1.2. Community Education and Awareness:

- Conduct regular workshops and awareness campaigns for local communities to educate them about wildlife behaviour, conflict avoidance strategies, and emergency response procedures.
- Provide training on proper waste management, livestock protection measures, and safe practices during wildlife encounters.

1.3. Conflict Resolution Mechanisms:

- Establish community-based conflict resolution committees comprising representatives from local communities, forest department officials, and conservation organizations.
- Implement transparent and fair mechanisms for resolving conflict incidents, including compensation for loss of property or livelihood due to wildlife damage.

2. Habitat Connectivity Enhancement:

2.1. Wildlife Corridor Identification:

- Conduct habitat connectivity assessments to identify and prioritize key wildlife corridors within the buffer area.
- Collaborate with neighbouring landowners and government agencies to secure and manage critical corridors for wildlife movement.

2.2. Corridor Restoration and Maintenance:

- Implement habitat restoration measures such as afforestation, revegetation, and invasive species control to enhance habitat quality along wildlife corridors.
- Regularly monitor and maintain wildlife corridors to ensure they remain functional and free from obstructions.

2.3. Eco-Infrastructure Development:

- Incorporate wildlife-friendly infrastructure features such as underpasses, overpasses, and culverts into road and railway projects to facilitate safe passage for wildlife.
- Retrofit existing infrastructure with wildlife crossing structures where feasible to mitigate habitat fragmentation and reduce wildlife mortality.

3. Sustainable Resource Management:

3.1. Sustainable Forestry Practices:

- Implement sustainable forest management practices in the buffer area, including selective logging, agroforestry, and non-timber forest product harvesting.
- Establish quotas and guidelines for timber extraction to ensure the long-term viability of forest ecosystems and minimize habitat disturbance.

3.2. Water Resource Management:

- Implement watershed management initiatives to protect and restore natural water sources within the buffer area.
- Promote rainwater harvesting, soil conservation measures, and water-use efficiency techniques to sustain ecosystem health and support wildlife habitats.

3.3. Land Use Planning and Zoning:

- Develop comprehensive land use plans and zoning regulations for the buffer area to balance conservation priorities with sustainable development needs.
- Identify and designate areas for conservation, agriculture, tourism, and other land uses based on ecological suitability and stakeholder input.

4. Monitoring and Adaptive Management:

4.1. Ecological Monitoring Programs:

- Establish long-term monitoring programs to assess the effectiveness of safeguard measures and track changes in wildlife populations, habitat quality, and human wildlife interactions.
- Use scientific data and community feedback to adapt management strategies and improve conservation outcomes over time.

4.2. Stakeholder Engagement and Collaboration:

- Foster collaboration and partnerships with local communities, government agencies, NGOs, and other stakeholders to implement safeguard measures and achieve shared conservation goals.
- Encourage active participation and ownership among stakeholders through regular consultations, feedback mechanisms, and capacity-building initiatives.

By implementing this Zone Plan for safeguards and retrofitting measures in the buffer area of Mukandra Hills Tiger Reserve, it is possible to mitigate human-wildlife conflicts, enhance habitat connectivity, and promote sustainable resource management for the long-term conservation of biodiversity.

7.2.1.5 Zone Plan for reclamation of mined areas

Reclaiming mined areas within the Mukandra Hills Tiger Reserve requires careful planning to restore ecological balance, rehabilitate habitats, and mitigate the environmental impacts of mining activities. Here's a zone plan for reclaiming mined areas:

1. Assessment Zone:

- Conduct detailed assessments of the extent of mining activities, including the type of mining, area affected, and degree of habitat destruction.
- Assess soil quality, vegetation cover, hydrology, and wildlife presence to determine the level of ecological degradation.
- Identify priority areas for restoration based on the potential for habitat recovery and the importance of connectivity within the reserve.

2. Restoration Priority Zone:

- Prioritize areas for restoration based on their ecological significance, potential for habitat recovery, and importance for tiger conservation.
- Implement immediate restoration measures in highly degraded areas to prevent further habitat loss and degradation.
- Focus on stabilizing soils, controlling erosion, and initiating revegetation efforts using native plant species to restore habitat structure and biodiversity.

3. Revegetation Zone:

- Implement large-scale revegetation programs to restore vegetation cover and improve habitat quality in mined areas.
- Select appropriate native plant species based on local ecological conditions, soil characteristics, and wildlife preferences.
- Establish nurseries for propagating native plants and seedlings for use in restoration efforts.
- Monitor the success of revegetation efforts and adapt planting strategies based on ecological feedback and performance indicators.

4. Habitat Enhancement Zone:

- Enhance habitat quality and biodiversity by creating diverse habitat structures and restoring key ecological processes.

- Introduce habitat features such as water sources, artificial dens, and perches to support wildlife populations and promote habitat connectivity.
- Implement landscape-scale habitat management strategies to create a mosaic of habitats that meet the diverse needs of wildlife species, including tigers and their prey.

5. Monitoring and Adaptive Management Zone:

- Establish long-term monitoring programs to assess the effectiveness of restoration efforts and track changes in habitat quality and wildlife populations over time.
- Use adaptive management approaches to refine restoration strategies based on monitoring data and ecological feedback.
- Collaborate with scientific institutions, conservation organizations, and local communities to conduct research and share knowledge on best practices for habitat restoration and wildlife conservation.

6. Community Engagement Zone:

- Engage local communities in restoration efforts through participatory planning, capacity building, and livelihood support programs.
- Provide training and employment opportunities for local communities in revegetation, habitat enhancement, and monitoring activities.
- Foster a sense of stewardship and ownership among local communities towards restored habitats and tiger conservation goals.

By implementing this zone plan for reclamation of mined areas, the MHTR can recover degraded habitats, enhance ecological resilience, and support the long-term conservation of tigers and other wildlife species.

7.2.2 Theme Plans

Management strategies, sometimes, cannot be confined to a particular zone & these cut across two or more zones. Various theme plans, which have been, conceived for the buffer zone of MHTR are as follows:

Theme plans for buffer area are:

1. Protection
2. Meeting Fuel wood Demand

3. Administration
4. Livestock healthcare and breed improvement
5. Income generating initiatives

7.2.2.1 Theme plan for protection

Protection is the topmost priority area of management. Wildlife management is 99% protection & 1% management.

Objectives:

a. To reduce the biotic/anthropogenic pressures on movements/ migration of wildlife by:
   i) Controlled & rotational grazing in pastures/forest lands of buffer area to make the optimum use of such areas. This will reduce the movement of cattle towards the core area.
   ii) Protection against poaching.
   iii) Protection of forest areas against encroachment & mining.
   iv) Fire protection in forest areas and community plantations / pastures.
   v) Vigilance over traditional hunter tribes.

b. To develop human resource so as to utilize them in best possible way for protection.

STRATEGEY:

Construction of Barrier

To avoid Man – animal negative interaction and crop protection, wall can be constructed in areas where there are many animal negative interactions happens regularly like agricultural and habituated areas without causing much hindrance in the continuity of animal movement. These crop protection walls will be made 6 feet height for sensitive and vulnerable area of the CTH is required. The work will be started from highly sensitive and vulnerable areas to less sensitive areas based on the field requirement and after analysing the effect on the corridor or connectivity factors. Extra care should be taken that this kind of structures doesn't affect any kind of movement of animals through corridors.

Out of turn Agriculture Electric Connections:

For ensuring livelihood of villagers on the periphery, improvements have to be made. Presently due to non-availability of agriculture electric connections, most villagers depend on rain fed agriculture only. Due to uncertain rainfall even Kharif crop is not ensured. Due to this uncertain

agriculture villagers are inclined to depend on forestry-based activities for alternate source of income and also goat rearing. If irrigation is assured, peripheral villagers will not only get Kharif crop but can grow Rabi crop also. This will ensure better livelihood option, and the practice of goat rearing will get reduced. Villagers will also be able to take horticulture and vegetable crops too. It will improve livelihood of these families and also at same time help in controlling illegal grazing. There is constant demand from other villages for priority connections as they are on the wait list for more than 15 years now. Govt. of Rajasthan vide its order No. F.12(16)/ urja/04/part/Jaipur, dated 7th March 2008 has issued an order to release the electric connections on priority basis under revised agriculture policy 2004, rule 7(i) to (iv) (sa). As per this order revenue villages located on the periphery of MHTR will be given immediate priority agriculture connections. The village would be selected in consultation and connection will be released in maximum 3 months from date of application. Efforts will be made for such orders which will be applicable to MHTR periphery villages.

Priority agriculture connections are mainly being given for producing fodder crops. This will help in promoting concept of stall feeding and cattle breed improvement programme, which will help in controlling illegal grazing in CTH area.

Use of Local work force/home guards/border home guards in Protection and patrolling in buffer areas:

Local work force will be employed through EDCs for protection purposes in the buffer area. This will not only provide employment for the local unemployed youth but will also spread the message of benefits of forest & wildlife conservation. Home-guards and border home-guards will be employed to assist to local staff in forest and Wildlife protection.

Reduce grazing pressure:

Since controlled grazing is to be allowed in the buffer areas, some steps for mitigating it are proposed subject to availability of land. Identification of wastelands/charagahs for fodder plantations will be carried out.

Efficient use of Buffer area through silvi-pastoral developments:

As per earlier management practices, the buffer area around protected areas used to be developed in such a way so that the buffer area could support not only the wildlife but also full fill the requirements of the local people especially for fuel wood and fodder. But after Hon ‘able Supreme Court order dated 14.2.2000, a complete ban on removal of forest produce from sanctuaries and national parks, has been imposed. Therefore, now the management strategy will be to allow the

cattle grazing in a controlled way in the buffer area with the sole objective of pushing these cattle out from the core area. Hence the silvipastoral activities are proposed in buffer area.

Development of pasture Area:

A total of 5000 hectares of land will be brought under pastures for the village cattle. Every year an area of 500 hectares will be undertaken for pasture development works. This area will be spread all over and around the buffer and units of minimum 100 hectares will be taken up. These units will also help in regulating the cattle grazing in each closure.

Species for pasture development:

In many of the areas selected for pasture development there is good tree growth of Khirni, Tendu, Godal, Sadar, Salar, Butea and Bamboo. These trees shall be preserved. Suitable grass species of *Cenchrus setigerus, C. ciliaris, Dicanthium annulatum, Sehima nervosum* etc. shall be sown.

Operation to be carried out:

The selected area will be fenced with loose stone wall so as to prevent cattle from entering the area. Live hedge plant seeds will be sown along the fence to make it more effective. For this the seeds / cutting of *Jatropha curcas or Euphorbia spp.* can be sown. Gates will be provided at suitable places. Soil and moisture conservation works will be done in the fenced area.

Scattered contour trenches of size 30 cm depth, 45cm width will be dug.

A grove of shady trees will be planted near the water points in pasture closures to provide shade for wild animals. Seeds of the fodder spp will be distributed free of cost to the villagers so as to motivate them to take up growing of fodder in their own agriculture field.

Utilization of pastures:

The success of the scheme lies in proper utilization of the created pasture without deteriorating the resources. For this villager will be taken into confidence by the park management. The benefit of the proper use of pasture has to be explained to the people and proper system of grazing has to be adopted. It will help in eliminating conflicting attitude and will ensure developing a healthier relationship between the managers and local masses.

Grazing in pasture immediately after the onset of monsoon will result in uprooting of germinated seedlings. Also, palatable species of grasses and freshly sprouted shoots germinating from old stock of perennial species will be devoured leading to depletion of seed stock and loss of vigour in rhizomes. This will lead to preponderance of unpalatable species. Hence in order to make good

use of closures it is essential that grazing is not allowed in the earlier period of development, so as to ensure good seed availability for making the closures self-sustainable.

Pattern of grazing:

Under rotational grazing the pasture unit (100 Ha) will be divided in to 'grazing blocks. Conversely four separated closures of approximately same size and situated reasonably apart will be treated as grazing block. Each of the 'grazing blocks' shall be closed to grazing for whole year by rotation while remaining three blocks shall be opened for grazing in rotation at intervals of one month from July. Only the cattle card holder will be permitted into the closure for grazing.

Free distribution of the fodder species seeds to agriculture land holder so that they can take up fodder cultivation in their agriculture field.

7.2.2.3 Theme plan to meet fuel wood Demand:

The strategy would be twofold: 1. Immediate measures 2. Long Term measures

Immediate Measures:

LPG Distribution to the prioritized villages causing immense pressure to the core area. Linkage with District Administration for establishing distribution Center/ agency at strategic locations like Darrah station, Borabas, Dolia, Mashalpura, Gagron etc with an effective mode of distribution

To reduce pressure on forest wood, the L.P.G. supply outlets will have to be set up at least at the following places: Darrah station, Naulav, Rawatha, Chandbaori, Gagron, Mander Garh, Bhatwara, Borabas, Bhainsroadgarh, Sripura, Khera, Latiyana.

Minimum 20 gas connections will be given in above listed villages at suitable rate. It is expected that 5000 gas connections would be given for 5 years.

Improved Crematoria:

Nearly 8-10 quintals of wood are consumed in traditional cremation of a dead body. This amounts to consumption of large quantity of fuel wood. The villages and towns in and around the core are facing acute problem of fuel wood for cremation. The improved crematoria will save a considerable quantity of wood. Hence it is proposed to install at least one improved crematorium in at least 20 selected villages.

Improved Smokeless Chulhas:

Fuel wood is the only means of cooking food in this area. The conventional chulas consume large quantity of wood. To economize improved smokeless chulhas will be given to the adjoining

villagers. Minimum ten chulhas will be given in each village at a subsidized rate of Rs.20/- each. Before distributing the same demonstration would be arranged. It is expected that 500 chulahs would be distributed for 5 years.

Long Term measures:

Fuelwood plantations on charagah lands after consent from Gram Sabha based on silvi-pastoral model. The degraded forestlands may be taken up for fast growing species for fuelwood plantations.

Fuel wood Plantation:

Fuel wood requirements: The villagers in and around the tiger reserve use wood as main source of fuel. Approximately 1000 head loads are brought by villagers every day. The tree covers in revenue areas have been removed in the name of increase in agriculture production. This diverts the total pressure on the forest areas for fuel wood. With per capita consumption of 0.018 m^3 the annual requirement of fuel wood comes to 1280 cubic meters for the population of 71,104 living in and around the reserve. This fuel requirement will be met by raising fuel wood plantation in the buffer area.

The plantation Area:

A unit of 25 hectares each will be selected for plantation in the buffer zone over a span of 5 years. 40 units will be selected. Thus 200-hectare area per year will be taken up under this scheme in first 5 years.

Table-7.2 Choice of Species: The following species will be given preference in fuel wood plantation:

Ronjh – *Acacia leucophloea*	Desi Babool – *Acacia nilotica*
Tendu – *Diospyros melonoxylon*	Kair – *Acacia catechu*
Bamboo – *Dendrocalamus strictus*	

Village level site specific strategies:

Fuel wood plantation and fodder development: Fuel wood plantations and fodder development to be carried out in a unit of 25 Ha areas in the following villages as listed below. This will help in reduction of pressure on the core area to a great extent.

Table-7.3: List of villages for Fuel wood plantations and fodder development

S.No.	Villages	Teshil	Units	Area (ha)
1.	Haripura dandi	Jhalarapatan	1	25
2.	Morukalan	Sangod	1	25
3.	Morukhurd	Sangod	1	25
4.	Kishore Sagar	Sangod	1	25
5.	Bhatwada	RamGanj Mandi	1	25
7.	Baxpura	RamGanj Mandi	1	25
8.	Ghatoli	RamGanj Mandi	1	25
10.	Nayagaon	RamGanj Mandi	1	25
11.	Jhmara	RamGanj Mandi	1	25
12.	Amjahar	RamGanj Mandi	1	25
13.	Ranwtha	Ladpura	1	25
14.	Padampura	Ladpura	1	25
15.	Kothala	Ladpura	1	25
16.	Haripura	Ladpura	1	25
17.	Bhanwaria	Ladpura	1	25
18.	Dadwara	Ladpura	1	25
19.	Keshopura	Ladpura	1	25
20.	Nayagaon	Ladpura	1	25
21	Borabas	Kota	4	100
22	Lotiyana	Chittorgarh	2	50
23	Sripura	Chittorgarh	2	50
24	Rawath Bhata	Chittorgarh	2	50
25	Sanita	Chittorgarh	2	50
26	Bhunjar Kalan	Chittorgarh	2	50
27	Dhaneshwwar	Bundi	2	50
28	Karondi	Bundi	4	100
S.No.	**Villages**	**Teshil**	**Units**	**Area (ha)**
			40	1000

Development of Natural Fruit Areas:

It is proposed to develop natural fruit areas in the reserve. For this fruit species like tendu, ber, jamun, lisoda, gular, khajur etc will be promoted. Naturally available fruit groves in the reserve will be identified and developed. The cost structure for the development of such areas is mentioned in the financial forecast. Internal cost for different components may vary depending upon the requirements of the site, which will be decided on the basis of treatment plan prepared for the purpose. Local fruit bearing species will be planted in the treated area.

Fuel saving and alternate fuel devices:

To reduce the growing pressure on forests, it is essential to introduce extensive fuel saving devices in the surrounding villages and towns of MHTR use of improved stoves, LPG, use of pressure cookers, training of fuel saving cooking techniques will be imparted to villagers. Help of Kisan Vikas Kendra will be taken in this field.

7.2.2.4 Theme plan for Livestock Health care and breed improvement program:

The excess of grazing in buffer reduces the availability of food in the reserve and brings contagious diseases to wild animals. Large uneconomic cattle population maintained by the villagers should be replaced by small number of high milks yielding cross bred cattle. Such cattle will be stall fed by their owners. It is therefore proposed to undertake an extensive cattle breeding program by artificial insemination. Training to breeders including immunization of cattle will be imparted frequently.

Around CTH of MHTR villagers keep large number of cattle herds comprising of cow, buffalo and goats. Most of the cattle are unproductive and mainly responsible for habitat depletion. Existing cows and buffaloes have to be replaced by cattle breed improvement programme. Park management will work in tandem with Animal husbandry department and NGOs for this responsibility. Rearing of goats will be discouraged.

The programs proposed are:

Improving the breed of livestock and inculcating practice of stall feeding.

Immunization of the livestock:

To fulfil this objective full co–operation would be sought from the veterinary units of animal husbandry department functioning in Ladpura, Sangod, Ramganjmandi, Jhalarapatan, Rawatbhata, Bhainsrodgarh, etc.

Creation of Immunization Buffer:

An immunization buffer will be created around the tiger reserve in consultation with District Veterinary officials, Indian Veterinary Institute (IVRI) and Wildlife Institute of India. The concept of creating immunization buffer around tiger reserve will be initiated keeping in mind the principles of herd immunity which is as follows:

1. Herd immunity concept proposes that in contagious diseases such as Canine Distemper (CD) the chain of infection is likely to be disrupted when large numbers of a population are immune (vaccinated) or less susceptible to the disease (due to vaccination). Based on the advisory of NTCA on special drive in respect Canine Distemper Virus it is undertaken to taken prevent measures through immunization.
2. The rationale behind this is that the exposure of unvaccinated/susceptible animals (tigers in the case of tiger reserves) to infected animals shall be substantially reduced. Hence greater the proportions of individuals which are resistant/vaccinated/immune to the disease, lesser are chances of its transmission. In essence vaccinated animals stand as a firewall between tigers and stray animals.
3. A policy of herd immunity can be formulated for stray dogs and cats around tiger reserves to prevent the spread of CD and provide a level of protection to a vulnerable unvaccinated group like tigers.
4. The herd immunity threshold i. e. proportion of immune individuals in a population (in the instant case population includes all animals susceptible to CD including tigers) above which a disease may no longer persists needs to be arrived at in and around tiger reserves. Possible source of information can be retrospective data available with the local veterinary & animal husbandry office or colleges which shall help to see secular trends of CD cases in the said geographical area. Analysis of disease data can help establish:
    a. Virulence of the CD virus prevalent in the area
    b. The efficacy of commonly used vaccines to see number of cases contacting the disease in spite of vaccination. Empirical data of different diseases however has shown that vaccinating 70 to 80% of the population helps in reduction of transmission of the disease. This shall help in designing a vaccination protocol for the envisaged immunization buffers with optimum costs as the entire population need not be vaccinated.

5. If retrospective data is not available, then support from Veterinary Colleges/ Animal Husbandry Departments needs to be solicited for conducting a seroprevalence study of stray dogs and cats around the tiger reserve for CD. The sylvatic presence of CD in tiger reserves can be established by

   a. Retrospective data on wild animal mortality available with tiger reserve management.

   b. Screening of serum samples of tiger after blood collection subsequent to immobilization.

6. Site specific preventive measures can be taken keeping in mind the following factors:

   a. The CD virus is fragile and will perish above 20-25 degrees C in sunlight. Therefore, drying of fomites after washing is sufficient.

   b. Any case of death if detected in the buffer/adjoining areas, the carcass should be removed and the area disinfected by flaming or 1:30 solution of bleach.

   c. The CD virus is susceptible to chemicals such as 0.75% phenol, 1:30 bleach solution and detergents.

   d. Accordingly disinfectant baths can be put up at all entry points to the park for vehicles coming from outside, staff should be advised to maintain strict hygiene of their premises inside the reserve.

   e. Advisories in the form of hoardings, posters, leaflets in dailies can be issued highlighting common signs and forms of CD with graphics and with contact numbers for reporting if a CD case is suspected in and around the reserve.

7.2.2.5 Theme plan for Watershed development/Improving water table/Water harvesting in the buffer:

WHS:

Water harvesting devices like WHSs and ponds etc. shall be constructed. These structures will not only conserve soil and moisture but also provide drinking water facility for wild animals. In hilly parts and slopes small stop dams and loose stone wall will be erected to check soil erosion as well as to collect water in pools.

Talais (Earthen water pond):

There are many natural depressions available in the foothills. These depressions can be developed in the form of small or big WHSs / water ponds as per the availability of the site.

Development of other water holes:

Though rivers are available as mega water bodies, the reserve is also provided with other rivulets and water springs. During subnormal rain year, water crisis arises. Open well / tube well (with water trough) and guzzlers with solar pumps will be constructed at suitable places.

Talais:

Talais /pond will be taken up this not only ensures the water availability of the MHTR buffer but also helps in the improvement of water table in the adjacent villages. These activities must be taken up with the help of EDC so that people living in and around the buffer will get employment which can in turn support the livelihood of villagers.

WHSs:

Since area is drought prone hence to increase availability of during water to animals, it is proposed to construct WHSs in the buffer. This will not only ensure the water availability of the buffer but will also help in the improvement of water table in the adjacent villages. These activities must be taken up with the help of EDC so that people living in and around the buffer will get employment which can provide support to the livelihood of villagers.

Returns/Outcomes:

Grass and Fodder:

The average annual yield of grass is expected to be around three tonnes per hectare. Hence the production of grass from 5000-hectare pastureland will be 15000 tones. The value of this grass @ Rs. 50 per quintal is Rs. 7.50 Lac per annum. In outer areas the eco development committees can make grass banks and collect the money generated by sale of grass from these areas under supervision of the park management. This money can be used for further maintenance of these pasture areas developed outside the buffer.

Fuelwood:

In all 500 hectares of non-forest area can be brought under fuel wood plantations. These plantations will be harvested after 10 years. Anticipated production from these plantations will be about 10 metric tonnes of fuel wood and 5.0 cubic metre of small timber per hectare.

Increased Agriculture Production:

The eco development will help raising the water table in wells, thus providing more water for the agriculture. The stall feeding of cattle will provide more cow dung manure that will reduce expenses on manure. EDCs can form milk cooperatives and market their milk at higher rates.

Increased Yield of Milk and Milk Products:

With the better fodder production animal health care and improved breed of cattle, the production of milk will increase. This will help in developing a trade based on milk products.

Later EDCs may act as milk cooperative committees and market the milk at higher rates.

7.2.2.6 Theme plans for Income generating Innovative pilot projects:

Economic benefits through speed controlling devices on Highways operated by EDC's of buffer areas:

As per NTCA guidelines, speed detecting radar guns will be installed on the roads for detecting speed of vehicles and subsequent regulations. It is proposed that EDC's of the buffer areas may be empowered to operate the Radar guns with forest personnel, ex-military men and the fine accrued of the offence may be deposited in the account of the EDC of that village as per the Wildlife Protection Act,2003.

Legal Provision:

As per the Wildlife (Protection) Act, 1972 amended up to 2006 sec 60-A: Reward to persons(2) When a case is compounded under section 54, the officer compounding may order reward to be paid to a person who renders assistance in the detection of the offence or the apprehending the offenders out of the sum of money accepted as by way of compounding not exceeding [fifty percent of such money]

Sec 60-B. Reward by State Government:

The State Government may empower the Chief Wildlife Warden to order payment of reward not exceeding ten thousand rupees to be paid to a person who renders assistance in the detection of the offence or the apprehending of the offender/s, from such fund and in such manner a may be prescribed.

Vehicles to EDC's of buffer areas:

The problematic villages in the buffer area Borabas, Darrah station, Nayagaon, etc., may be prioritized and based on the population of unemployed, few tourist vehicles may be provided on

loan basis to be utilized for tourism purposes in the park and the benefit will flow to the villages. This would send a message in the peripheral areas that for tiger conservation the economic benefits are flowing to the people.

CHAPTER 8

ECO DEVELOPMENT AND LIVELIHOODS

8.1 Policy and Institutional Framework:

Introduction:

Mukandra Hills Tiger Reserve has many peripheral villages on all sides. The problems of these peripheral villages need to be addressed property. The management practices in the past attempted to keep the villagers away. The villagers residing in the vicinity have been dependent on this protected area. It has resulted in conflicts with the villagers. In response to biotic pressures on protected (core) area, a broad-based strategy of eco-development has to be adopted. The eco-development has two main thrusts i.e. improvement of buffer management and involvement of local people in developmental activities so that the negative impact on the core could be reduced.

A few eco-development activities to provide alternative fuel and fodder resource on the fringes of MHTR were executed. These also provided alternative livelihood opportunities for the local people. These schemes overlooked the participatory approach, which is fundamental philosophy of eco-development program me. At this juncture, we have to initiate the process of trust building and participation. These initiatives will generate initial trust of the local communities with the park management enhancing the understanding of the staff about the programme and generating base line information on the impact villages. The investments, so far, had been very low, sporadic & without proper micro planning. The real issues of management – conflict with people, could not be addressed.

Institutional Framework:

An elaborate institutional mechanism for implementation of the eco-development programs me in buffer areas of MHTR will be developed. This institution will ensure participation of different stake holders; quick decision making at park management & state level and will facilitate the implementation of eco-development programme at grass root level.

Specific issues to be addressed through eco-development

i) Reduced dependence of villagers on core area.

ii) Sustainable use of the resources of buffer.

iii) Alternative livelihood strategies.

iv) Amelioration of living conditions of villagers.

v) Community development work.

vi) Sharing of income of tiger reserve.

vii) Non- consumptive use of resources through eco-tourism.

viii) Specific investments in the key support sector of rural economy.

8.2 Livelihood support initiatives through village micro plans

a) **Participatory micro planning and implementation processes:**

Micro planning support teams composed of park personnel, collaborating NGOs and villagers (each team with at least one woman and with members able to easily communicate with village woman) would assist village communities to develop and implement site-specific reciprocal plan on a sustainable basis. Focused guidelines clearly determined investment criteria, supportive training programs and carefully scheduled planning will be ensured to meet the objectives of eco-development and to embody the active commitment & participation of local people.

b) **Methodology to be adopted for village eco-development**

1. Active participation of all segments of society in plan formulation and decision making through a community institutional framework of village ecodevelopment committees that elicits the widest possible consensus.
2. Participatory rural appraisal (PRA) focused on the mutual interactions and reciprocal arrangements between the management and people.

8.3 Integration of rural development programs

Various rural development programs are being implemented in the district under financial support of Govt. of India and with the plan funds of State of Rajasthan. Efforts will be made to channelize maximum funds towards the buffer area. National rural employment guarantee scheme is an important scheme flowing maximum funds to the rural areas. Focus will be to propose more & more eco-development works in buffer area under this scheme. Funds available under other social welfare & employment generation schemes will also be utilized in buffer area at optimum level.

8.4 Monitoring and evaluation

Monitoring and evaluation are two indispensable arms, which support and strengthen any management. Developing & using information base is essential step in deciding management

goals & objectives. It is expected that findings of a well-organized, rigorous scientific monitoring will help park management in the following aspects:

i) Status of implementation of scheme.

ii) Quality of works executed.

iii) Enhancement in benchmark knowledge

iv) Improve decision-making.

v) Reduce overall management costs & enhance benefits.

vi) Improve sustainability.

vii) Increase public awareness & people's participation.

An analysis of reciprocal commitments and obligations will be done to evaluate the works. The success indicators have to be evaluated whether these are in accordance with those anticipated at the time of micro planning.

CHAPTER 9

IMPLEMENTATION STRATEGY

9.1 State Level Monitoring Committee

There is need to constitute a State Level Steering Committee chaired by the Chief Minister of the State and can be represented by different departments operating in the region with Chief Wildlife Warden as Member Secretary and Assisted by the Field Director.

The monitoring of the eco-development works by a State Level Monitoring Committee shall ensure that there is synergy of operations between different government departments operating the area. This will prevent duplication of work and help in dovetailing of similar schemes to help comprehensive development of the area. This shall also help in sorting out problems relating to different departments in a quicker manner.

9.2 Tiger Conservation Foundation and District Level Coordination Committee

Wildlife Protection Act 1972 section 38(x) and NTCA guidelines, 2007 the Govt. of Rajasthan has constituted the Tiger Conservation Foundation under chairmanship of Forest Minister for the tiger reserve vide Notification No. F 8-20/2007/10-2 Dated 30-09-2010. The by-laws of the foundation have been formulated and duly registered. Due to very a smaller number of tourists to the tiger reserve the foundation does not have substantial funds to carry out its objectives.

A Foundation named Rajasthan Tiger Conservation Foundation at state level has been setup to cater to the needs of lesser-known Tiger reserves. Through govt. order no. p3 (16) forest/ 2022 dated 01-03-2023 the name of the Mukandra Hills Tiger Conservation foundation was changed to Rajasthan Tiger conservation Foundation Jaipur. Efforts must be made to collect the funds from the corporate under the CSR (Corporate Social Responsibility).

9.3 Formation of Eco-development Committees (EDCs), Confederation of EDCs and Other Supporting Institutions like Self Help Group (SHGs) and Nature Clubs

In the Buffer Area, Eco-Development Committees (EDCs) are in existence. But there is need to revive their capacity and functioning. The confederation of EDCs is functioning as FDA (Forest Development Agency). Efforts must be made to strengthen the EDCs for carrying out for eco development works in the buffer areas. The female members of the EDCs would be encouraged to constitute SHGs and livelihood activities will be financed through Micro Finance Institutions and Banks. In schools and colleges Nature Clubs will be formed in order to impart the concept of eco development and conservation.

9.4 Livelihood Support Initiatives through Village Micro Plans

Village level micro-planning is the foundation for the development of any village. The quality of the micro-plan determines the quality of the field output. Therefore, planning at the grassroots level should be done judiciously. At present the village micro-plans which are in use are in urgent need of revision due to the changed field level scenario. All the existing micro plans need to be revived after conducting a detailed field level PRA exercise conducted under the direct supervision of an Assistant Conservator of Forest and monitored by the Deputy Conservator of Forest, Wildlife.

The micro-plans would be aimed at conservation oriented developmental work encouraging partnerships with the local communities instead of giving one-sided support. The plan would be prepared for a period of ten years with a midterm review after five years. It would be ensured that the eco-development activities incorporated in the micro-plan are as per the needs and interest of a villager which can sustain for long-time.

Emphasis would be given on skill building activities at the individual and group levels so that they can function autonomously in future. Common concerns like creation of community-based plantation for greening of the village, community fodder land for livestock, water resource management, tourism and related issues etc could be taken up in the micro-plan. Any other issue of topical interest which shall have a bearing on the area in the coming days should also be taken up.

9.5 Integration of Rural Development Programme

Emphasis would be given to integrate the ongoing rural development programme in the buffer zone by different government/non-government agencies to avoid duplication of work and try that they work in coordination with each other.

9.6 Monitoring and Evaluation

Monitoring would be done by inter-range inspections as well as monitoring & evaluation team under PCCF (HOFF). Efforts would be made to develop an objective and measurable monitoring and evaluation criteria and indicators for the buffer area. Annual evaluation would be carried out to study the impact of management inputs in buffer area. This could also be done by external agencies other than the steering committee. After careful analysis of the results corrective measures would be undertaken to improve the overall management in the buffer area.

CHAPTER 10

MAINSTREAMING STRATEGY WITH VARIOUS PRODUCTION SECTORS

Introduction

Mainstreaming towards wildlife concerns should be understood as a process to integrate wildlife conservation with various production sectors of the buffer zone where the primary emphasis is not conservation. This will safeguard wildlife interests by ensuring habitat supplement in buffer areas i.e. beyond the core for tiger spatial land tenure dynamics. Further, it would also strengthen conservation by reducing the possible interface conflicts between various production sectors and conservation, which otherwise leads to wild animals' earning a 'pest value' and eventually getting eliminated from the area. Thus, mainstreaming of wildlife concerns in the outer buffer landscape is essential to prevent such area from turning into

'Ecological sinks'. Mainstreaming tiger (wildlife) conservation concerns in various production sectors is imperative for the buffer zone to be viable and let it fulfil its objectives. This will involve modification of developmental practices in the key production sectors to make them more 'conservation friendly'. The process is, sector as well as landscape specific. However, some generic suggested activities based on environmental guidelines issued by the Ministry of Environment and Forests for developmental projects in different sectors, are as follows:

10.1 Wildlife habitat

For mainstreaming habitat works, the following strategies will be followed:

1. Monitoring of wildlife/tiger presence or sign survey in standardized formats on a daily basis will be done.
2. Foot patrolling by staff to ensure protection is mandatory for any situation.
3. Exchange of tiger/wildlife presence data with core or nearby other divisions will be done.
4. Monitoring of water points for sign survey will be done every day.
5. Timely payment of compensation for livestock killings to reduce the retaliatory killing of wildlife.
6. Depredation by wild carnivores will be addressed and ex gratia payment will be given in time.
7. Regulation of livestock grazing in areas prone to wild ungulates' movements will be effectively accomplished.

8 Timely and proper payment of compensation for crop damage by wild animals will be given to the effected person/family.

9 Village forest committees will be directed to keep strict vigil on forest fires to avoid great disasters.

10 Review of wildlife status will be discussed in the meetings of forest development agency and further course of action will be determined.

11 Regulation of collection of non-timber forest products from the reserve will also be done

12 Monitoring of village cattle for disease will be done for prevention from epidemics

13 Maintenance of village level wildlife crime dossier is very important to enhance the knowledge base about the crimes of the area.

14 Protection of riparian margins, if any, as special habitat will be done.

15 Retention of old/dead trees as unique habitat has a great value. So these will be retained.

16 Staggering of forest stands belonging to different age groups will be maintained.

17 Maintenance of grassy blanks for herbivores' forage is necessary.

18 Incentives to local communities from the foundation fund will be given to keep up the enthusiasm

19 Accruing of funds through recycling of gate receipts, as a reciprocal commitment for villagers' involvement in addressing wildlife concerns, forming part of MoU with the tiger conservation foundation in the village level micro plan.

10.2 Agriculture: For mainstreaming the agriculture around park, the following strategies will be followed:

i) Adoption of 'eco-agriculture' model as a land use pattern to produce food as well as to conserve wildlife.

ii) Sudden change in cropping pattern (*viz.* lure crops) will be discouraged to avoid accentuating man-wild animal conflicts.

iii) Mosaic habitat *viz*. mixture of Fallow land, cultivation field, fruit orchard, plantation, under planting of shrubs, small timber etc. will be promoted to mimic natural forest.

iv) Provision of economic incentives for safeguarding wildlife concerns will be there.

v) Incentive for carbon, water and other environmental services will be given to local people.

vi) Ex-gratia compensation for losses due to wildlife will be given rationally and in time.

vii) Traditional farming will be encouraged for conservation.

viii) Use of green manure will be promoted, and use of chemical manures and pesticides will be discouraged.

viii)Marketing of local products will be facilitated through tiger conservation foundation.

ix) Rural tourism will be promoted, and involvement of local people will be ensured.

x) Use of market instruments through tiger conservation foundation (production certificate for organic products) for production, marketing etc. will be done.

10.3 Integrated Development

(i) Eco-development

Participatory village level planning and preparation of village level micro plans for eco development will be done. Providing inputs for resource substitution, income generation, community welfare and ecotourism for reducing the resource dependency of local people on surrounding forests through foundation will be done.

Ensuring reciprocal commitments with the local people through respective eco-development committees by keeping in micro plan the agenda for safeguarding wildlife interests.

(ii) Development through District Administration

This involves multiple sectors operating in the landscape pursuing development, where wildlife concerns have to be integrated through formal contracts/ agreements between the Tiger Conservation Foundation, district authorities and eco-development committees. The responsibilities of various parties will be spelt out in the contract/ agreements for safeguarding wildlife concerns along with reciprocal commitments. Normally, such contracts/ agreements will discourage any detrimental practice and assign responsibility to the community for carrying out some interventions. In return, the community should receive an assurance from the tiger reserve authorities to have access to certain natural resources in the area or benefits.

10.4 Eco-Tourism

For mainstreaming the tourism, the following strategies will be followed:

i) Development of ecotourism spots in buffer area.

ii) Facilitating wildlife ecotourism involving local host communities.

iii) Obtaining contributions from private commercial tour operators and lodge owners for local community development and conservation.

iv) Contributions from tour operators for maintaining tourist facilities, staff welfare, and conservation.

10.5 Industry- There is a no major industry in near the buffer area. The captive mines of which are located in the fringe area of buffer zone. Some small scale and cottage industries are also situated in the town. There is need to promote development of commerce in form of small-scale industries in adjoining area so that the dependency of local people on forest resources for their livelihood is reduced. Engaging local people in handicraft industry with micro financial support will be a preferred option for livelihood.

10.6 Irrigation projects:

There is only one minor dam used for irrigation purpose in the buffer zone. This dam called Sawanbhado dam is located near Kanwas. Following measures will be undertaken to mainstream wildlife concerns in the area.

i) Safeguards will be taken to prevent landslides on the periphery of reservoirs.

ii) Monitoring of recharge of ground water will be done.

iii) Silting and erosion prone areas will be identified, and preventive measures will be undertaken.

iv) Old trees in the impounded area will be retained to facilitate roosting of birds and fostering ecotourism.

v) Joint patrolling in the water body areas will be done with irrigation department.

10.7 Temple Pilgrimage – Pilgrimage is a growing problem in wildlife areas. In the buffer zone major pilgrimage site is Mandergarh temple situated in the Rawatha Range. Following strategies will mainstream it:

i) Master plan will be prepared and followed for normative approach for crowd regulation and visitors' facilitation.

ii) Proper garbage disposal will be ensured.

iii) Accommodation facilities for pilgrims in nearby Satellite townships will be provided.

iv) Architectural code of civil works as contained in the master plan should blend with the environment.

v) The key habitats, wildlife corridors will be avoided for pilgrimage purpose.

vi) Pollution of local streams and water bodies will be checked.

vii) Local shopping facilities to tourists through the Tiger Conservation Foundation, involving the Eco-development Committees, can be provided.

CHAPTER 11

RESEARCH, MONITORING, TRAINING & WILDLIFE HEALTH

Introduction

Research on natural and social science is essential for PA management. The tiger reserve management has to be equipped with all scientific data of exact status of park resources, ongoing ecological process, nature of threats and opportunities, etc. It will help in proper decision-making and adopting effective strategies to deal with various management challenges. For strengthening park management, Research and Monitoring are integral parts. Core of Mukandra Hills Tiger Reserve is a natural laboratory, and it has vast scope for research. It is also necessary to engage organizations like WII, WWF and WCS to conduct research around buffer areas.

11.1 Research Priorities, Main Projects and Implementation

The research priorities are in the following fields:

1. Creation of baseline data – The information regarding flora, fauna, their distribution, abundance, movement pattern, ecosystem type, ecosystem services, social values is lacking. So, top priority will be given to create the base line data. To do this help will be needed from reputed organizations and research institutes.
2. Landscape level studies – Studies will be conducted to know the landscape aspects and connectivity. It will reflect the present condition and from this model it can be simulated to know the future of wildlife in this landscape.
3. Ecosystem level studies – The Phyto-sociological studies in the park is also a priority sector, as there are a good number of endemic species found in and around buffer area. The different functions, aspects and critical biotic impacts are the other areas where research has to be given special emphasis.
4. Species level research – There is a huge scope to explore new species and their detailed ecological status and distribution over this geographical area. Along with this, different entomo-fauna, herpeto-fauna, mammalian species are there which require broad scale studies on their diverse ecological values and aspects.
5. Studies on Human dimensions – Anthropogenic factor are one of the major factors involved in any park management. The buffer is having human settlements, agricultural area, cash crop plantation and other such multiple land use areas. Extraction of natural resources from the forest areas is a usual practice of local residents. These practices along with livestock grazing

and poaching are having direct adverse effects on the habitat conditions and wildlife status of core and buffer. So, study should be conducted on the aspect of biotic impacts on animal movements.

6. Animals' behavioural studies – The ethology of the wild animals in human dominated areas, the ranging pattern, movement pattern etc. should be studied.

11.2 Monitoring framework

Monitoring is an indispensable arm that supports and strengthens tiger reserve management. It is expected that findings of a well-organized, rigorous scientific monitoring will help the tiger reserve management in the following aspects.

- Improve decision-making.
- Improve quality of management.
- Reduce overall management cost & enhance benefits.

An analysis of reciprocal commitments and obligation will be done during the monitoring process. The success indicators have to be evaluated whether these are in accordance with those, anticipated at the time of micro planning. A committee at tiger reserve level will do monitoring. It is suggested that eminent scientists and tiger reserve managers should be requested to serve on this committee.

11.3 Training needs assessment:

Proper training is required in following fields,

1. Crime investigation and filing complaints.
2. Intelligence network building.
3. Preparation of forest offence case files.
4. Monitoring methods including camera trap.
5. Wildlife forensics.
6. Management in other protected areas of the country.

11.4 Training programs

- Training of local people for skill transfer.
- Training of teachers for students.

- Training of forest personnel for eco-activities.
- Training of trainers for above approach methods.

11.5 Human resource development plan

To build up capabilities in human resources, trainings and exposures shall be organized in the National institutes of repute. Specific orientation towards research has to be developed. Persons having inclination towards research and monitoring have to be picked up and sent for specific training courses.

11.6 Wildlife health monitoring

It is essential to periodically monitor and survey the parasitic and infectious diseases in the buffer area. On the basic of these reports, park managers will be able to take necessary action to prevent the disease outbreak.

Following examinations are important for the evaluation of health & detection of diseases in wild ungulates.

1- General examination

a. Physical examination

b. Clinical observation

2- Laboratory test

a. Faecal examination.

b. Haematological examination.

c. Serological examination.

3- Study of kill

a. Detailed postmortem examination

b. Collection of material for laboratory examination.

11.7 Mortality survey

Detailed investigations will be carried out with reference to each mortality and action will be taken accordingly. Complete data will be kept, and analysis will be done as per the situation.

CHAPTER 12

TIGER POPULATION AND HABITAT ASSESSMENT

12.1 Daily Monitoring Protocol

Daily monitoring of forest habitats is primary operation of tiger monitoring. Forest watchers and guards must patrol a considerable area every day to identify the presence and absence of tiger and other co-predators and the effective habitats where they are leaving their indirect evidence. The forested area of buffer of MHTR tiger reserve will be divided into several census blocks to pursue systematic evaluation of tiger monitoring. For daily monitoring and forecasting at block level, following different activities are proposed to be carried out in the field:

1. Extensive survey will be carried out in all the regions at census block level to identify the potential habitats where tiger and other co-predators are migrating.
2. The field staff along with the regular patrolling duty will do this.
3. The presence/absence data of tiger and other co-predators will be gathered by both direct sightings and indirect evidence like pugmark, scat, scrape, rake mark, scent marking, vocalization, kills etc.
4. At least 10 pugmark impression pads (PIPS) will be laid in a census block, preferably in areas frequented by tigers & other co-predators.
5. The distance between two successive PIPs will be 1 km. The size of PIPs will be 3m×2m.
6. The PIPs will be monitored once a week for tiger and other co-predators' evidences (pugmarks/ scats) and camera traps (at least one pair in each block) will also be deployed.
7. Photographs of the individuals, in case of direct sighting, will be captured with digital cameras. Plaster casts of pugmarks will also be taken.
8. Sudden/drastic reduction in tiger and other co-predators' evidence must be conveyed to the range office and divisional office as warning and alarming information.
9. All the available data from daily monitoring will be kept in proper format with GPS location and direct sightings will be conveyed to the divisional office.

12.2 Tiger Population Estimation and monitoring framework (Phase I, II and III)

The monitoring framework for tiger and other co-predators is a multiphase process.

Phase I: Spatial mapping and monitoring of tigers, prey and habitat.

This stage consists of mapping of tiger presence and relative abundance, tiger prey presence and relative abundance, habitat quality and anthropogenic pressure at a high spatial resolution of 15 to 20 km^2.

Sampling for tiger, leopard, and another carnivore sign encounter rate.

Phase I contains intensive survey of the PA for the search of tiger, leopard or other carnivore signs. This target data is extremely easy to collect and require no high-level technical skills or equipment. Tiger monitoring team will primarily be responsible for the data collection. The Tiger monitoring team will be trained in the data collection protocol and will be tested for consistency.

To obtain data on presence, absence and intensity of use of a census block by tigers and other carnivores, the relative abundance of tiger, leopard, and carnivore signs in a block will be quantified. The following procedure needs to be followed for data collection:

- The total area under PA will be divided in to several census blocks and each census block will be considered as a sampling unit.
- Areas within the block that have the maximum potential for tiger/ panther occupancy will be intensively searched.
- Since tigers and leopards have a tendency of using dirt roads, trails, footpaths, riverbeds and 'nallahs', these landscape features, within the block, will be searched intensively.
- One to three persons who know the terrain and habitat features of the block should conduct the search for tiger/panther sign.
- There should be 3-5 separate searches (in different parts within the block and/or at different times 1-5 days apart), each search covering about 4-6 km distance in areas having the best potential for tiger/panther presence. It is important to record the distance covered and the time spent during each search separately and accurately. If time is spent in resting or in other activities, while conducting the search, this duration should be reported separately. GPS coordinates of the beginning point of each search path should be recorded.
- The total minimum distance covered, while searching for tiger and other carnivore sign, should be 15 kms per block.
- Tiger and leopard signs should be classified into the following categories

  1) Pugmark trails

2) Scats (Old: dry with hair and bones visible; Fresh: dry but intact with shiny surface; Very Fresh: soft, moist, and smelly

3) Scrapes

4) Scent marks (spray, rolling)

5) Rake marks on trunks

6) Actual sighting

7) Roaring (vocalization)

8) Kills (Predation on wild prey).

- On a terrain and vegetation cover like MHTR core, getting pugmark trail is little difficult. So maximum emphasis will be given on getting other signs.
- A brief description of the topography and forest type is to be recorded for each sign.
- In case of pugmark trails, each trail set will be considered as one sign (not each pugmark as one sign). In case, a tiger (or other carnivore) continues to walk along a dirt road for a long distance, then this should be considered as one sign, and a comment should be recorded in the remarks section of the data, regarding distance covered by a pugmark trail of a single tiger.
- Tiger and leopard signs if encountered outside the sampling route should also be recorded with GPS coordinates and with appropriate comments.
- Special emphasis should be given to signs of tigress and leopardess with cubs, and any authentic evidence of tiger cubs (sighting of cubs, lactating tigress, tracks, etc.) obtained within the past twelve months.
- While sampling for tiger and leopard signs, record should also be kept for signs of other carnivores that are encountered.
- The number of livestock that are killed by predators within past three months needs to be recorded in the questionnaire following the data sheet.
- It is important to report data sincerely. It is likely that there may be reliable information that tiger/leopard is present in the block being sampled, but no signs are recorded during the intensive search survey. In such cases, mention should be made in the remark's column of the data sheets. However, failure in obtaining tiger sign from a block is equally important as recording signs and for appropriate analysis of this data, the actual data should be reported.

Phase II: Spatial and attribute data:

The spatial and attribute data that are likely to influence tiger occupancy of a landscape will be used for modelling in a GIS domain. The vegetation map, terrain model, night light satellite data, drainage, transportation network, forest cover, climate data, normalized difference vegetation index, livestock abundance, human density, socio – economic parameters etc. will be used for modelling habitat condition and tiger occupancy. Beat wise vegetation sampling will be done to generate broad vegetation map. This modeling will help in determining current spatial distribution of tigers, potential habitats, threats to crucial linkages between occupied landscape & conservation planning.

Phase III: Estimating the population of tigers, its co-predators and their prey: Teams of researchers will be deployed in each landscape complex for estimating tiger and its co-predators' density and ungulate densities within stratified sampling units.

12.3 Habitat assessment framework -

This consists of:

a) Tiger presence and relative abundance.

b) Tiger prey presence & relative abundance.

c) Habitat quality and anthropogenic pressure at a high spatial resolution of 15-20 sq. kms.

A forest beat (an administrative unit), 15-20 sq.km in size, delineated primarily on natural boundary will be the unit of sampling. The sampling will be systematically distributed in all beats of forests of buffer area and adjoining revenue lands. Thus, the entire landscape where tigers & panthers are likely to occur/migrate is sampled. The detailed methodological approach for sampling other carnivore signs, pellet/ dung counts, habitat & anthropogenic pressure will be followed.

12.4 Spatial data base development

The spatial data generated shall be scientifically robust and amenable for statistical analysis & inference. Since several replicate surveys will be undertaken in each beat, we shall be able to model tiger occupancy, detection probability of tiger sign and relative sign density at a high spatial resolution. Since data will be analyzed in GIS domain, several spatial attribute like human density, livestock density, road network, topographical features, forest type & cover, meteorological data, poaching pressure and landscape characteristics will be used as covariates to model tiger occupancy and relative abundance in a landscape and individual forest patches. Time series

analysis of data at a larger spatial resolution is likely to have sufficient precision for monitoring spatial occupancy of tiger and its co-predators in association with changes in their prey, habitat quality and anthropogenic pressures.

12.5 Analysis and reporting framework

A tiger monitoring team will be constituted in buffer area. It will function as follows:

i) Concerned Range Officer shall coordinate the monitoring team in his range.

ii) Concerned 'naka' staff & watchers will accompany them.

iii) Asstt. Conservator of Forests shall be the overall in charge of the tiger monitoring team.

iv) Range Officer Research shall be the coordinator of the group. A technical committee for the monitoring activities of the teams will be constituted as:

Conservator of Forests & Field Director, MHTR	-	Chairman
Deputy Conservator of Forests, Buffer MHTR	-	Member
Asstt. Conservator of Forests	-	Member
All Range Officers	-	Member
Range Officer, Research	-	Member

Asstt. Conservator of Forests shall coordinate the field level monitoring. The final annual report shall be prepared and submitted to the Chief Wildlife Warden, Rajasthan and NTCA, New Delhi.

CHAPTER 13

PROTECTION AND INTELLIGENCE GATHERING

13.1 Deployment of native workforce

Different strategies have to be adopted for protection and intelligence gathering in a tiger reserve, by the management officials. One step will be direct implementation and control over the illegal activities by checking the culprits who are actually involved in committing crime, while another way is to reduce the crime by solving the problems/reasons for which these people go for poaching & other crimes. Different strategies recommended are-

i) For protecting the buffer area, the native residents will be deployed as security personnel/ Village Wildlife Volunteer (VWV) through EDCs.

ii) Promoting the concept and awareness of eco-tourism amongst the local communities and their direct involvement in it will be a good solution.

iii) Young boys and girls will be deployed in different activities of the eco-tourism wing, thus the threats towards conservation practices, from the local residents, will reduce.

iv) Eco-development committees will be constituted whose duties will be operation of tourism in the park. Different activities like selling the tickets, controlling the vehicle entry, avoiding the usage of non-biodegradable products and replacing them with biodegradable products, checking the actions of the tourists and suggesting proper behaviour are expected from these EDCs.

v) Local people will be deployed as guides and watchers in different activities like jungle patrolling, tiger trailing, nature walk & green walk, bullock cart ride and also in visit to rural heritage sites. Thus, local youths will be deployed in protection work as well as in revenue earning business.

vi) Consciousness towards biodiversity conservation will be spread through local youths.

The standard of life of the native communities will be raised both economically as well as ethically through proper education of their children. This process will reduce their dependency on the natural resource, and they will associate themselves in conservation actions. Thus, deployment of native workforce will help in sustainable management of MHTR.

13.2 Patrolling strategies including Joint Patrolling

Patrolling operations will be carried out through trekking as well as by motor vehicles/ bikes in different zones of the buffer area. Regular patrolling will be carried out for effective protection of valuable flora and fauna of the buffer area. Vulnerable locations will be visited regularly. The patrolling staff will be equipped with Rifle, Wireless sets, GPS, medicines. They will record every observation in course of their patrolling and will report regularly to the range head quarter through wireless sets. Whenever there is an emergency, the field staff will immediately report to the Range head quarter and depending upon the situation, all adjacent camps will join hands in tackling the situation. Measures suggested for effective patrolling are as follows:

i) Regular day and night patrolling and sudden checking will be carried out by each camp/chowki located in buffer region.

ii) Range officers of respective ranges of buffer zone will patrol the area at least twice a week.

iii) Joint foot patrolling will be done at least once in each fortnight with range staff of both buffer as well as core areas under the leadership of a range officer. They will search for all the wildlife signs and patrol vulnerable areas. They will also search for illegal activities if any.

iv) Supervising officers will do crosschecking of patrolling.

v) All existing patrolling paths will be cleared annually to provide safe passage to field staff for patrolling.

vi) The trekking paths will also be maintained every year

vii) Proper mapping of these patrolling paths and trekking routes will be done and if required, new alignment for effective patrolling will be done.

viii) Basic logistic support will be provided to field staff such as wireless equipment, search and torch lights, arms and ammunition, kerosene, jungle boots, medicines etc.

ix) Servicing of rifles and guns will be done as per requirement

x) Repair of wireless sets will be done as and when required.

xi) Ration will be provided to the staff in each camp.

xii) A ready stock of new torchlight's will be kept at the range headquarters for replacement of old and unserviceable torch and searchlights, and the defective ones will be repaired immediately.

xiii) At least 5 litters of kerosene will be supplied to each field camp every month and new hurricane lamps will be provided to replace the old ones, where electricity is not there.

xiv) Two pairs of uniform, one pair of jungle boots and two pairs of socks will be provided to each field staff every year.

xv) Other items of uniform such as raincoat, pull over etc. will be provided to staff in every two years.

xvi) A quality binocular will be provided to each camp to enhance the range of visibility for effective patrolling.

xvii) Night vision binoculars will definitely help in effective patrolling during night emergencies.

xviii) Construction of watchtowers at strategic locations will enhance the efficiency of patrolling staff.

xix) A mobile patrolling party of divisional head quarter will also check and cross check the areas covered by various other parties, in order to supervise their patrolling activities.

xx) Special protection parties will be organized.

xxi) A monitoring / daily observation register will be maintained in each patrolling camp, in which the field personnel will record their daily observations based on patrolling.

13.3 Maintenance of Village level Crime Dossiers

To control the illegal activities, a proper list of persons residing in the adjoining villages and having a record of forest offences will be prepared. For this purpose, police department sources may be referred, and their photographs should be kept in all respective range offices and division offices. Proper description of their address along with their identifying marks will be categorically written in proper format. For investigating any forest offence in adjacent areas, these people should be interrogated, and their alibi information should be collected from other residents. If a categorical list can be prepared in this way, it will help in both reductions of offences as well as intelligence gathering, as few poachers or offenders later on may become good informers to help the department.

13.4 Fire Protection

Accidental and man-made wildfires are quite common in the buffer area of MHTR. The vegetation types like grasslands and deciduous forests are more susceptible to forest fires. Based on the NTCA advisory on fire protection to control forest fires following strategy are proposed:

i. Existing fire lines in grass lands will be maintained by cleaning the lines in at least 3m-12m wide strip and work must be completed by February before the dry season sets in.
ii. Trekking paths that also act, as fire lines will be similarly maintained.
iii. Special firewatchers will be deployed during summer season through EDCs.
iv. During the daytime, extensive patrolling will be carried out to detect point of origin of fire if any.
v. Whenever any fire is detected, every effort will be taken up to extinguish it. It will be ensured that the staffs show no negligence in this regard.
vi. Whenever any patrolling staffs detects any fire, it must be conveyed over wireless to the respective beat, range and division office and the record must be kept in diary or patrolling record.
vii. Before start of the dry season, the divisional officer must hold meeting of all the rangers and beat officers to identify the fire prone areas and mount up vigil in such areas to prevent fire.
viii. Efforts should be made, through the eco-development committees; to influence the local villagers not to make any man-made fire incidents.

13.5 Intelligence Gathering and Coordination

Intelligence gathering is a very important tool for prevention of wildlife crime. Prior information of movement of poachers and illegal wildlife traders helps to initiate timely action to prevent the offence. It is also necessary to nab the culprits even after the offence has been committed. The success of protection depends on information gathered by the management. The mechanism of information collection, in most of the cases, becomes highly personalized and its effectiveness depends upon the initiative taken by the official concerned.

Some of the proposed strategies are as follows:

i) Maintenance of regular source of information by the Field Director, DCF, ACFs and Range officers for getting regular feedback about the miscreants. A reliable source will have to be specially maintained in each notorious locality that harbours poachers.
ii) Close collaboration with Police and Custom authority will be maintained.
iii) Assistance from NGOs, Wildlife enthusiasts and local people will be sought.
iv) Provision for suitable rewards to informers will be kept.

v) Suitable modifications in patrolling methodology of the field staff so that their movements and secrecy match with that of poachers.

vi) Well-equipped legal cell at FD office will be established for record keeping and disposal of cases of forest and wildlife offences.

vii) Soliciting support from villagers through mass eco-development activities in villages of buffer area.

viii) Secret list of persons with criminal track record/involved in poaching, whether convicted or not, will be prepared and regularly updated at Range level.

ix) A fund for operating secret information service will be maintained.

Since the illegal activities in the area are also related to neighbouring states, it is necessary to have coordination between various enforcement agencies like Police, Railway police, Customs, Director of intelligence etc. There should be one committee comprising of all these agencies to exchange the information. This committee should meet at least once in six months. For better management and protection, coordination among various line department and law enforcing agencies is required.

CHAPTER 14

ECOTOURISM AND INTERPRETATION

Now a day's most of the activities of the people are confined to their houses. Business or service one hardly gets a chance to be a part of nature. There are many people who have not really seen how a Jungle looks or what a thrill it is to walk and watch wild animals in the jungle. Gradually a lull to see and wander in the forest is surfacing in the society. Nature tourism is called "Ecotourism".

Living with the nature in camps, trekking and viewing wildlife would definitely be a source of adventure and environment education. It may not be possible for a stranger to have an idea about the forest and the nature on his own, the services of experienced person acquainted with nature and wildlife with a set of comprehensive guidelines is essential.

Existence of wildlife is an indication of biological health of an area. The recognition and understanding of inter relationship between flora and fauna by human beings is of utmost importance for co-existence and well-being of all the three.

Increasing tourism trends in wildlife areas brings about varieties of pressure threatening the very biodiversity of protected areas. Therefore, a well thought well planned and disciplined tourism is the need of the time.

The protected areas can only become sustainable with presence of friendly host communities around their periphery. The communities can become friendly if they are gaining economically, socially and culturally through the Eco-development programme and tourist activities.

Eco-tourism in context of Tiger Reserve is ecologically sustainable nature-tourism, which is emerging as an important component of tourism industry. It is distinct from mass tourism, having sustainable, equitable, community-based effort for improving the living standards of local host community living on the fringes of the Tiger Reserve. Eco-tourism is proposed to be fostered with financial support to the host community through soft loans from eco-development committees, in accordance with site-specific Eco-Tourism plan and carrying capacity of Tiger Reserve in the buffer areas. The Core would be used for tourism will only be utilised as per criteria prescribed by NTCA and this will also be phased out once the buffer tourism catches up with the core. It would require specific inputs in Buffer areas with development of habitat to augmentation of herbivore which could ensure better sighting to the tourists. The development of tourism related facilities within the buffer zone of the Tiger Reserve would continue with inputs under Project Tiger. The

opportunities for stake holders would include management of low-cost accommodation for tourists and showcasing the culture of the region.

Organization, Setup and Management

Tourism in MHTR will be managed by a tourism cell. For computer job work out sourcing will be done.

A proper system of advanced booking will be enforced so that there is no uncertainty and wastage of time at the entry point. For this-

(1) Tourism zones must be delineated.

(2) Routes must be laid out and tourists are to be restricted to these routes only.

(3) Trip time to be fixed to 4 hours only. Two trips to be allowed in a day, one in morning and one in evening.

(4) Only petrol Vehicles/Camper and canters of local Eco Development Committee will be registered by the park authorities and allowed to enter the park for a trip at the initial stage. Reservation of vehicles could be done well in advance.

(5) Till tourism gains momentum private vehicles suitable for the terrain will be allowed and fee will be collected as per the prevailing orders of CWLW Jaipur.

(6) MHTR is fortunate to have richness of natural beauty, flora and fauna accompanied with places of religious historical and archaeological importance.

14.1 Tiger Conservation Foundation and Management of Community Based Ecotourism Programme

Mukandra hills tiger conservation foundation came into existence by state govt. order no. P3 (8) forest/2012 dated 14-02-2018 and its draft of memorandum of association and articles of association were approved by Cabinet Order. No 11/2018 dated 09-02-2018. Through government Order No. p3 (16) forest/ 2022 dated 01-03-2023 the name of the Mukandra Hills Tiger Conservation foundation was changed to Rajasthan Tiger conservation Foundation Jaipur. The Tiger Conservation Foundation (TCF) would play key role in streamlining of tourism in the area. Also, the existing FMCs needs to be revived, and new FMCs needs to be constituted in the Reserve. Eco-tourism would be managed by Forest Management Committees in coordination with TCF. The TCF would act as a nodal agency and help in bringing together different government and non-government agencies on a common platform to help plan and execute organized eco-

tourism activities in the area. The TCF would aim to strengthen the local communities by capacity building and offering any other help which is required by them.

It would also deal with issues like:

1. The kind of tourism that is being practiced could actually qualify for ecotourism.
2. Development of carrying capacity for the area.
3. Periodic training programmes on eco-tourism conducted for tourism planners, operators and general public.
4. Periodic meetings with all the stakeholders may be carried out both at the beginning and closing of the tourist season to smoothen out any difficulties being faced as well bring about better coordination resulting in a better visitor experience.
5. Developing a formal mechanism of rewarding good tourist practices like acknowledging them publicly at functions like Earth Day, World Environment Day, World Biodiversity, World Forestry Day and Wildlife week.
6. Conducting EIA/ environmental audits for new/ ongoing eco-tourism projects.
7. Providing soft loans to village beneficiaries for fostering eco-tourism
8. Ensuring training programmes for the host community in:
    - Conservation awareness
    - Health and sanitation
    - Hospitality
    - Marketing & publicity
    - Code of conduct
    - Garbage disposal

14.2 Ecotourism Guidelines and Constitution of Park Welfare Fund

The NTCA guideline vide letter no. F 15-31/2012-NTCA dated 15-10-2012 regarding ecotourism is being broadly used as a reference to guide the ecotourism in the Tiger Reserve. For regulating Local Advisory Committee (LAC) would be constituted as envisaged in the above guidelines.

Following principles are to be used for carrying out ecotourism:

1. Tourism with minimum negative impact on the environment.

2. Educating the visitors regarding the conservation importance of the area.
3. Development of infrastructure in harmony with the local environment.
4. Maximize the benefit from ecotourism to the local people.

These broad guidelines have to be followed to ensure the following:

a) Establishing building codes in consultation with the *Panchayats* and local people to be encouraged. Structures with an exotic look causing visual pollution and noncompatible and unaesthetic architecture would be avoided.

b) The private entrepreneurs could be encouraged to go for Eco friendly lodges. These would be lodges which would be designed harmony with the natural surroundings and are constructed with little disturbance to the natural surroundings. They adopt the concept of rainwater harvesting, recycling, and encourage minimum use of non-renewable energy resources, Energy and water saving devices apart from proper sewage disposal. The lodges also need to abide by the planning restrictions, code of conduct and standards prescribed by the authorities.

c) Environmental, physical and social carrying capacities to limit the various developmental activities in the fringe area to be identified for eco-tourism.

d) Mechanism to ensure continuous monitoring of adverse effects of tourism for quick redressal could be devised.

e) A system to be developed for awarding of incentives among the tour operators, lodge owners complying with the tourism guidelines. Such operators /owners to be recognized publicly and some concession in fees based on recommendation of the State Government.

f) Sensitization regarding conservation of endangered species.

g) Control of noise pollution, chemical pollution and air emissions.

h) Reduced use of environmentally unfriendly items like asbestos, pesticides, inflammable material.

i) Providing appropriate interpretive service to visitors for communication with nature and local culture.

j) Ensuring proper marketing of eco-tourism products.

k) Ensuring training of staff on environmental issues.

l) Ensuring safety and security of visitors.

m) Respecting local inhabitants, culture and involving them in various activities as far as possible.

n) Sensitizing the tourists to respect the rules and regulations and local traditions.

Constitution of a Park Welfare Fund

The TCF could be empowered to collect all the gate receipts from tourism once started. These shall then be ploughed back into the Tiger Reserve for the development and maintenance of ecotourism related assets. In addition to the above, a Welfare Fund could be opened for the Welfare of the local staff and the fringe dwellers actively working in the Tiger Reserve. The Fund would cater to the requirements of the field staff like capacity building, medical expenses, and hostel for school going children, scholarship for meritorious students etc. This welfare fund would also be able to accept donations from private parties for the said purpose.

Tourists could also be encouraged to donate to such funds which may then be used to improve the existing tourist facilities and developing new ones.

Action points for planning eco-tourism

The development of an over-all eco-tourism strategy would incorporate following action points:

- Local participation
- Sound environmental design
- Visitor management
- Conservation Education
- Training
- Financial sustainability
- Monitoring & Evaluation
- Assessment of existing tourism situation and potential.
- Assessment of desirable tourism situation and identify steps to maintain the same.

Eco-tourism Strategy

Foremost work would be to develop a Participatory Community Based Eco-tourism strategy for the buffer zone through stakeholder's meetings and workshops. The eco-tourism strategy would address following:

- Potential PA attributes vis-à-vis eco-tourism.

- Identification of sites
- Development of monitoring mechanisms for ecological impacts of ecotourism.
- Visitor information and levels.
- Identifying marketing opportunities.
- Development of guidelines for visitors/staff viz; visitor centre, orientation centre, brochures, handbooks, signages etc.
- Development of mechanisms to collate visitation data for management.
- Development of guidelines/building code for environmentally acceptable and culturally appropriate designs.
- Identification of staffing levels for tourism, future requirements and training needs.
- Identifying institutional arrangements for eco-tourism management, mechanisms to increase long-term local participation in benefit sharing and decision-making, local training needs.
- Developing monitoring and evaluation of plans to assess local participation and benefit sharing.
- Evolving legal framework for eco-tourism activities.
- Establishing administration and legal requirements for zoning, entry fees, and revenue sharing with indigenous people.

Proposed initiatives under Ecotourism

1. Involvement of local people as route guides, trackers, vehicle drivers, and small cafeteria owners, as petty shop keepers, as managers, labourers in grocery shops, resorts, and cafeteria should be encouraged. Establishment of an Interpretation centre, eco-centre or orientation centre.
2. Creation of Nature trails, cycle trails, pedestrian tracks in the proposed area of buffer zone.
3. Creation of Amphitheatre for film shows, folk dance, folk art etc.
4. Development of communication materials, literature package, books, documentaries on local aspects.
5. Development of souvenir shop.

14.3 Interpretation Programme

It is important to convert a tourist visiting the buffer zone into eco-tourist. This is possible by interpretation programme. At present there is no interpretation centre in the Buffer zone. There is need for having an interpretation centre in the buffer after proper assessment of the area. Nature interpretation forms one of the most important components of Ecotourism.

According to Freeman Tilden (1977), Ecotourism can be defined as 'An educational activity which aims to reveal meaning and relationship through the use of original objects, by firsthand experience, and by illustrative media, rather than simply to communicate factual information".

The different tools and techniques for interpretation are through appropriate signage, pamphlets, interpretation centers, audio visual presentations, publications, museums, discussions, etc depending on the type of target audience.

14.3.1 Park Interpretation Programme

Interpretation programme is to be implemented in MHTR through:

- Interpretation Centre at Kota for which provision of Rs 100 lakhs has been kept.
- Park safari by modified 4-wheeler and Canter
- Visit of Fort and Temple
- Boating in Chambal River
- Nature trails Publications of brochure, poster, sticker, etc. for MHTR.
- Amphitheatre in the forest complex.
- Eco-centre or information centre – Biodiversity training centre.
- Library
- Way side exhibits
- Signages
- Nature and souvenir shops etc

14.4 Nature Education

Objectives

Nature education and tourism development program is proposed in this project with the following objectives.

- To promote nature tourism among all sections of the society.
- To develop a sense of appreciation for all living beings.
- To promote understanding and appreciation of the tiger reserve and its significance for cultural, religious and recreational purposes.
- To promote public understanding and support in Favor of policies and programs being executed for the preservation of the tiger reserve.
- Creating a source of income to the local communities.
- To dispel the fear from wild animals and encourage sympathy, support and love for wildlife as a whole.

THE STRATEGIES:

For achieving this goal analysis of the infrastructure of the park and facilities as regards the accommodation, food, and movement in the park and guide services to be provided will be carried out. Identification of the places to be developed for tourism, assessment of kind of information the visitors would look for and message to be communicated to the visitors will also be taken note of in these proposals.

Identification of Zone:

For promoting tourism in MHTR, following aspects have to be developed so that visitors get attracted and carry desired message of nature conservation. Under the "Nature Education Campaign" in MHTR the following activities will be taken up:

(a) Wildlife safari

(b) Nature education camps.

(c) Trekking.

(d) Wildlife viewing.

(e) Horse or camel safari.

(f) Herbal medicine.

(g) Botanical excursions.

(h) Walking on Nature education Trail.

(i) Bird watching

Infrastructure Development:

For proper management of the park, basic infrastructure is necessary. Development of view places, rest places, nature trails, track, routes, construction of watch towers and hides at strategic locations, training of staff and guides for conducting nature trails and camps, printing of publicity material etc. are things which are necessary to promote tourism and nature education. Apart from these promotional activities will be taken up during wildlife week as well. A dormitory will be constructed at Darrah for regular eco – education trips of students from neighbouring areas.

Facilities for the tourist would be developed in the administrative zone and ticketing stations.

The following activities will be taken up for the interest of the tourist and native education groups:

A. Trekking and trail walking, specially, during rains & winters

B. Nature quiz.

C. Watch tower and water hole observation.

D. Plants species identification and information's on medicinal plants.

E. Guided tours on selected tracks.

F. Participation in census operation

Regulation, Monitoring and Evaluation:

Fee structure:

Fee structure for entry, still and movie cameras, vehicles and other charges will be taken according to order of Govt. of Rajasthan.

Program evaluation:

Program evaluation and feedback system will be introduced and information thus obtained will be regularly processed to improve upon nature education and tourism.

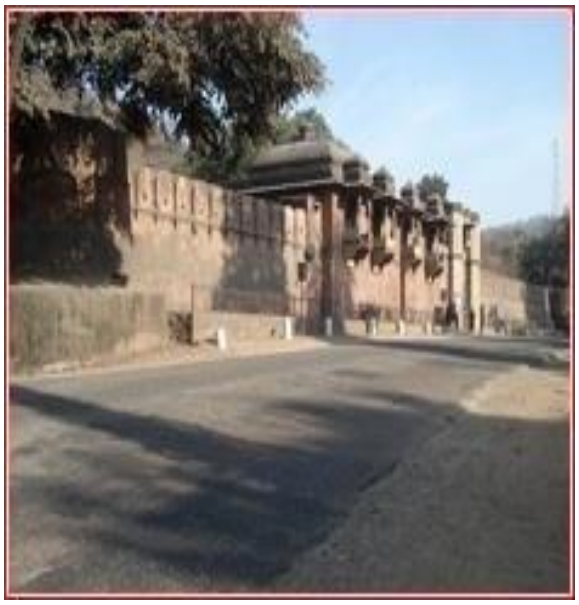
Regulations:

The following regulatory measures will be adopted:

- There will be a Ban on night stay inside the Tiger Reserve.
- Flow of Tourist will be guided to pre – decided routes only.
- Other activity related to eco –tourism will be regulated as per law.
- Religious tourism inside the reserve will be regulated.

Plate-14.1: Heritage sites in MHTR

Gagron Fort



Abli Meeni Mahal

Rawatha Mahal

Badoli Temple

The rich cultural and historical heritage of the area attracts people from other states of India as well as from all over the world. Tourism has over the past decade emerged as a key sector in the National Parks. The tourist traffic in the park has been growing over the last few years.

So far tourism in MHTR has been attracting domestic and foreign tourists in small numbers but looking to the enchanting beauty and splendour of the picturesque forest wealth presents in the surrounding sanctuaries and reserve forest areas, there is still a lot of scope for opening avenues of tourism related to nature and forests. The development of "Green Tourism" or Eco- Tourism will not only enhance the tourist arrivals in the district but will also earn sizable foreign exchange together with employment generation largely in an around the reserve giving benefit to rural population living in and around the park.

Guides

Nature guides will be selected from local Eco Development Committee and registered by the park authorities. The guides will be compulsory with each vehicle.

Vehicles

Two types of vehicles, i.e., modified 4-wheeler and 16/20 seat canters (mini canters and minibuses) will be permitted in the park.

Table-14.1: Comparison of modified 4-wheeler & Canter:

Modified 4-Wheeler	**Canter**
Advantages	**Disadvantages**
Less air & sound pollution per vehicle	More air & sound pollution per vehicle Noisier, disturbs tourists since noise is less tolerable
Better satisfaction of the tourists since vehicle is less noisy, the noise of the vehicle is more tolerable	Disturbance from the fellow tourists is more
Better satisfaction to tourists since disturbance from fellow tourists is less	Privacy is not assured since the group is large
Privacy of the tourists is assured	The diverse interests of tourists cannot be satisfied
More freedom to pursue special interests, little chance of clash with interests of tourists	
Delays before entering the park are less	Delays before entering the park are more since tourists are lifted from various places
Erosion of forest tracks per vehicle is less since vehicle is light	Forest Track damage per vehicle is more since vehicle is heavy
Satisfies the ego of VIPs and rich people	The rich people and VIPs feel as if they are commoners

Can run on all designated forest tracks	Canters cannot run on all designated forest tracks
Suitable for professional photography	Professional photography cannot be done unless the whole group comprises of photographers
Control by nature guide is better since tourists are less	In case nature guide is not good the tourists may become unruly
Close one to one communication with nature guide	One to one communication with nature guide is difficult
Creates less turbulence behind the vehicle, thus, disturbance to dust is lesser in case vehicle is moving slow	Creates more turbulence behind the vehicle, thus disturbance to dust is more.
Disadvantages	**Advantages**
Limited seating capacity, hence large number of vehicles are required resulting in higher frequency of disturbance to the animals	Can accommodate large number of tourists, hence a smaller number of vehicles are required implying less frequency of disturbance to the animals. One canter can accommodate tourists equivalent to 4 or 5 modified 4-wheeler
Large groups cannot be accommodated on same routes which causes dissatisfaction.	Group satisfaction is better since the group is able to share same experience on the same route; it is better option for group entertainment.
More chances of violation of rules since nature guides & drivers can easily be lured.	Less chances of violation of rules
A Modified 4-wheeler can rush quickly to the spot where tiger is being sighted. Since it has high manoeuvrability breaking speed limit rules and behaving unruly is possible.	Less manoeuvrability, hence, cannot rush to spot where tiger is being sighted
Modified 4-wheeler is risky in case a enterprising driver takes it very close to the tiger.	Canters are safer due to its height
wildlife viewing is poor since its height is less, tourists stand on seats & even on the top to view animals creating a situation of risk.	wildlife sighting is better since seats are high
Not effective for educational trips, educational value of modified 4-wheeler tour is poor but good for conducting surveys.	Better for educational trips, more educative in case nature guide is proficient.
modified 4-wheeler can go cross country for sighting tigers leaving designated tracks, thereby damaging habitat	Canters cannot go cross country and off the tracks hence less damage to habitat is caused by canters.
The trip incurs a higher cost.	The trip is cheaper
Seating in modified 4-wheeler is crowded and uncomfortable	It has more space and is less crowded.

Problems of Management of Tourism:

The staff cannot communicate in English, thereby; communication with tourists directly is inadequate. Due to language problem staff is unable to provide requisite information to the tourists. The behaviour of the staff is sometimes improper which is unpalatable to the tourists and others. Staff is overburdened because of shortage of manpower. They have to work hard from early morning to late evenings, thus, reducing their efficiency.

Roster System of Vehicle:

The Roster system is an assured business activity. The local people won't be getting benefited because of the business opportunity. At the most the local people are engaged only as drivers. For sustainability of the park, local people should get maximum benefit. It should not become yet another business opportunity for the people with money and the greedy. Only the locals who are drivers as well owners should be allowed to register the vehicles to ply in the park. This ensures maximum involvement of the needy local people in protection of the park.

Tourism Methodology:

- Tourists will be allowed in the park on through registered vehicles only.
- Trekking/camping/adventure tourism is not in vogue.

Closing season:

The core area of park will remain closed for tourists from July to September every year.

Tourism Facilities:

Kota is well connected by train from Jaipur, Agra, Delhi and Bombay. It is also well connected by road with Jaipur, Agra and Delhi. From low cost to luxury class hotels have come up in Kota for the tourists. Tourist reception centre run by the Tourism department facilitates tourists and provides them required information. One Interpretation centre has been constructed at Garadiya Mahadev Temple. Lack of state of art Interpretation centre is also felt by the tourists. Tourists need to be tackled by trained and reliable group of persons in a sophisticated manner. Tourists still approach the forest department for correct information and guidance.

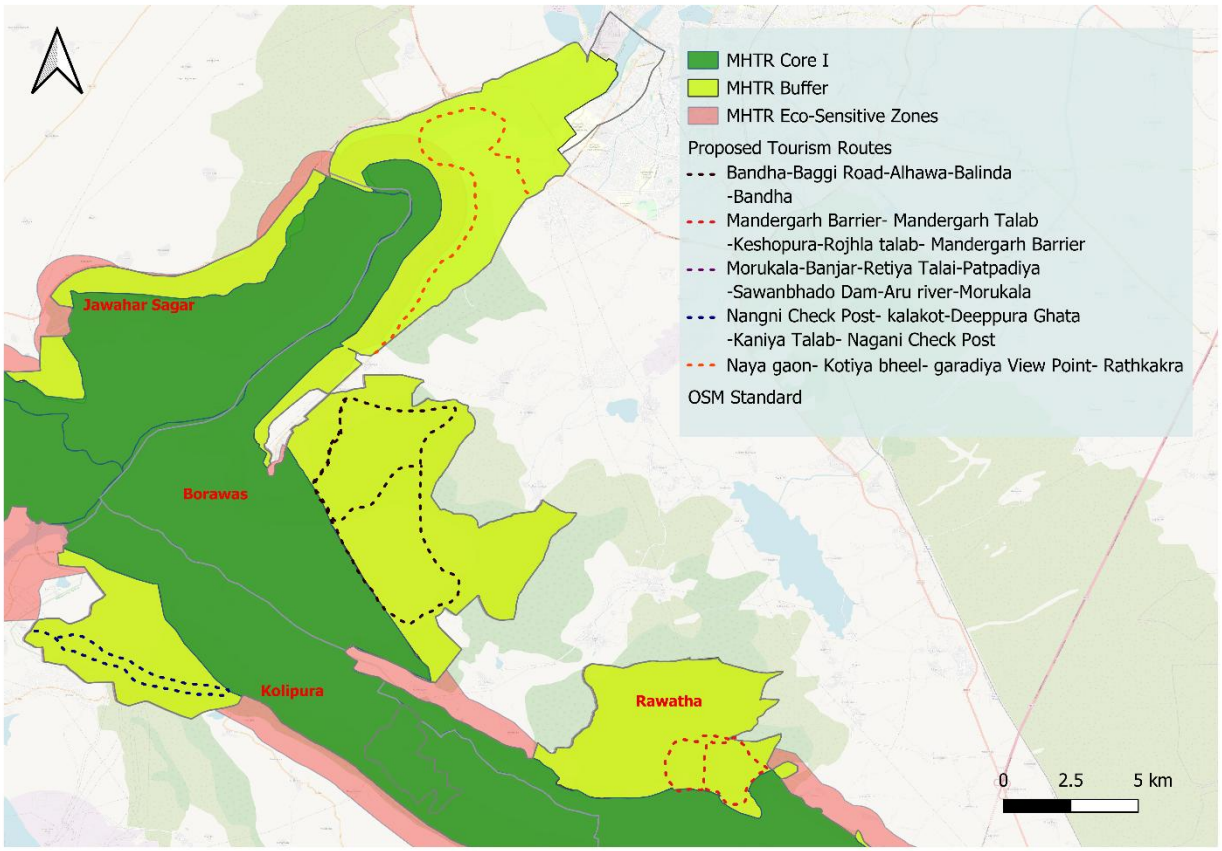
Tourism Zone:

The proposed tourism zones in MHTR are as follows

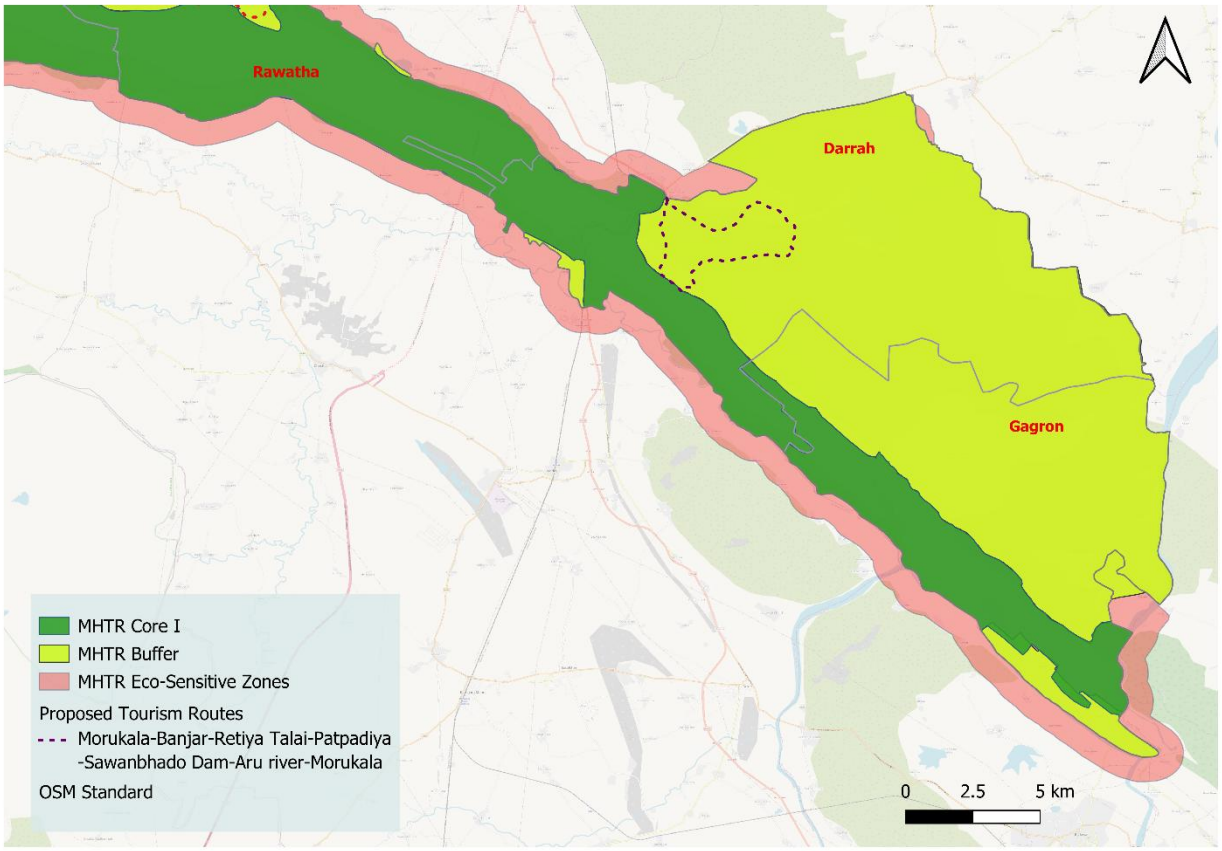
1. Bandha-Bagghi Road-Akhawa-Balinda-Bandha
2. Nagani Check Post-Kalakot-Deeppura Ghata-Kaniya Talab-Nagani Check Post

3. Mandergarh Barrier-Mandergarh Tabla-Keshopura-Rojhala Talab-Mandergarh barrier
4. Morukalan-Banjar-Retiya Talai-Patdaiya-Sawanbhado
5. Daulatganj-Kotya Bhil-Garadiya viewpoint-Rathkankra

All these routes are fair weather tracks, which normally takes one full day time for up and down. These are to be maintained every year after the rains to keep them usable.



Map 14.1: Tourism Routes in the Buffer Zone Borawas, Jawahar Sagar, Kolipura and Rawatha ranges



Map 14.2: Tourism Route in the Buffer Zone of Darrah range

Research need for Eco-tourism activities & carrying capacity -

The primary objective of wildlife management is to protect and conserve wildlife and its habitats. For environmental education and environmental awareness activities tourism is promoted in protected Area. More tourism may adversely affect the conservation of wildlife. Hence well thought eco-tourism programme is necessary to improve the financial condition of surrounding host communities and raising fund for wildlife management without causing adverse impact on wildlife and its habitat. The core area of MHTR is very small so scientific research is necessary to propose eco-tourism activities in the protected Area.

For the Park Management:

The following operational guidelines are proposed:

The eco-tourism planning should be flexible, site-specific and participatory, and should form part of a larger eco-development/ eco-regional plan for the area

Assessment of existing infrastructure, surface transportation, air service, road, electricity, water supply, law and order situation

The eco-tourism package should invariably include:

- Simple, adequate boarding and lodging facilities, in tune with the environment and the general setting of the landscape
- Road network within the identified tourism zone
- Self - guided Nature trails
- Transportation options
- Interpretation Centre
- Way-side exhibits
- Signage
- Observation towers
- Public conveniences
- Garbage disposal facility
- Living quarters for staff/ personnel
- Structures with an exotic look causing visual pollution and non-compatible and unaesthetic architecture should be avoided
- Site-specific micro - planning for community based eco-tourism should be resorted to
- Providing soft loans from the “Foundation” to identified beneficiaries
- Temporary housing structures blending with the surrounding should be encouraged Environmental, physical & social carrying capacities to limit the various developmental activities in the fringe area to be identified for eco-tourism
- Mechanism to ensure continuous monitoring of adverse effects of tourism for quick redresal should be devised
- Recognize eco-tourism operators, provide incentives to deserving cases and award quality labels

Provide visitor information & interpretation services (bilingual) covering:

- “Do's” and “Don’ts”
- What to see?
- Where to see?

- (Brochures, leaflets, guide service, visitor centers)
- Periodic training programmes on eco-tourism should be conducted for tourism administration, planners, operators and general public

Ensuring training programme to the host community in:

- Lodge ownership/ management
- Basic education and awareness
- Health and sanitation
- Skill development for preparation of local souvenirs as appropriate
- Codes of conduct
- Forest and wildlife conservation
- Litter control
- Forging partnerships with tourists & tourism industry
- Environmental management
- To evolve and implement eco-tourism package in a few selected sites initially as pilot projects

For Tour Operators/ Developers

- To abide by the planning restrictions, codes and standards prescribed by the authorities
- Implementation of desired environmental principles through regulation
- Conducting EIA/ environmental audits for new/ ongoing eco-tourism projects
- Being sensitive to the conservation of endangered species & corridor value of the area
- To ensure construction of structures blending with the environment as per the prescribed building code
- To take into consideration the carrying capacity and sociological use-limits of the site while creating tourist facilities and ensuring safety & convenience of tourists.
- To use local material and design as far as possible, while avoiding over construction.

  The planning, architectural design and construction of tourist facilities should use eco-friendly techniques viz., solar energy, recycling of garbage, harvesting of rainwater, natural cross ventilation instead of AC, self-sufficiency in food through kitchen garden & farming.

- Energy & water saving devices should be used apart from controlled sewage disposal.
- Control of noise pollution, chemical pollution and air emissions.
- Use of signages/ boards as per the standard prescriptions in the code.
- Reduced use of environmentally unfriendly items like asbestos, CIS, pesticides, inflammable material.
- Respecting the historic and religious sites in the area.
- Providing appropriate interpretive service to visitors for communication with nature & local culture.
- Ensuring proper marketing of eco-tourism products.
- Ensuring training of staff on environmental issues.
- Ensuring safety and security of visitors.
- Respecting local inhabitants, culture & involving them in various activities and vocations as far as possible.

For the Visitors

- Abiding by the code of conduct, “Do's” & “Don’ts”
- Helping conservation, apart from protecting any site natural or cultural, this may be adversely affected by tourism
- Avoiding wastage of resources
- Avoiding littering & carrying back all non - degradable litter - Leaving the camp sites clean before departing
- Avoiding removal of plants, seeds, drift - wood from the site
- Respecting local culture/ customs
- Respecting holy places
- Strictly adhering to the safety precautions

For the Host Community:

- Respect the value of environment and cultural heritage
- Avoid overusing the area

- Co-operate with the authorities in ensuring healthy eco-tourism
- Realize and react to the threat of investors who see opportunities and exploit the locals
- Be friendly with the visitors as effective “nature guides” & “conservationists”
- Park Interpretation programme
- Development of PA-level Participatory Eco-tourism & Visitor Strategy

Action Points for Planning

The development of an over-all eco-tourism strategy will incorporate the following:

- Sound environmental design
- Local participation
- Visitor management
- Conservation education
- Training
- Financial sustainability
- Monitoring & evaluation
- To assess the existing tourism situation and potential
- The desirable tourism situation and identify steps to attain the same
- To prepare a Participatory Community Based Eco-tourism strategy for the project area, involving the stakeholders through meetings & workshops - The eco-tourism strategy should also address the following:
- Potential PA attributes vis-à-vis eco-tourism
- Identification of sites
- Development of monitoring mechanisms for ecological impact of eco-tourism
- Visitor information & levels
- Identify marketing opportunities
- Development of guidelines for visitors/ staff viz., visitor centre, orientation centre, brochures, handbook, signages.
- Development of mechanisms to collate data of visitors for management.

- Development of guidelines/ building code for environmentally acceptable and culturally appropriate designs.
- Identification of: staffing levels for tourism, future requirements & training needs.
- Identifying institutional arrangement for eco-tourism management, mechanisms to increase long-term local participation in benefit - sharing and decision-making, local training needs
- Developing, monitoring & evaluation of plans to assess local participation & benefit sharing
- Evolving legal framework for eco-tourism activities
- Establishing administration and legal requirements for: Zoning, entry fees, revenue sharing with indigenous people

Eco-tourism Package for the Buffer Zone:

Community based eco-tourism is important in the present context. The host community should be actively involved in conservation and eco-tourism planning. Professional and technical training should be imparted to the local people to ensure them a sustained income from ecotourism initiatives, apart from giving a respectable status.

There is more scope for involving the host community in several activities, viz. owners of modest tourist accommodation, catering (ethnic dishes), souvenir making, cultural events etc. There are several examples of local community involvement in eco-tourism, like Nepal (Annapurna Conservation Area, Sagarmatha National Park), Canada and South Pacific (Fiji group).

For the Visitors

The following facilities would be provided to the visitors in the buffer zone, as a part of the buffer zone eco-tourism package:

Nature Trail

Four nature trails of almost 2–8 km have been designed. These trails will enable the visitors to feel the forest by trekking and closely observing the trees and birds, which are found inside the park. A field brochure highlighting the interpretative points would be provided to the visitors.

Horse/ Camel/ Camel cart Rides

Horse/ Camel/ Camel cart Rides would be made available to identified beneficiaries by providing loan from the Foundation/ EDC. The beneficiaries would be trained in the housekeeping and maintenance.

Ethnic Art/ Folk Dances

Talented beneficiaries will be provided loan for skill development and to foster talent, which will serve as added attractions to the visitors in the area, apart from generating income.

Problems

Unplanned tourism in an area of conservation significance may lead to conflicting objectives. Different categories of tourist's viz. casual tourist, hard core and dedicated nature lovers and religious tourists are expected to visit the Sanctuary, once it is organized. The casual tourist may cause disturbance to the nature if their activities are not regulated. Disposal of waste by tourists, including plastic carry bags and other similar things is injurious to the health of the reserve. In order to minimize these problems, the tourism will be allowed in a controlled and regulated manner only.

CHAPTER 15

ORGANIZATIONS, ADMINISTRATION AND BUDGET

15.1 Organization, Setup and Management

To facilitate coordination and mainstreaming wildlife concerns of various production sectors in buffer zone, two committees have been proposed, namely State level Monitoring Committee and District level Coordination Committee. Coordination will be established among committees of core and buffer for better working. The Mukandra Hills Tiger Foundation will look after the matters of eco development, research etc. in buffer zone also. In the executive body of Mukandra Hills Tiger Foundation, there will be representation from buffer and connectivity area also.

15.2 Coordination with EDCs, Confederation and other Line Agencies/ Departments/ Production Sectors

A confederation of EDCs of different villages will be formed. Field Director MHTR and Dy. Conservator of Forests Mukandra National Park will coordinate with different departments of the State Government and other institutions & non-Governmental organizations for conservation of MHTR and its buffer area. Mukandra Hills Tiger Foundation will ensure this coordination and will try to concentrate the flow of funds for development of buffer area.

15.3 Fund Raising Strategies

Mukandra Hills Tiger Reserve gets funds from Central Government as well as State Government under various Plan and Non-Plan schemes, but no funds are being received specifically for development area. Various forestry works are, however, being undertaken under regular plan schemes and NREGS. Funds can be received but not limited to the following schemes:

CENTRAL SECTOR:

1) Development of National Parks & Sanctuaries.

2) Project Tiger Scheme.

3) Eco-development Scheme.

4) National Rural Employment Guarantee scheme (NREGS)

5) Integrated forest protection scheme.

STATE SECTOR:

1) Preservation of wildlife in Rajasthan.

2) CAMPA

3) NABARD

4) MJSA/RJSA

Following other sources can also be explored:

1. The Mukandra Hills Tiger Foundation can directly receive funds from various national and international donor agencies, NGOs and private sectors.
2. **Ploughing back of revenue earned**- Part of revenue earned from tourism shall be ploughed back for development of core & buffer of MHTR.
3. **Income from Hotels** – Hotel situated inside the MHTR and in Eco-sensitive zone of MHTR can be charged with additional fees (Green Cess) ranging from Rs. 500 to Rs. 3000 per month per room.

15.4 Schedule of operations:

Sanctioned works will be executed as per schedule of time. Following is the proposed time schedule:

1. Soil & moisture conservation works Before rains
2. Desiltation of water holes, nadis & anicuts Before rains
3. Eradication of unwanted species During and after rains
4. Clearing & maintenance of tracks After rains
5. Cutting of fire lines in winter
6. Construction of water harvesting structures After rains
7. Repair of buildings After rains

MHTR proposes an Annual Plan of operations every year, based on the various strategies envisaged in the management plan. Govt. of India also sanctions the grant, but timely allocation of funds never takes place. Sometimes it reaches as late as in October. As a result, timely execution of works becomes impossible, and half of the crucial period just goes waste.

15.5 Activity Budget:

Activity wise financial requirement for execution of various components proposed in this Tiger Conservation Plan. Detailed Plan Added in Annexures-1.

Items of budget components are as follows:

Recurring cost (Maintenance cost)

i) Treks & Roads

ii) Expenditure on protection forces – Ex-army man

iii) Fire protection

iv) Cattle kill compensation

v) Crop compensation

vi) Maintenance of buildings

vii) Vaccination of domestic cattle

viii) Wildlife census

ix) Uniform to field staff

x) Tourism management

xi) Training and Research

xii) Secret service

xiii) Cash reward

xiv) Maintenance of wireless network

xv) Running & maintenance of vehicles

Non-Recurring cost

1) Buffer area management

   i) Roads

   ii) Soil & water conservation

   iii) Habitat improvement

   iv) Protection force – Home guards

2) Infrastructure Development

   i) Vehicles

   ii) Wireless system

   iii) Office equipment's

iv) Field equipment's

3) Amenities for field staff

i) Solar lighting

ii) Camping equipment's

4) Tourism management

i) Tourism facilities

ii) Nature trails

iii) Camping facilities

iv) Publications

v) Barracks for flying squad & field staff

5) Information technology

i) Computers

ii) Survey equipment's

6) Village Eco-development

i) Entry point investment (credibility activities)

ii) Village eco-development programme

iii) Income generating activities including dairy Development

7) Environmental Education

i) Development & procurement of education material

ii) Educational programmes

1. PROTECTION SYSTEM:

S.No.	PARTICULARS	Details	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	TOTAL
1	DGPS Survey of the Sanctuary Outer boundary & interior line survey	Survey will be done in alternate years	10.00	-	10.00	-	10.00	-	10.00	-	10.00	-	**50.00 lakh**
2	Demarcation of Boundary Pillars & interior line pillars	500 pillars	@12000 per pillar										**60.00 lakh**
			25 pillars	25 pillars	75 pillars	75 pillars	50 pillars	50 pillars	50 pillars	50 pillars	50 pillars	50 pillars	
3	Maintenance of old pillars & interior line pillars also	LS	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	**20.00 lakh**
4	FRA (Forest Right Act, 2006) Construction of pillars around Vanadhikar Patra Land	1000 pillars	@12000 per pillar										**120.00 lakh**
			100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	100 pillars	
5	Creation of Physical Barrier Pucca Wall	6 feet height	50 km.		@ 40 laks/km.								**2000.00 lakh**
A.	Along the outer boundary of the Sanctuary		5 km.	5 km.	5 km.	5 km.	5 km.	5 km.	5 km.	5 km.	5 km.	5 km	
B.	Along the village boundary or agriculture field boundary in special cases so as to check encroachment on forest land and to save crops from wild animals like wild pig & blue bull	6 feet height	@ 40.00 lakh/km.										**600.00 lakh**
			1 km.	1 km.	1 km.	1 km.	1 km.	2 km.	2 km.	2 km..	2 km.	2 km.	
6.	Hiring of BHG, Police Home Guards, Fire Watchers, local volunteers to	10 BHG/month	4.00 lakh Every month										**480.00 lakh**

	protect the sanctuary from different sort of crimes	5 HG	3.00 lakh Every month	**360.00 lakh**
		10 FW & Volunteers	1.00 lakh Every month	**120.00 lakh**
7.	Motor Boat to patrol in the river	10 seater	least with life jackets & jetty (fibre)	**30.00 lakh**
8.	Purchase of vehicle			**40.00 lakh**
A.	Bolero for A.C.F.	1 No.	15.00 lakh	
B.	Jeep (Thar) for R.O.	1 No.	15.00 lakh	
C.	Motor Cycles for Naka In-charge	10 No.	10.00 lakh	
D.	Fuel & Maintenance of Vehicles		**30 lakh/year with 10% increase every year**	
9.	Fire Line Creation & maintenance	30 km.	@ 1.5 lakh/year	**30.00 lakh**
			5 km. 5 km. | 5 5 | km. km. | 5 5 | 10 km. km. | 5 5 | km. km. | km. | 5 | km.	
10.	Forest Road Creation & maintenance	290 km.	@ 1.00 lakh/km	**290.00 lakh**
			30 km. | 30 km. | 30 km. | 30 km. | 25 km. | 30 km. | 30 km. | 30 km. | 30 km. | 25 km.	
11	Purchase of tranquilizing gun			**8.00 lakh**
12.	Medicine for gun & maintenance charges		@ 1.00 lakh/year	**12.00 lakh/yr.**

13.	Purchase of search lights, torches, sticks for FGs, Helmets, Shields etc. for protection workers		2.00 lakh	2.00 lakh	2.00 lakh	4.00 lakh	3.00 lakh	2.00 lakh	2.00 lakh	2.00 lakh	4.00 lakh	3.00 lakh	**26.00 lakh**

14.	Legal support for defending court cases		@ 1.00 lakh/yr.	**12.00 lakh/yr.**
15.	Reward to informer/excellent staff		@ 1.00 lakh/yr.	**12.00 lakh/yr.**
16.	Compensation for man-animal conflict		@ 5.00 lakh/yr.	**60.00 lakh/yr.**
	TOTAL			**4330.00 lakh**

B. ANTI-POACHING ACTIVITIES & INFRA STRUCTURE DEVELOPMENT:

S.No.	PARTICULARS	DETAILS		TOTAL
1.	Construction of R.O. Quarter at Bridge Side (including all amenities)	1 No.	25 lakh each	**25.00 lakh**
2.	Construction of A.C.F. Quarter at Saddle Dam (including all amenities)	1 No.	30 lakh each	**30.00 lakh**
3.	Construction of Rest House at Saddle Dam (including all amenities)	1 No.	50 lakh each	**50.00 lakh**
4.	Construction of interpretation centre at Saddle Dam	1 No.	100 lakh each	**100.00 lakh**
5.	Anti-poaching Camp at Bheem Chauraha	1 No.	20 lakh each	**20.00 lakh**
6.	Barrack at Saddle Dam, Bridge Side, Agra, Ganeshpura, Bandarmutha	5 No.	10.00 lakh each	**50.00 lakh**
7.	Forest Guard Chauki at Bandarmutha, Agra, Ganeshpura, Bridge Side	4 No.	15.00 lakh each	**60.00 lakh**
8.	Maintenance of old quarters & buildings	5 lakh/yr. for 10 yrs.	5.00 lakh x 10 year	**50.00 lakh**
9.	Watch Towers at	4 No.	15.00 lakh each	**60.00 lakh**
A	Agra (Neemdi FB)			
B	Bridge Side (on top of Padajhar FB)			
C	Dudhi Talai Gorge			
D	Richa Khoh Gorge			
10.	Water storage tanks (to use water for water holes in pinch period & by controlling fire)	4 No.	@ 10.00 lakh each	**40.00 lakh**
A	FB Padajhar			
B	Neemdi			
C	Bandarmootha			
D	Kolgarh			
11.	Maintenance of old Pucca wall	@ 2 lakh/year	with 10% increase each year	**20.00 lakh**
12.	Development & maintenance of Nature Trails	20 km.	1 lakh/km.	**20.00 lakh**
13.	Wildlife Veterinary Camps	5 camps	@ 0.50 lakh/camp/yr.	**25.00 lakh**

A.	Vet. Camps	@ 0.50 lakh/camp/yr.		**5.00 lakh**
B.	Translocation of chital, sambar etc. & rehabilitation of Wildlife	@ 05.00 lakh/yr.		**50.00 lakh**
C.	Visit of senior veterinary officer to the sanctuary & submission of report, interns stipend etc.	@ 2 lakh/yr.		**20.00 lakh**
14.	Medical Camps for villagers & staff	5 camps in a yr.	@ 0.50 lakh/camp/yr.	**25.00 lakh**
	TOTAL			**650.00 lakh**

C. HABITAT DEVELOPMENT:

S.No.	PARTICULARS	DETAILS	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	TOTAL
1.	Grassland Development	1750 ha. @ 25 lakh/50 ha.	150 ha.	150 ha.	150 ha.	150 ha.	150 ha.	150 ha.	150 ha.	150 ha.	150 ha.	400 ha.	**875.00 lakh**
A.	Bandarmootha FB												
B.	Padajhar FB												
C.	Kolgarh FB												
D.	Neemdi FB												
E.	Kalakhet FB												
2.	Closure development with indigenous tree planting & seed sowing Selected compartments of all blocks of sanctuary	1100 ha. @ 30 lakh/50 ha.	100 ha.	100 ha.	100 ha.	100 ha.	100 ha.	100 ha.	100 ha.	100 ha.	100 ha.	200 ha.	**660.00 lakh**
3.	Maintenance of Grasslands for 10 yrs.	2.5 lakh/yr.											**25.00 lakh**
4.	Maintenance of closures for 10 yrs.	2 lakh/yr.											**20.00 lakh**
5.	Bio-diversity Conservation in gorges	750 ha. @ 15 lakh/50 ha.	100 ha.	50 ha.	50 ha.	50 ha.	50 ha.	50 ha.	50 ha.	50 ha.	50 ha.	250 ha	**225.00 lakh**
A.	Padajhar Khoh												
B.	Sankhal Khoh												
C.	Kalsiya Khoh												
D.	Richa Khoh												
6.	Pasture land development on community land	200 ha. @ 10.00 lakh/50 ha.											**40.00 lakh**
7.	Development of Re-location centre at Bheem Chauraha	@ 100.00 lakh.											**100.00 lakh**
A.	Sprinkler System & creation of ponds to attract avian life	20.00 lakh											**20.00 lakh**
B.	Maintenance of tracks in Relocation Centre	@ 5.00 lakh/yr..											**50.00 lakh**

C.	Maintenance of old nadis & water bodies	20.00 lakh	**20.00 lakh**

D	Maintenance of old watch towers & rising the heights of towers including IGWT	4 towers	**20.00 lakh**
E.	Maintenance of outer boundary wall & rising the height of this wall if needed	20.00 lakh	**20.00 lakh**
8.	Eradication of weeds like *Lantana, Parthenium, Prosopis juliflora*	50.00 lakh/yr.	**500.00 lakh**
	TOTAL		**2,575.00 lakh**

D. ECO-DEVELOPMENT:

S.No.	PARTICULARS	DETAILS	TOTAL
1.	Micro planning of villages inside the sanctuary and nearby places	30 villages @ 0.50 lakh/village	**15.00 lakh**
2.	Human Resource Development	10 yrs.	
A.	Nature Awareness Camps	5 camps/yr. @ 2.50 lakh/yr.	**25.00 lakh**
B.	Formation of New EDCs & reconstitution of old EDCs (All villages inside the sanctuary & nearby villages should have an EDC)	15 EDC/yr. (till all EDCs covered) @10 yrs.	**7.50 lakh**
C.	Hand pumps repair & in special case, digging of new hand pump	20.00	**20.00 lakh**
D.	Establishment of improved Chula, electric crematoria, solar cockers & distribution of LPG connections	1.50	**50.00 lakh**
E.	Women empowerment through SHG & other schemes	1.50	**50.00 lakh**
	TOTAL		**167.50 lakh**

E. ECO-TOURISM & INTERPRETATION CENTRE:

S.No.	PARTICULARS	DETAIL	TOTAL
1.	Development of Camp Sites	15 lakh for each site	**15.00 lakh**
A.	At Re-location centre, Saddle Dam	15 lakh for each site	**15.00 lakh**
B.	At Agra	15 lakh for each site	**15.00 lakh**
C.	At Padajhar, Chuliya Fall, heem Chauraha	15 lakh for each site	**15.00 lakh**
2.	Printing & Awareness Material	05.00 lakh each year	**5.00 lakh**
3.	Purchase of tents & accessories	05.00 lakh each year	**5.00 lakh**
4.	Construction of rest house	05.00 lakh each year	**5.00 lakh**
5.	Purchase of:		

A.	Projector	3	**10.00 lakh**
B.	Camera	2	**5.00 lakh**

C.	Binoculars	20	**4.00 lakh**
D.	Wildlife Study Material	1 Year	**10.00 lakh**
E.	Firefighting Equipments	1.5	**7.50 lakh**
F.	Rescue Equipments	1.5	**7.50 lakh**
G.	Water Tanker and Tractor	1	**10.00 lakh**
H.	Camera Traps	100 Nos. x 10	**10.00 lakh**
I.	Range Finder	25	**2.50 lakh**

J.	GPS	25	**5.00 lakh**
K.	Mobile for M-Stripe	25 x 20	**5.00 lakh**
6.	Development of Padajhar Mahadev	100.00 lakh	**100.00 lakh**
	TOTAL		**251.50 lakh**

F. CAPACITY BUILDING, RESEARCH, EDUCATION & NATURE AWARENESS:

S.No.	PARTICULARS	DETAILS	TOTAL
1.	Wildlife Week Celebration	1.00 lakh each year	**10.00 lakh**
2.	Wildlife & Bird Census	1.00 lakh each year	**10.00 lakh**
3.	Signage, Folder, Film etc.	2.00 lakh each year	**20.00 lakh**
4.	Celebration of important Conservation Days & Nature Awareness	12 No. each year @ 0.50 lakh each year	**5.00 lakh**
5.	Maintenance of computer & accessories	@ 0.50 lakh each year	**5.00 lakh**
6.	Strengthening of wildlife research, education through college & university students by paying them stipend	2 students each year @ 15,000 per month 10% increase every year	**3.96 lakh**
7.	Staff Training	6.00 Lakh per year	**60.00 lakh**

A.	Intrastate & Interstate training in Pas	05.00 lakh each year	**50.00 lakh**
B.	Staff Training	10 Nos. in a year @ 01.00 lakh for each training	**10.00 lakh**
	TOTAL		**173.96akh**

G. RE-LOCATION OF VILLAGES:

S.No.	VILLAGE NAME	DETAILS	TOTAL
1.	Dareeba	L.S	**2000.00 lakh**
2.	Prempura	L.S	**2000.00 lakh**
	TOTAL		**4000.00 lakh**

MUKANDRA HILLS TIGER RESERVE

TIGER CONSERVATION PLAN

2025-26 TO 2035-36

PART – III

CORRIDOR AREA PLAN

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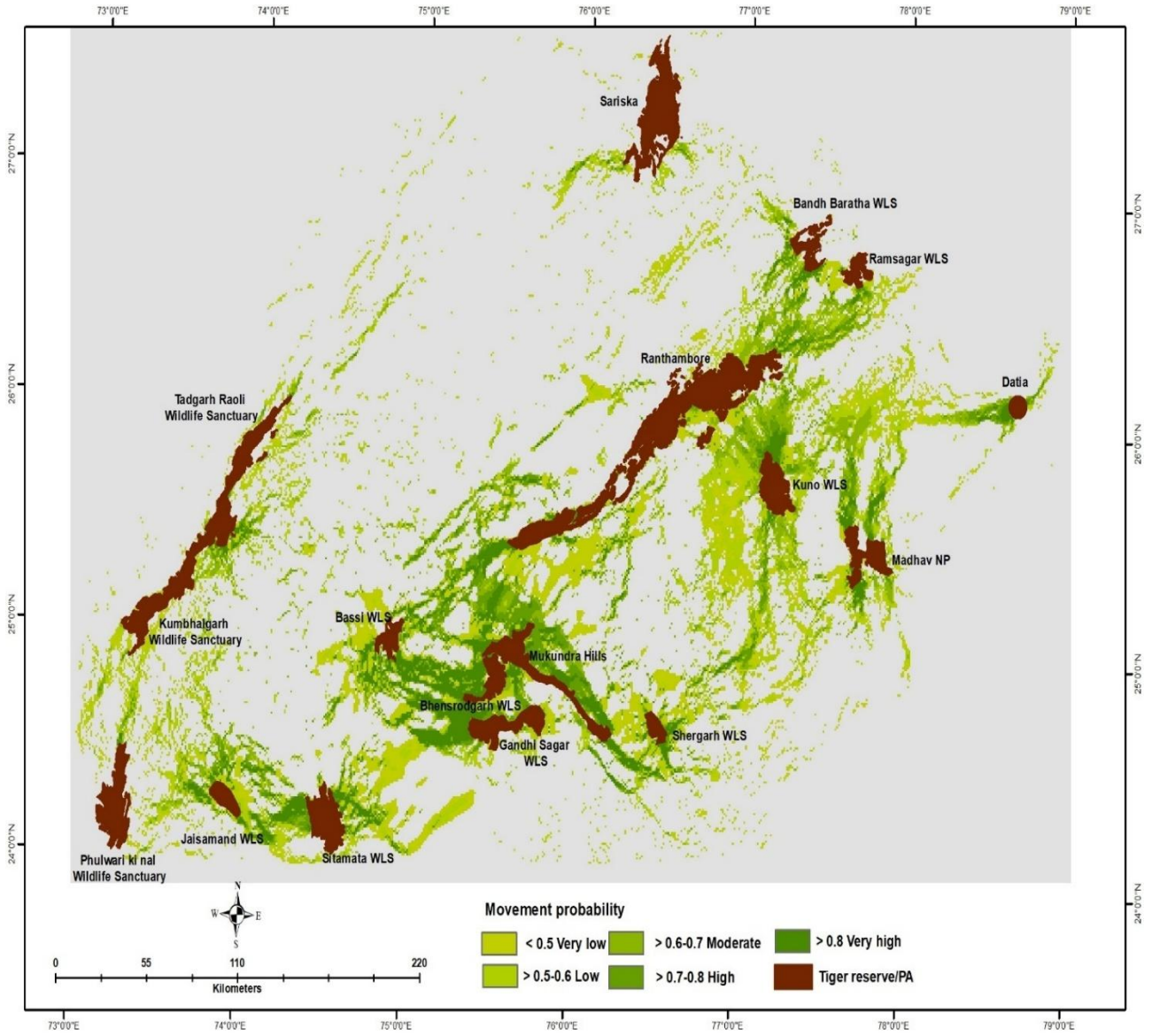
CORRIDOR AREA PLAN



Tiger Conservation Plan: For Adjoining Areas (Corridors)

PART - A
EXISTING SITUATION

CHAPTER - 1
INTRODUCTION OF THE AREA

Corridors

Section 38V 4(ii) of The Wildlife (Protection) Amendment Act - 2006 provides that each Tiger Reserve is required to create Core, Buffer and Corridors areas. Conservation of Tiger will not only require the management of core and buffer areas, but it will also be necessary to maintain their connectivity to other core areas for ensuring gene flow as an ecological requirement for long term survival of the species. Therefore, it will be necessary to identify these areas of connectivity/corridors between two source populations. In fact, management of these critical areas will be as important as the core areas. In most of the cases such areas will be under traditional forestry practices and other land uses. These areas will also be under tremendous pressures due to habitations and human activities. Therefore, in such areas the existing management practices will have to be modified so as to upgrade and maintain the ecological status of the connectivity/corridors. Obviously, the agenda of co-existence will have to be implemented for such areas with a focus on the wildlife habitat parameters and the livelihoods/developmental needs of the local communities. Role of the local communities, line agencies and other stakeholders will be extremely important for the management of such areas. The plan for these areas has to be very simple and focused. Many of the activities of extension, research/ monitoring and HRD will have to be linked with the Buffer Area Plan.

1.1 Brief Description of the Area and significance for Tiger Conservation

India's tiger occupied forests are divided into six landscape complexes, the largest of which is the Central Indian landscape. Central India is a globally significant landscape in terms of tiger conservation. Not only does it have the largest area of tiger occupied forest (39,017 sq. km.), it also has the largest tiger population (Jhala et. al., 2010). One of the unique features of the Landscape and one that makes it so important for tiger conservation is the corridor connectivity between the Tiger Reserves. This connectivity makes this landscape suitable for supporting large tiger numbers with relatively low conflict with humans (WWF India, 2011).

Protected areas (PAs) are the cornerstone for conservation of endangered species, but individual PAs may be too small to harbour stable and resilient populations of wide- ranging large

carnivores. Rapid conversion of natural habitat outside protected areas is resulting in their isolation (De Fries et al., 2005). Isolation of habitat patches can restrict the natural ranging behaviour of animals to foraging or breeding sites and for dispersal from their natal ranges. Dispersing individuals maintain the viability of populations because they have the potential to colonize new areas, increase genetic variation, and maintain gene flow (Smith, 1993; Thomas, 2000). Thus, landscape connectivity is a vital component of biodiversity conservation, and conserving and restoring linkage zones or corridors is a common strategy for mitigating impacts of human-caused landscape change on biodiversity (Taylor et al., 1993; Crooks et al., 2011).

Only 21 % of the country's land area is forested (Reddy et al., 2013), and just 5 % is under the PA network. Forest cover in India has undergone a significant loss: from 89 million ha in 1880 to 63 million ha in 2010 (Tian et al., 2014).

Tigers typify the challenges faced by many species of large carnivores worldwide: small, isolated populations in fragmented and shrinking habitat, illegal trade of their body parts, poaching, and conflict with humans to name a few. Like those of many other large carnivore species, breeding populations of tigers are confined to small PAs that are insufficient for their long-term survival. And MHTR is no exception with CTH just little over 1000 sq. km. is the current tiger range represents a mere 7 % of the historic range, and in just one decade, there has been a 41 % decline in tiger-occupied area (Dinnerstein et al., 2007). Because PAs are small relative to the needs of large wide-ranging species, it is essential to manage networks of PAs within the land-use dynamics of their larger regional setting (Margules and Pressey 2000). About 60 % of the global population of wild tigers is found in India, mainly restricted to central India, western ghats, the Terai Arc landscape (along the base of the Himalaya), northeast India, eastern ghats, the Sundarban mangrove forest, and some isolated patches in western India (Jhala et al., 2011). Tigers depend on forests with high prey density and minimal human disturbance. They have good reproductive potential, and there are well-documented cases where tiger populations have rebounded in areas from where they were once extirpated (e.g., Panna Tiger Reserve, Sethuraman, 2014). When populations increase within reserves, individuals will move out in search of new territory and mates. These dispersing individuals are critical to maintain the genetic diversity of the larger population and need a permeable landscape through which they can successfully navigate to other areas with sufficient prey and access to mates.

The corridor plan for Mukandra Hills Tiger Reserve aims to establish and maintain ecological connectivity between the core area of the reserve and surrounding landscapes. This plan is designed to facilitate the movement of tigers and other wildlife, reduce habitat fragmentation,

and mitigate human-wildlife conflicts. The corridor plan adheres to the guidelines provided by the National Tiger Conservation Authority (NTCA) and integrates scientific research, stakeholder engagement, and conservation principles.

Objective: The primary objective of the corridor plan is to enhance tiger conservation by:

1. Identifying key wildlife corridors and critical linkage areas.
2. Implementing measures to restore and maintain habitat connectivity.
3. Minimizing human-wildlife conflicts along corridor routes.
4. Monitoring and evaluating the effectiveness of corridor management strategies.

1.1.1 Natural Habitat Corridors

The main purpose of corridors is providing three essential functions, namely colonization, migration and interbreeding. The corridor which provides these functions naturally to the native species are called natural habitat corridor. The entire tract of Ranthambore-Ramgarh Vishdhari-Mukandra wildlife corridor as well as Chambal-Kali Sindh corridor is bestowed with biological diversity of different forest types with a considerable variation in the vegetation due to immense heterogeneity of soil, geology, temperature and moisture conditions.

Mukandra and Darrah hill Ranges in Kota district, along with the adjoining forests of Jawahar Sagar Wildlife Sanctuary and Ramgarh Vishdhari Wildlife Sanctuary in Bundi district, along the banks of River Chambal has a potential to act as a corridor between Ranthambhore Tiger Reserve and Mukandra Hills Tiger Reserve. The Sawai-Mansingh Sanctuary, Qualiji Closed area of Ranthambhore Tiger Reserve can act as a source of population site for Southern Protected areas like Ramgarh Vishdhari WLS and MHTR where up to RVWLS corridors are linear through hills and gorges. Past presence of tiger in Mukandra area establishes the corridor value of the said area through which tiger dispersed naturally from the source area of

Ranthambhore tiger reserve to the Mukandra area proving it as a sink. The increasing population of tiger in Ranthambhore tiger reserve is demanding a sink area for the dispersing tigers in future. This presses the need of development of a viable corridor between Ranthambhore tiger reserve and Mukandra tiger reserve. The existing corridors around Mukandra Tiger Reserve are:

1. Ranthambhore – Ramgarh Vishdhari – Mukandra hills
2. Chambal-Kali Sindh-Mukandra Hills

1.1.2 Remnant Habitat Corridors

Due to developmental activities, corridor gets fragmented, and the connectivity is lost. A remaining portion of natural habitat is called a remnant, and such portions need to be connected, because when migration decreases, extinction increases.

1. Mukandra Hills-Shergarh sanctuary
2. Mukandra Hills-Bhainsrodgarh Sanctuary-Gandhi Sagar Sanctuary

1.1.3 Regenerated Habitat Corridors

Regenerated habitat corridors results when re-growth occurs in a disturbed line or strip. Regrowth may be the product of natural succession or re-vegetation via planting. Re-growth in abandoned roadways, trails, and railroad rights-of-way are examples. Corridor width and configuration are dependent upon the nature of the previous disturbance. Regenerated corridor vegetation is often dominated by aggressive weedy species during the early stages of succession.

1.1.4 Planted Habitat Corridors (from plantations, shelter belts, etc.)

These are corridors introduced via plantations, shelter belts etc. Various plantation works has been taken up by Bundi territorial division over the years to create a green patch which could act as corridor from Ramgarh Visdhari to Mukandra Hills Tiger reserve.

1.1.5 Disturbances in Habitat Corridors (railway lines, cleared transmission line, etc.)

Mining: In Bundi particularly Dabi has been affected by illegal and legal mining of stone. This poses a major threat to the wildlife as it inhibits the migration and also fragments the corridor.

Railway line: Railway line also passes through the corridor at various locations.

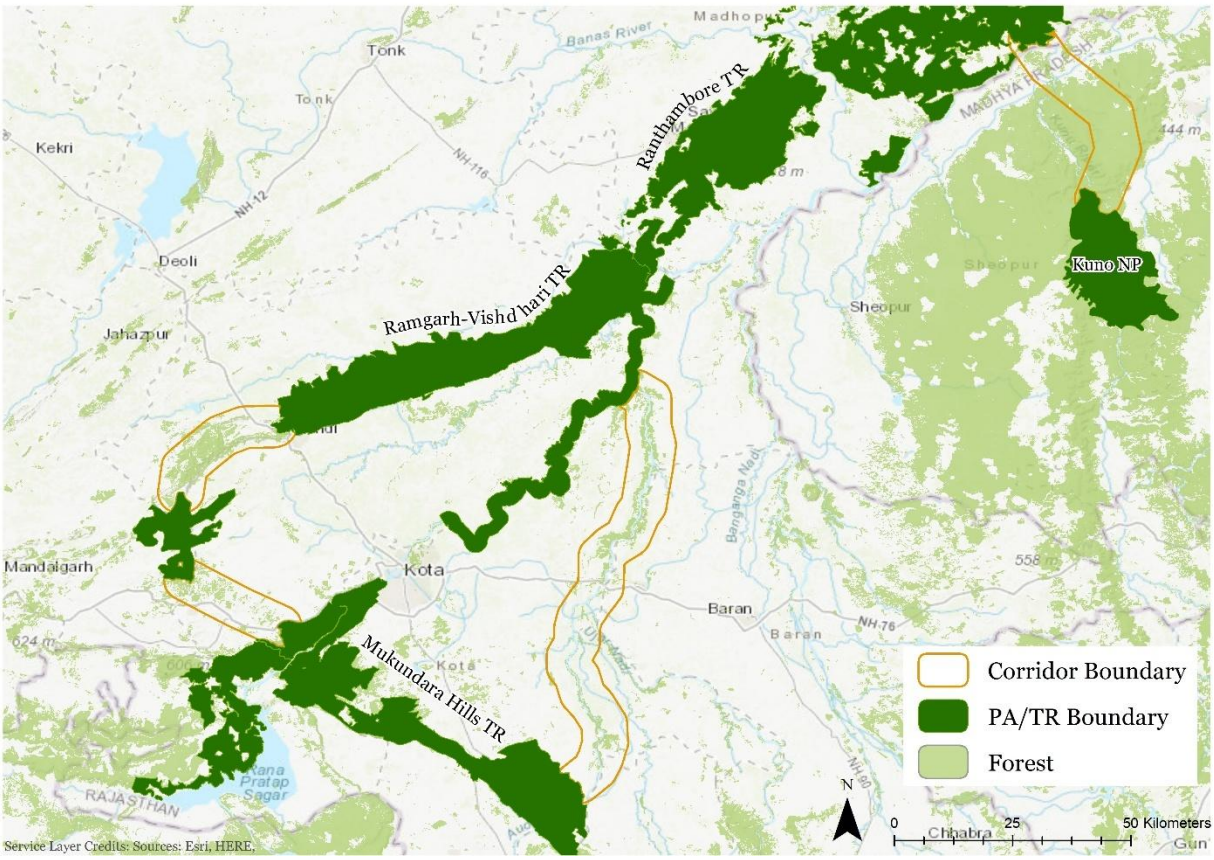
Roads: Various National highways and several State highways are there in corridor which could affect the movement of wild animals.

1.1.6 Stepping stones (suitable habitat patches)

To manage corridors effectively, one of the conservation strategies is providing network of unconnected patches of forests or “stepping stones” remnants to facilitate the persistence of population. “Stepping stone” corridors are small patches of suitable habitat. Stepping stones arranged in a line form a strip of land connecting two areas, just like a continuous corridor would. Thus, it would be helpful for dispersing tigers and other large mammals if enhanced

cover and connectivity can be provided in these fragmented areas by adequate restoration measures.

1.2 Map showing Corridor beyond core and Buffer Areas



Map 1.1: Tiger Corridors of Mukundra Hills Tiger Reserve (MHTR)

1.3 Major land use classification in the Area

Majority of people living in the corridor area are dependent on agriculture where the water underground water availability is high. Further the communities dependent on grazing are also a regular feature of this area with fragmented territorial forest and revenue area. A detailed study of the functional and future probable corridors is required from recognised institute to learn about the movement of animals from one protected area to another. This would also help in learning about the hurdles faced by the animals due to human disturbance and developmental projects.

1.4 Significance of corridors

Isolated populations of wild animals face the risk of extinction owing to insulation and inbreeding depression. Habitat fragmentation adversely affects wildlife due to decreased

opportunity available for wild animal movement from different habitats. This in turn prevents gene flow in the landscape.

The corridors allow animals to disperse naturally where the natural evolution cycle will carry on. This will help animals to evolve naturally with changing times. Climate change also poses great risk to the evolutionary potential of animals. With increase in human population and significant pressure on natural resources it will further put pressure on movement of wildlife. Here Corridors come to rescue of debilitated wildlife which is fighting for its survival.

1.5 Geological attributes and hydrology

This area is a part of Vindhyan Range system. Under rock is basalt in composition and consists essentially of basic plagioclase and accessories in the rocks. The trap is usually fine grained and dense. The colour is black and brown. At places amyloidal and angul cavities are filled with zeolite, calcite, chalcedony and its varieties. The trap is hard, tough and heat resistant. Geologically the area comprises of sandstone, limestone and conglomerate rocks belonging to Vindhyan super group. The general strike of the rocks is NW – SE to WSW – ESE. Geology of the adjacent area is an admixture of complex geological formations belonging to Archean and Purana group of Algonkian, Archean and toridenian age and consists of the upper Vindhyan systems.

The elevation of Vindhyan scrap lands is marked with soap stones, which appear to be separated by the slatestones. Steep escarpments on the left bank of Chambal in the north-western parts of the region appear, thereafter, there is a scrap land, which stretches upto Dholpur and Karauli areas. The uplands of Kota and Bundi are large and stony uplands where some deposits of black soils are seen here and there in the valleys. Chambal and its tributaries like Kali-Sindh and Parvati have formed a triangular alluvial basin in Kota. The hills of Bundi and Mukandra are extended to Jhalarapatan through southwestern tracts of Kota.

1.6 Vegetation Types

According to "Revised Forest Types of India" by Champion and Seth (1968), the forests within MHTR fall under **"II Dry Deciduous Forest".** The main species are Dhok (*Anogeissus pendula*), Salar (*Boswellia serrata*), Khair (*Acacia catechu*), Palash (*Butea monosperma*), Khair (*Senegalia catechu*), Bamboos (*Dendrocalamus strictus*), Ber (*Ziziphus mauritiana*) etc. the area is having lot of ground flora comprised of shrubs, herbs, grasses and sedges, etc. The forest scattered and sparse over a large area on various geological and soil formations vary greatly in composition. In the valleys where better soil and moisture conditions exist, the

vegetation is comparatively denser. Approximately 35 % of the forest area is either occupied by bare rocks or covered with degraded and poor type of scrub growth. The growth of the principal trees is generally slow, and the height is poor. On an average the height varies from 4.5 mto 7.5 m, but trees of one-meter girth and up to 12m height are also found in favourable areas.

Anogeissus pendula is the dominant tree species, covering over 90% areas of the forests. *Boswelia serrata* and *Lannea coromandelica* grow on rocks and dry slopes. *Acacia catechu* is common in valleys, whereas *Dendrocalamus strictus* is found along well-drained reaches of the streams and moist and cooler parts of the hills.

1.7 Wild Fauna and Habitats

Like Mukandra Hills Tiger Reserve, its corridor harbours good wildlife population with sparse vegetation cover. Different types of habitats are available in this reserve, which meet ecological, biological and ethnological requirement of the different life forms. Different animals prefer different type of habitat for food and shelter.

1.8 Major Changes in landscape

The existing protected area has become an ecological island with severely depleted linking corridors. There is a serious threat to the wildlife population due to protected area network being in islands. As a result, erosion of genetic variability is taking place for want of linking corridors to protected areas. The small sized population and simple structure tends to be more susceptible to the genetic loss then large geographically dispersed and subdivided population. Loss of genetic variability has been diminishing the chance of survival of a population due to inbreeding depression and loss of evolutionary potential. There is need to increase the number of protected areas depending upon genetic variation and bio geographic distribution of species and eco system and linking them with broad stable and balanced corridors so that the physical and ecological boundaries of fauna coincide. For this purpose, multiple use areas with the potential of acting as corridors will be identified and scientifically managed.

Such connecting habitats, apart from facilitating animal movements also act as refuge for spill over populations from the core areas. They may also act as smaller “source” by facilitating breeding and movement of native wildlife populations to colonize adjoining habitats. Natural linear features like rivers or mountain ranges may act as boundaries for wildlife populations. However, disturbance of corridors on account of human interventions (highways, canals, industries, roads, railway tracks, transmission lines, mines) is deleterious to wildlife.

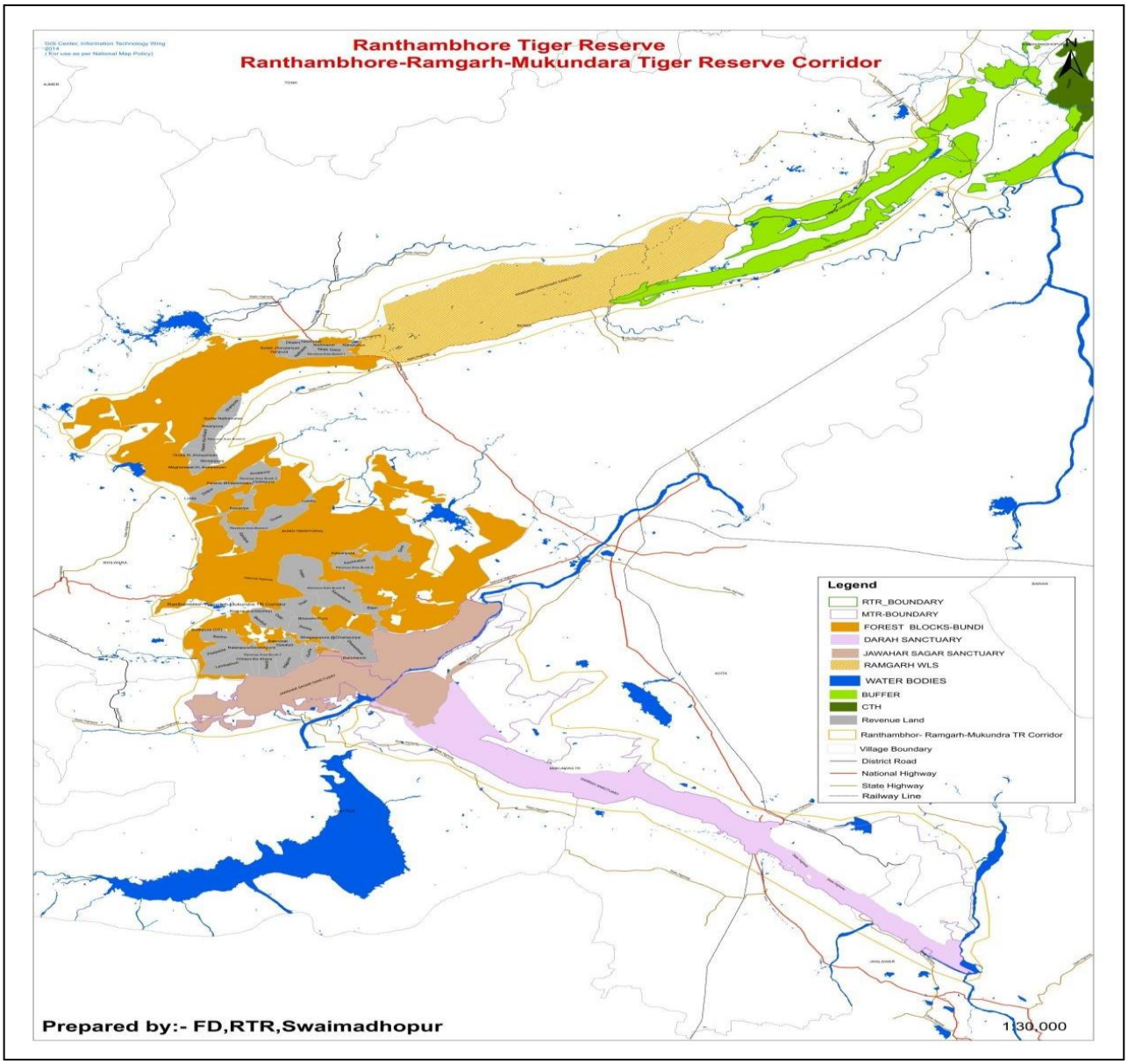
"Source" populations are those which produce a surplus of animals which are potential colonizers. On the other hand, "Sinks" are those populations in which deaths exceed births, and their persistence depends on regular influx of immigrants.

Patches of suitable habitats in the landscape may support wildlife populations (local populations), which may be separated from one another on account of various disturbance factors. Collectively, such patches of local populations are known as "regional populations". This general situation of sub divided populations interacting with one another in a landscape to supplement new genes through movement is known as a "meta population". In the context of tiger land tenure dynamics, the core-buffer areas conform to the "island-mainland" or "core satellite" form of Meta population model. The core area of a tiger reserve provides a source of colonizers for the surrounding local populations of different sizes and varying degrees of isolation.

The core area may not readily experience extinction owing to the protection inputs for maintaining its inviolate nature. However, the surrounding isolated patches in the buffer area may suffer from local extinction if wildlife concerns are not mainstreamed in the area.

Therefore, a Meta population management approach is required for the buffer zone as well as corridors to facilitate:

a) Supplementing declining local tiger populations
b) Facilitating re-colonization in habitat patches through restorative management
c) Providing opportunity to tiger for colonizing new areas through patches of habitats (stepping stones) between isolated populations.



MAP 1.2: Corridor map showing PAs, forest areas and revenue areas

1.9 Administration and Organization

The Corridor falls nearby to the areas of Mukandra Tiger Reserve. Various Wildlife and Territorial Divisions commanding the corridor area are as follows:

1. Dy. Conservator of Forest, Project Tiger Ranthambhore, Sawai Madhopur.
2. Dy. Conservator of Forests Territorial, Sawai-Madhopur
3. Dy. Conservator of Forests, Ramgarh-Vishdhari Tiger Reserve, Bundi.
4. Dy. Conservator of Forests, Wildlife Division, Kota
5. Dy. Conservator of Forests Territorial, Bundi
6. Dy. Conservator of Forests Territorial, Jhalawar

CHAPTER 2
STATUS OF TIGER AND CO-PREDATORS

2.1 Distribution and Abundance Status with type of use by the tiger and co-predators

In the proposed corridor Tigers and Leopards are found as main predators. MHTR region before it became tiger reserve was once replete with tigers and was a known name in hunting community where royals enjoyed hunting of tigers. It is evident from the number of Shikargahs present throughout the territory of MHTR. Tigers were reported till 1978 in this region. There is evidence of resident tigers of Ranthambore tiger reserve have been moved in outskirt landscape through Ramgarh-Vishdhari corridor and reached MHTR. MT-3 was the tiger from Ranthambore which came by on its own exploring the territory and came to MHTR. It however couldn't survive for long, but it gave the idea of established corridor in the region. One more incident occurred when a camera trapped leopard from Kuno national park in Madhya Pradesh was again captured in a photo of camera trap inside MHTR. It signifies that not only tigers, but the other carnivores are also familiar with this corridor and are not hesitant to use it. After Ramgarh-Vishdhari became tiger reserve the corridor protection has strengthened further with Bundi territorial being added in Buffer area of Ramgarh-Vishdhari tiger reserve. Transient Tiger signs are seen frequently due to proximity to both tiger reserves. All the GPS locations of the dispersing radio collared tigers and their movements are recorded. Smaller carnivores like jackals, foxes, small cats, and mongoose are reported in these routes. Sloth bear is one large carnivore reported frequently in these corridor-forests.

2.2 Prey-Predator Relationships

Although not much has been done in this regard but it is established that the corridors act as important range areas for movement of large carnivores and presence of prey is major factor which is routinely explored by the wandering population of carnivores.

- Prey-predator dynamics within the corridors of Mukandra Tiger Reserve are influenced by factors such as prey abundance, habitat structure, and predator behaviour.

- Tigers and other predators select prey based on factors such as size, vulnerability, and availability. Prey species, in turn, exhibit behaviours such as vigilance, herding, and habitat selection to minimize predation risk.

- Predation pressure from tigers and other predators can have cascading effects on prey populations, influencing population dynamics, distribution patterns, and community structure within the corridor ecosystem.

Understanding these prey-predator relationships is crucial for managing and conserving the biodiversity of the Mukandra Tiger Reserve. By maintaining healthy prey populations and ensuring the protection of key habitat areas, conservation efforts can support the ecological balance and long-term survival of both prey and predator species within the corridor.

2.3 Assessment of threats

The size of corridors including buffer Area are very small. In the landscape some corridors are linear, and some are stepping stone corridors and those are under heavy pressures from the population in vicinity. Already these areas are highly degraded. In some places there is threat of people encroaching upon the forest land and utilizing it for agriculture purpose. Stray incidences of illegal removal of masonry stone and tree cutting also occur. The biggest threat to these areas is from livestock grazing particularly goats and sheep the population of which is increasing day by day.

The present MHTR has evolved through different stages. The owners have changed from princely state to Government. Through this process of state controlling the resources, the local people got alienated gradually over a period of time. In the past local villagers had access to forest for grazing livestock's and extracting natural resources but after certain notifications, restrictions were imposed which have also resulted into conflict of local communities with Forest department.

The Human-Wildlife conflict mostly occurs due to crop depredation by wild animals and livestock depredation by leopards. There is compensation mechanism against crop raiding and cattle depredation but doesn't reach in correct time which tends to create negative attitude towards the conservation of wildlife and its habitat. There are also records of poaching. The villagers may sometime retaliate in negative way which might results in poaching of wild animals.

Human presence is very close to the forests and such a close interface of wildlife with people and livestock sometimes leads to increased conflict. Increasing conflict will subsequently hold back the movement pattern of wildlife. Cattle lifting incidents can create chaos in community and in return wildlife has to lose their lives in form of carcass poisoning, poaching and sometime forest fire triggered deliberately by the communities.

Threats:

Chambal River has faced ample transformations due to various developmental activities in the landscape such as Roads, Dams, Canals and Sand mining. The dry and shallow riverbed of Chambal and Kali Sindh is attracting dozens of sand miners. Large quantities of sand are extracted from the area.

Barriers:

Roads and highways, water canals and rail networks are passing through the corridors creating large barriers for the movement of wildlife. Water canal from Kota Barrage passes through the corridor horizontally and parallel to River Chambal. Water remains in this canal for couple of months, mainly during January and February. There are ample dry streams coming from Chambal which act as corridor for wildlife and tigers. However, rampant agriculture practice across the area may prove hindrance for the movement of wildlife in corridors.

The ever-increasing demand for firewood and fodder exerts tremendous pressure on the PA's and on corridors. The cattle rearing community depends primarily on the forest for grazing their cattle, particularly during the monsoon period.

Although Government has designed the route of sheep grazing yet the sheep herd owners illegally enter into PA's and come with direct and indirect conflict with wildlife. Such grazing activity has adversely affected regeneration of native plant species, and the quality of grass has deteriorated in the area.

CHAPTER 3

LAND USE PATTERNS AND CONSERVATION-MANAGEMENT ISSUES

3.1 Socio-Economic Profile of Villages and Resource Dependency and Human-Wildlife Mutual Impacts:

The people of the area are mainly agriculturist and pastoralist, whose economy is totally based upon natural resources of land and forest, supplemented with labour work in mines, Govt. development works and in the agriculture fields of other people.

The average land holding of the people is very small (1.5 to 2 Hectares), with a large number of marginal farmers having large families. Some communities are pastoralists, totally dependent upon the dairy activities. Landless communities are dependent upon labour for livelihood. Some communities like Brahmins, Rajputs, Jat, Bania are well educated and are in service with Govt. or Non-Govt. organisations. They are generally well off. These communities are also the main business class in the area.

Other communities such as agriculturalists, pastoralists and landless labourers form the major portion of the society. All these communities have natural resource-based economy, mainly dependent on rainfall resulting in poor economy.

Agriculture is a seasonal work and does not provide employment throughout the year. They do not have employment for nearly six months in a year. During these six months of unemployment they take up variety of jobs like animal husbandry, labour, fuelwood collection, collection of timber and N.W.F.P., etc. to supplement their income. Most of their activities are dependent upon forests, thus, the number of people visiting forests for illegal purposes increase tremendously.

The communities, which are dependent on animal husbandry traditionally, live near forest areas or in the forest areas, which facilitates easy grazing for their large number of cattle, which they keep sustaining their economy. They are busy round the year but the practice of cattle feeding change with seasons.

Forest areas falling in the corridors of the territorial Divisions i.e. Bundi, Kota are very sensitive for mining and poaching. Some landless communities like Bhil, Banjara and Meena are also

engaged in Sand Mining from rivers mainly Chambal & Banas and illegal sandstone quarrying in Forests as well as from other legally sanctioned mines. Due to presence of livestock's, graziers, have increased. The incidences of human-wildlife conflicts are on the increase.

All the corridors have high human presence and distinct livelihood dependency on the forests of corridors. The people living in this area mainly belong to Gurjar and Bairwa communities of Rajasthan. Some other communities like Jat, Prajapat, Brahmin and Keer are also found here. "Mongiyas" the notorious community specialized in trapping and killing of wild animals are found throughout the landscape. In the corridor land use pattern is divided amongst Agriculture, Ravines and Forests. Forests has highest stake in land occupancy than Ravines and least area is covered by farmlands.

Agriculture and cattle rearing is main occupation in corridor villages. The villagers are dependent on the forest for fuel wood, grazing and NTFP collection. Agriculture is carried out along the bank of the rivers and on steep slopes. Wheat and mustard are the major crops produced along with millets, chili, sesame and pulses.

3.2 Assessments of inputs of line agencies /other departments

The inputs of Agriculture department, Animal Husbandry department and other line departments have been good. Large numbers of people are provided employment through MNREGA by Rural Department. However, a lot needs to be done to promote stall feeding of animals. Goat and sheep rearing has been promoted in the area which is detrimental to forests. A policy change is required in this matter and goat and sheep rearing needs to be discouraged.

Cattle vaccination camps will be organized in coordination with Animal husbandry department in the villages around Mukandra Hills Tiger Reserve and in corridors. While technical help will be taken from Agriculture University, Jaipur & Kota for the development of fodder plots in villages around MHTR. Inputs from NGOs towards implementation of sustainable interventions that help to reduce dependency from the forest resources will also be taken.

PART B
PROPOSED MANAGEMENT

CHAPTER 4
VISIONS, GOALS, OBJECTIVES AND PROBLEMS

4.1 Vision:

To establish and nurture a linkage with nearby Protected Area and also various divisions of forest and other line departments so that viable wildlife population is maintained at the source and gene flow takes place between the PA via these corridors.

4.2 Management Goal

Wildlife populations in corridors and in adjoining managed forests are increased and protected. Effectively manage corridors with coexistence and established meta-population of tigers to double their numbers in the landscape.

4.3 Management Objectives

1. To monitor Tigers, Co-Predators and Prey in the corridors. (Work will be supported by WII, WWF etc.).
2. To strengthen cattle compensations scheme with ex-gratia payment in corridor and the Villages too for long term security of dispersing tigers and co-predators.
3. To assess the connectivity of the corridors that connects Ranthambhore NP to neighbouring protected areas. With the help of GIS teams, maps marked with corridors will be developed at the scale of 1:50,000.
4. Implement livelihood conservation initiatives in the villages such as solar models, energy efficient chulhas, sustainable agriculture practices, development of fodder lands and veterinary services through Local NGOs and Line departments.

4.4 Problems in achieving objectives

Corridors that connect Mukandra National Park to other managed forests are not with delineated boundaries. Any land can act as a corridor until and unless it doesn't have barriers and threats. In the landscape, MHTR connects with neighbouring forests with river, streams, ravines, gorges, hills and even with croplands. There are rivers and ample of streams that support movement of wildlife smoothly from nearby PAs. However, it's impossible for the park management to conduct studies and monitor corridors with limited staff and budget. For the

rest of objectives, management will request concerned authorities like IT wing of the Forest Department or State Remote Sensing Centre to develop maps. NTCA has to increase funds for tiger reserve and its corridors. WII may carry out intensive studies while Non-Government Organisation like WWF having experience in landscape management can continue studies on corridors in larger view like landscape level. Other NGOs can work with communities on livelihood conservation.

The main issues relating to corridor management are:

(i) Reduction in biotic pressure from villages situated inside corridors.

(ii) Man- animal conflicts due to late & insufficient compensation for loss of livestock.

(iii) No Provision for crop damage compensation.

(iv) Lack of Funds.

(v) Inadequate intelligence information network poor legal assistance and protection to forest staff.

(vi) Multiple administrative control and poor integration with other departments.

(vii) Poor regeneration and inadequate information on techniques for habitat manipulation like the weed etc.

(viii) Insufficient Base Line data.

(ix) Lack of Political Will regarding launching new welfare schemes.

(x) Lack of awareness about Eco-tourism concept and insufficient interpretation facilities.

(xi) Higher age group and educational background of the staff with least training and technical manuals exposures.

4.5 SWOT Analysis

Strengths-Weaknesses-Opportunities-Limitations (SWOT) Analyses Strengths:

- Several conservation initiatives by locals already in place
- Some amount of sensitization towards conservation has to take place viz control on grazing, poaching of prey
- Good relationship between Forest Department and village headmen (Sarpanch) through local organizations and WWF.

- Availability of water inside the park throughout the year.

Weaknesses:

- Lack of awareness amongst local communities
- Prevailing hunting, mining, encroachment around the park.
- Sand mining and ravine flattening in corridors. Expansion of crop lands that is to change in land use pattern.
- Crop damage and injury by wildlife causes resentment
- Depredation of cattle by carnivores causes retaliation killing.
- Unsustainable developmental activities
- Socio-economic condition of the local community

Opportunities:

- To use the funding by NTCA to reduce dependency on forest resources Increasing involvement of locals in conservation activities
- Decreasing animosity towards Forest Department through goodwill from incentives provided.
- Presence of International Organisations for Studies on corridors such as WWF, WII.

Threats:

- Poaching
- Mining
- Illegal and unsustainable fuel wood harvesting
- Other development projects
- Sand mining in Banas River belt
- Increase in invasive species /weed in buffer and corridor.

CHAPTER 5
MANAGEMENT STRATEGIES

1. River Banas and river Chambal are extensively used by local people for vegetable cultivation. Fencing on the agriculture fields that fall in corridor passage should be discouraged.
2. Relocation of all the villages in the corridor region would not be possible but education and awareness on corridors should be taken to villagers of corridor villages.
3. Delineate the corridor and develop the area with native forestry species and restoration of the degraded patches within corridor area shall be taken up.
4. Develop water points at appropriate places.
5. Capacity building of staff by regular trainings on protection, wildlife monitoring, NTCA SOPs, etc.
6. Improve protection to reduce risks of poaching through MSTrIPES Patrolling.
7. Handholding will be done with WII, Dehradun and NTCA on various technical, financial and infrastructure support for delineation, development and monitoring in corridors.
8. Co-ordination with Governmental/Non-Governmental Organsiations in the landscape for putting conservation in mainstream.
9. Financial support will be seeked from NTCA in CSS-APO.
10. Implementation of eco-development activities for reducing resource dependency of local people on surrounding forests.

5.1 Delineation of Corridors and other habitat used by tigers and co-predators

Recently it has been observed that spill over tiger population of Ranthambhore uses these corridors for their movement to other areas. Tigers have been tracked moving away out of Ranthambhore and using these areas as corridors for dispersal to Kota and other regions. These are important linkages of Ranthambhore landscape with other forested landscapes, and it is through these linkages that the genetic transfer has been taking place for centuries. Therefore, in the long run these linkages are crucial to the wellbeing of tigers in the core area. The core area can give everything but this linkage with other wildlife areas of the part of the country can only be provided by the corridor area.

Ranthambhore – Ramgarh Vishdhari – Mukandra hills

Delineated as an important corridor for movement of tiger and other animals. From the high animal density areas of Ranthambhore to other suitable Sink areas those are from Qualji Closed area to Papda RF, Indragarh RF and Ramgarh-Vishdhari Tiger Reserve and further from Jawahar Sagar to Darrah WLS or MHTR.

This Corridor can be developed by undertaking the following activities.

a) Protection and afforestation.

b) Soil conservation and water harvesting measures.

c) Effective anti-poaching measures.

d) Training and capacity building of staffs on various protocol and sops.

e) Increase support for conservation from corridor villages.

f) Habitat restoration of corridor villages, forest land and revenue land.

Details of forest and non-forest land falling in the corridor are given in **Annexure 5.1** and **Annexure 5.2** respectively.

Development of MHTR corridors:

MHTR is not only rich in scenic beauty and biodiversity but also has at least two probable corridors from Ranthambhore – one through **Indergarh-Lakheri-Ramgarh Vishdhari Sanctuary-Dabi-Jawahar Sagar Sanctuary** and the other through the r**avines of Chambal and Kali Sindh to Darrah**. However, special efforts are required to conserve this rich natural heritage, to provide safe passage/corridor to the tigers of adjacent Ranthambhore Tiger Reserve and to reintroduce tigers in the area. This can facilitate movement of wild animals between MHTR and RTR and also help in gene exchange. An intensive program of rehabilitation will be started in the following corridors to facilitate uninterrupted gene flow.

Table 5.1: An intensive program of rehabilitation will be started in the following corridors to facilitate uninterrupted gene flow

Sr No.	Name	Length & Breadth	Approx Area in Km.
1.	Darrah – Gandhi Sagar	35 km x 6 km	210 sq. km.
2.	Darrah –Ramgarh	25 km x 7 km	175 sq. km

Detailed survey and micro plan will be prepared with the help of local villagers because plan has to be implemented by both wildlife authorities and local people.The corridors are multiple land use areas which include forest areas, community pastureland and privately owned lands. It is proposed that suitable areas would be rehabilitated during the plan period within these corridors by undertaking following activities with active collaboration of territorial DCFs of the concerned forest and also DCF Core and Buffer of Ranthambhore Tiger reserve and wildlife divisions –

1. Protection and afforestation.
2. Soil conservation and water harvesting measures.
3. Development of eco-tourism and recreational facilities.
4. Effective anti-poaching measures.

Suggestive measures for development of corridors:

1. The revenue villages falling within the corridor should be covered under eco development scheme. Micro plans for each selected village should be prepared.
2. Proper habitat is required for easy movement of animals. Hence planting of adequate and suitable species is required. Extensive plantation works should be taken up for all animals. Shrub species should be included in the plantation
3. Anti-poaching camps should be organized at the entry point of corridors.
4. Regular scientific assessment of habitat and monitoring of wildlife should be done in scientific manner based on protocols and SOPs.
5. Riverbed cultivation should be totally banned. Plastic should be banned in the area.
6. Soil and water conservation works should be taken up.
7. Entire corridor zones should be declared as eco sensitive zone.

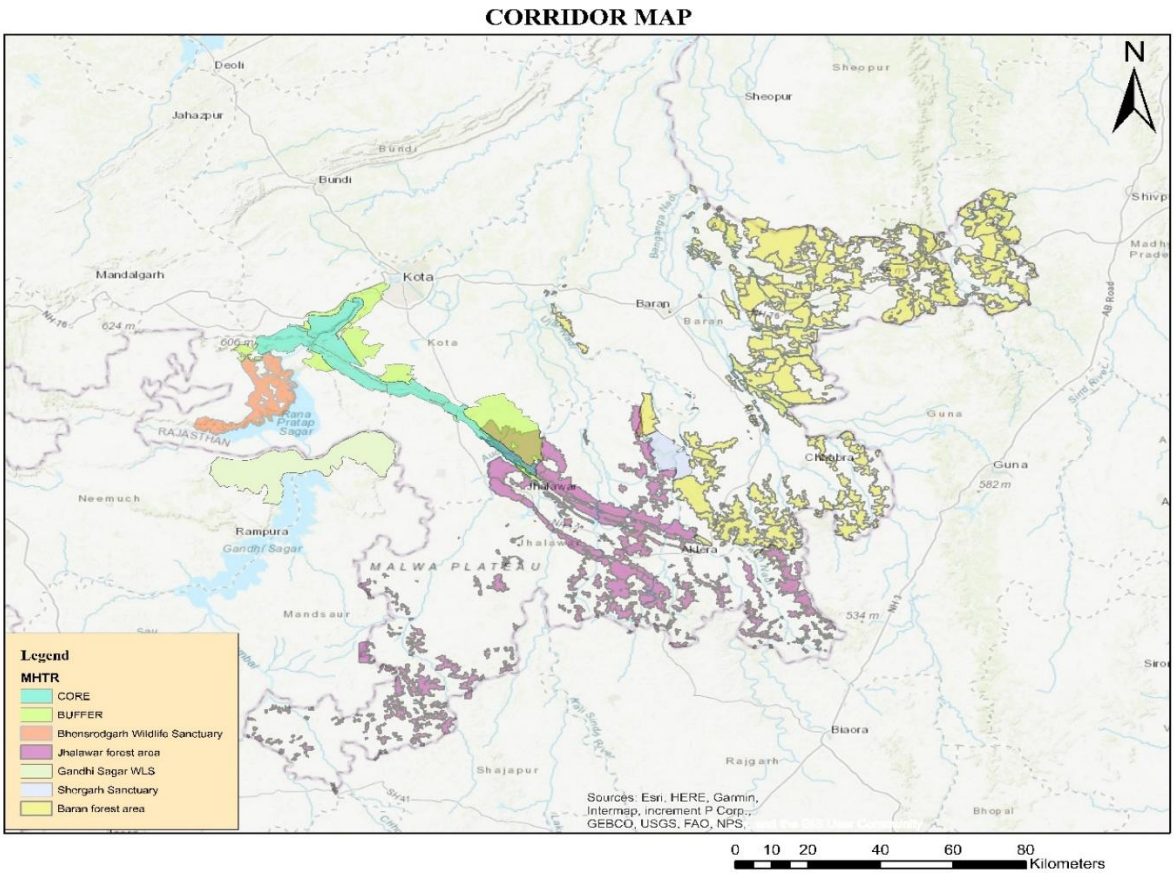
Corridor area between MHTR and Gandhi Sagar sanctuary of MP is badly affected by sheep migration every year. Sheep migration through this area should be completely stopped. The area should be developed so that wild animals from Gandhi Sagar Sanctuary in Madhya Pradesh can move up to MHTR and vice versa.

Corridor connectivity Jhalawar-Baran territorial divisions along Shergarh Wildlife Sanctuary with Mukandra hills tiger reserve

Territorial forests of Baran and Jhalawar divisions along with Shergarh Wildlife Sanctuary forms a viable connectivity for tiger dispersal from Mukandra Hills Tiger Reserve. Old hunting records of near independence shows that these areas supported a healthy population of tigers. Currently these areas should be developed looking into the future of Mukandra Hills Tiger Reserve. Before development these areas should be scientifically surveyed and evaluated with special focus on tiger dispersal.

Strategies

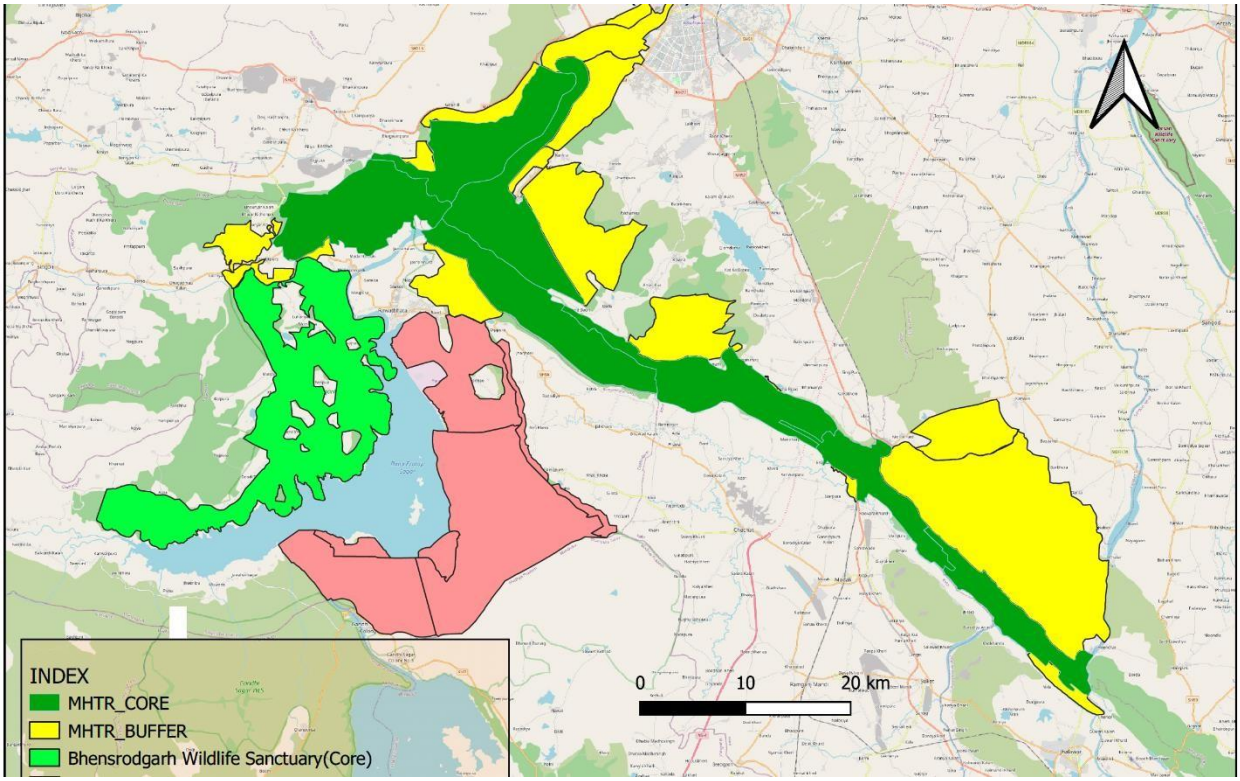
- Scientific survey and evaluation of the habitat and ecological factors with special focus on tiger dispersal.
- Wildlife Institute of India needs to be roped in for handholding with department for conducting and implementing these studies.
- Coordination with managers of these areas should be created by forming a coordination committee with Field director as chairman and DCF Mukandra in charge as member secretary.
- Training of the staff in these different divisions on various wildlife management and monitoring techniques needs to be imparted.
- Based on the scientific evaluation, steps shall be taken to develop these identified viable areas as wildlife corridor and habitats.



Map 5.1: Corridor between Shergarh Sanctuary and MHTR

Map 5.2: Corridor Joining Bhainsrodgarh Wildlife Sanctuary to Gandhi Sagar Sanctuary, Madya Pradesh

Note- Blue colour is showing the corridor between Bhainsrodgarh Wildlife Sanctuary to Gandhi Sagar Sanctuary, Madya Pradesh



Map 5.3: Territorial area of Rawatbhata range of Chittorgarh division's territorial area connecting MHTR with Gandhi-Sagar Sanctuary

5.2 Prioritizing Linkages

1. **Ecological Importance:** Identify linkages that are critical for maintaining connectivity between core tiger habitats and other important wildlife areas. These linkages should facilitate the movement of tigers and other species, contributing to genetic diversity and population viability.
2. **Current Status:** Assess the current status of each linkage in terms of habitat quality, landscape connectivity, and the presence of threats such as habitat fragmentation, human encroachment, and infrastructure development.
3. **Feasibility:** Evaluate the feasibility of implementing conservation measures within each linkage, considering factors such as land tenure, land use practices, stakeholder engagement, and available resources.
4. **Threats and Vulnerabilities:** Prioritize linkages that are most vulnerable to threats such as poaching, habitat loss, and human-wildlife conflicts. Targeting these linkages for conservation interventions can help mitigate potential risks to tiger populations.

5. **Strategic Importance:** Consider the strategic importance of each linkage in the overall landscape connectivity network. Prioritize linkages that serve as key corridors for facilitating movement between core tiger habitats and connecting with other protected areas or wildlife reserves.

Based on these considerations, the prioritization of linkages in the corridor plan of the Mukandra Tiger Reserve may involve the following steps:

1. **Mapping and Assessment:** Conduct a detailed mapping and assessment of potential linkages based on ecological significance, current status, feasibility, threats, and strategic importance.
2. **Stakeholder Consultation:** Engage with relevant stakeholders, including local communities, government agencies, conservation organizations, and experts, to gather input and insights on prioritizing linkages.
3. **Ranking and Selection:** Rank the identified linkages based on the criteria mentioned above, considering the relative importance and urgency of conservation actions needed for each linkage.
4. **Implementation Strategy:** Develop an implementation strategy that outlines targeted conservation measures, timelines, responsibilities, and funding sources for prioritized linkages.
5. **Monitoring and Adaptive Management:** to establish a monitoring and evaluation framework to assess the effectiveness of conservation interventions in prioritized linkages. Use adaptive management approaches to adjust strategies based on monitoring results and changing circumstances.

By prioritizing linkages effectively within the corridor plan of the Mukandra Tiger Reserve, conservation efforts can be directed towards maximizing the connectivity and resilience of tiger populations and their habitats in the landscape.

5.3 Development of integrated land-use approach for the area commensurate with tiger conservation and co-existence agenda

Afforestation work and Ravine Management in corridors:

To improve vegetation cover for wildlife movement in corridor areas mainly on the periphery of Mukandra tiger Reserve, the plantation and land restoration work will be taken up by planting suitable local plants like Ber, Gular, Karanj, Chural, Khair, Kadam, local grasses, Khus, Munja,

Elephant grass, etc. This will help us in restoring waste lands and ravines in corridors. Maintenance for 5 years will be done in public private manner. Ravine management will also be considered with Gram Sabhas, and plantation will be raised accordingly to meet requirements like fuel wood species, browsing species and fruit bearing trees.

Soil & moisture conservation work:

To improve the water conditions in corridors and to conserve the water holding capacity of the soil check dams/WHSs etc. will be developed at appropriate places so as to benefit local population and wildlife both.

5.4 Wildlife management in territorial forest areas

Maintenance of the biological diversity is the new mandate for forest and wildlife planners and managers. This implies management of wildlife on all categories of lands under the control of the forest/wildlife departments. This is different compared to the current protection afforded to wild animals under the law outside the PAs. Protection does not necessarily mean that their habitats are being managed. Protection is critically essential to wildlife management but protection by itself is not habitat management that is fundamental to conservation.

Besides reorienting forest management practices objectively, the managed forests need support of the full range of habitat management practices as they relate to a PA properly. Hence the challenges for conserving biodiversity in corridors are far steeper than the Protected areas. Habitat management cannot be in isolation of management for corridors. The existence of villages within most sanctuaries and national parks is a reality. Notwithstanding any village relocation programmes, between several groups of villages the forest actually exists as a set of several corridors. Natural forest growth existing between a series of plantations constitutes corridors, especially for life forms dependent on older successional stages. Hence all possible measures that we take in PAs will be imitated for the corridor areas and territorial forests. Apart from this entire Silvicultural Treatment model will be developed for corridor areas which are under territorial divisions. Ancillary support systems and miscellaneous regulations-such as forestry related activities such as roads, extractions, paths, camping sites, coups, forest depot, fire lines will be kept in control. Fuel wood collection, sale can be carried out in participation with communities so that their actual pressure can reduce from the bottle neck areas.

Capacity building of field staffs should be done regularly and vigorously. Active participation and handholding with Wildlife Institute of India, Dehradun needs to be done for effective technical and scientific monitoring,

5.5 Zone Plan Management Strategies for corridors

The delineated corridor area of Mukandra Tiger Reserve can be divided in two zones.

1. **Forested Zone**
2. **Multiple-Land Use zone.**

In both the zones protection strategy would be:

Protection from Grazing and lopping:

To control grazing in corridor areas and in habitat block barriers will be constructed in each habitat blocks. Community living nearby will also be brought in confidence through gram sabhas and conceptualisation of corridors will be discussed. Through livelihood programs pasture lands will be developed in Village grazing fields, concession areas will be marked in corridors.

Poaching:

Dispersing Tigers or other cats have always been target of poachers in corridors. To control poaching, chowkis, patrolling units will be formed for continuous patrolling in corridor areas.

Informer network too will be developed for corridor areas. Continuous monitoring of dispersing cats and other wildlife will be under operation with WII, WWF field teams. Kill monitoring in corridors will be done meticulously to avoid cattle poisoning incidents for retaliation killing.

Anti-Poaching measures and other activity:

1. Regular Patrolling

2. Surveillance over suspicious tribes/persons.

3. Maintenance of village wise wildlife crime report for each village.

4. Mechanisms to ensure rapid reporting of cattle kills and speedy compensation.

5. Rewards to Informers.

6. Construction of Forest Guard Check posts.

7. Wireless stations at the check posts and barriers at necessary points where human disturbance is possible.

8. MSTrIPES patrolling trainings to be given to frontline staff.

9. Patrolling gears and accessories to be provide to the staff at chowkis.

Intelligence Gathering:

The intelligence on the movement of the invasive poacher will be gathered from the loyal reliable informer from the fringe village areas. The persons in the civil dress of the department in the weekly markets or periodic markets near the fringe area will collect the information about the detrimental activities related to wildlife and park security.

Fuelwood and fodder

1. The degraded areas on the periphery of the PA should be developed as pastures/medicinal plant farms and fuel wood plantations.
2. Distribution of LPG on subsidiary rates.
3. Smokeless chulhas and energy efficient models of the stoves will be showcased and developed in corridor villages.
4. High value fodder species like elephant grass will be introduced in corridor villages.

Man-animal conflict: -

The villagers should be encouraged to go for permanent enclosures near their settlements to avoid cattle lifting at night. Stall feeding model will be discussed and encouraged in villages to reduce grazing pressure and depredation inside the forest areas. Compensation mechanism (Ex-Gratia Payment) **Annexure-5.3** for the Cattle and Human loss should be made as early as possible and voluntary organizations will be involved for interim compensation. Further the NTCA SOP in case of human wildlife conflict must be widely adapted and protocol enforced. The Crop depredation Compensation Scheme as proposed in Tiger Project areas by Govt. of India is not yet implemented in these regions. Efforts should be made to implement the crop compensation scheme to these areas as well. The pattern of the Human Wildlife Conflict will be studied in Corridor villages and recommendation to the Government will be suggested.

Forested Zone:

- With participation of local community, flora and fauna and important wildlife habitat shall be protected. This will involve deployment of local people in protection work.
- Commercial and domestic use of forest products shall be regulated as per the previous working plan of the respective divisions.

Multiple-Land Use Zone:

This zone shall consist of human settlements, agriculture, and small-scale industries. This zone will also involve providing alternative livelihood options to minimize resource dependency.

Capacity building of staff

Corridor areas are mainly managed by staffs falling to different divisions including territorial divisions. A regular and continuous capacity building is necessary to develop wildlife-oriented skills in the field staff. In this regard Wildlife Institute of India, Dehradun can be roped in for imparting skill development to staffs regarding various technical and scientific monitoring and management of wildlife. A detailed skill development in case of various monitoring protocol and SOPs needs to be done regularly.

Protection of wildlife and their habitat:

Several measures will be taken in order to protect wildlife populations and their habitat in the Corridor area.

- Nature sensitization
- Employment of local youth for protection
- Paid informers who will report poaching or habitat destruction incidence's.
- Self-help groups who will be beneficiaries of rotational funds will also be expected to give information of poaching or habitat destruction

CHAPTER 6
ECO-DEVELOPMENT AND LIVELIHOODS

6.1 Constitution of Adjoining Corridor Area Management

Committee (with representation of different Forest Divisions, Line agencies and other Stakeholders) and Linkages with Tiger Reserve Authority

Scope of Contribution of NGOs in Corridor:

– They can help to generate awareness among local communities on wildlife conservation.

– Provide financial support to families on cattle kill, crop depredation from their revolving fund.

– Selection and training of local youth on eco-tourism development.

– To encourage local communities for plantation on their agricultural bunds in premises.

– Help to reduce biotic pressure on corridor forest by promoting L.P.G connections, improved chulha and biogas units.

– They can help in establishment of small-scale industries, training of local communities on sericulture, lac production, bee- keeping etc.

6.2 Formation of Eco-development Committees (EDCs) and supporting institutional framework

As such there is no formation of EDC being taken up for corridors of MHTR. The framework mentioned below will be taken into consideration the eco-development activities in the corridors. Corridor of MHTR will be looked after by the committee formed for Critical Tiger Habitat of Mukandra Hills National Park.

Policy and Institutional Framework.

The purpose of demarcating and creating corridors for the park is to try and facilitate movement of wildlife across multiple source populations. Most corridors will have people living within them who have a close relationship with the core area. In such cases, there can be several measures taken by the management to try and wean the local people away from using resources from the core, buffer and corridors. It is also important to note that these people lose life and property by living close to the core area. They face high amounts of crop depredation, cattle depredation and many times human death. It is important to gain goodwill from them for any

successful conservation programme. For this purpose, the tiger reserve management will have to work with several other governmental and non-governmental bodies to reach out to the people living in the buffer.

The eco-development programme shall be carried out through the eco-development committee (EDCs to be formed in corridors and buffer of the MHTR). Several other organisations shall also take part in the eco-development programme like WWF, DASTAKAR, local NGOs and multiple Self-Help Groups (SHGs) present in the area.

6.3 Livelihood Support Initiatives through Village Micro-plans

The drafting of a Village-Micro Plan requires an understanding of the feasibility and want of the specific livelihood initiatives. A Village Micro-Plan involves community-asset buildings, individual income-generation activities, alternate energy and energy conservation devices, biomass regeneration, and human resources development suitable for the area. The micro plan shall be prepared by the EDC which will be formed with the help of NGOs and the Forest Department.

Integration of Rural Development Programmes

The District Co-ordination Committee can decide on integrating the plans of the Forest Department in the corridor area and the existing Rural Development Programmes. In addition, the following Rural Development Programmes which exist in other areas can be started in the area with the help of the district administration.

- Central Rural Sanitation Programme: This programme can be used to establish low-cost sanitation facilities in the area.
- Pradhan Mantri Gram Sadak Yojana: This programme can be used to connect several villages without linking roads.

6.4 Monitoring and Evaluation

The beneficiary organisations should report back to the Eco-development Committee and the Executive Committee of the Tiger Conservation Foundation which will monitor the transfer of funds. All monetary transactions will happen only through the Tiger Conservation Foundation. There will be an annual review and evaluation of the effectiveness of the Eco-development program by the District Level Monitoring Committee which will be formed soon.

For monitoring of impacts of ecotourism, a holistic framework needs to be prepared which can take care of all the categories of impacts. Broadly, these categories of impact can be identified:

1) Environmental impacts – on protected area and surrounding lands ○ Physical impacts ○ biological impacts

2) Experiential or psychological impacts - on visitors

3) Economic impacts – on communities and protected area

4) Socio-cultural impacts – on communities

5) Managerial or infrastructural impacts – in protected areas and surrounding lands

The following steps are recommended for initiating and implementing an ecotourism impacts monitoring program.

A. Planning for Monitoring

1) Formation of a steering committee

2) Holding a community meeting

B. Developing a Monitoring Program

3) Identifying impacts and indicators to be monitored

4) Selecting methods of measurement

5) Identifying limits or ranges of acceptable change

6) Developing an operational monitoring plan

C. Conducting Monitoring and Applying Results

7) Training staff, managers and community representatives

8) Carrying out monitoring and examining data

9) Presenting monitoring results

D. Evaluating and Advancing Monitoring

10) Evaluating the monitoring program and conducting outreach

Monitoring responsibility might be divided up among various stakeholders in the following way:

- Environmental monitoring – protected area managers, Range Officers and guides
- Experiential monitoring – guides

- Economic monitoring – Protected area managers, ecotourism managers and community representatives
- Socio-cultural monitoring – community representatives and others (possibly a sociologist or anthropologist)
- Managerial monitoring–Range Officers and community representative

CHAPTER 7

TIGER POPULATION AND HABITAT ASSESSMENT

7.1 Day to day Monitoring Protocol

Apart from forest land remaining land in corridors are private agriculture land and other government land, in which only some transit wild animals are found. In these areas for trekking/monitoring of straying tigers, trekkers, village wildlife watchers, informers shall be engaged from local community.

7.2 Tiger Population Estimation Framework

Corridor areas which fall in buffer and continuous with CTH, Provisions of Phase- IV Monitoring Protocol of NTCA would apply in this aspect.

Corridor areas, which are forest land but scattered and not adjoining / continuous to CTH. In these areas beat-wise monitoring of signs and encounters of animals/vegetation/habitat disturbance would be carried out following Phase- I Monitoring Protocol twice in a year (Summer & Winter). Simultaneously waterhole census could be carried out for estimation of fauna. Analysis and reporting will be done annually.

7.3 Scientific assessment and monitoring

Scientific assessment and monitoring of habitat and wildlife is an integral part in the corridor management. Wildlife institute of India, Dehradun may be roped in for handholding with the department for providing technical and scientific support. Monitoring of habitat and wildlife can be done with the help of Wildlife Institute of India.

CHAPTER 8
ORGANIZATION, ADMINISTRATION AND BUDGET

8.1 Corridor Areas Coordination Committee

Since the corridor area of the Reserve is large and is spread over in multiple districts of one state, hence separate committee for coordination is not required. The committees constituted for the core area would also oversee the works related to corridor and buffer area. Committee will also liase with Madhya Pradesh State Forest Department on administrative issues that need to be address in relation to corridors.

8.2 EDC Coordination

Joint Forest Management Committee (JFMC) will be involved in protection and management, Skill development programme, training etc will be done. All EDCs will have micro plans. As per micro plans, village development activities will be taken care without making any adverse impact on corridor. Schemes which reduce dependency on forest resources will be taken up.

8.3 Staff deployment, Protection Strategy and Linkages with Tiger

Cell and Buffer Zone Striking Force Sensitive areas for poaching and weak linkages will be identified. Accordingly, patrolling camps, barriers, FG Naka will be established to monitor the sensitive areas. Linkages will be established with police, judiciary, tiger cell, CCMB, Tiger reserve, District Magistrate to strengthen protection strategies.

8.4 Schedule of Operations

Yearly scheduling of all operations related to forestry, eco-development activities, training etc. would be done. There will be ten-year plan for all such forestry activities. Eco-development activities will be done as per provision of five-year micro plan.

Schedule of Operations envisaged are listed below:

1. Tiger Reserve to announce available eligible candidates for dispersal to all the corridor forest divisions.
2. Placing camera traps during the monsoon period and other times to take photo evidence of migrating tigers
3. Identifying suitable meta populations sites and stepping stones
4. Declaring them as Conservation Reserves

5. Taking up habitat improvement measures including developing water holes and improving existing water holes
6. Taking up plantation in the degraded areas both at meta population sites and stepping stone sites
7. Awareness programmes for people through PRIs and JFM committees
8. Timely cattle compensation payments
9. Organizing a minimum of two meetings of Steering committee to coordinate the things on the ground.

Budget

Budget provisions shall be included in the annual CSS APO proposed by Mukandra Hills Tiger Reserve to NTCA. Detailed budget provisions should be included regarding development of infrastructural establishment for intensive management and monitoring. Special budgetary provisions shall be made for capacity building of staff through regular training programs related to management and monitoring protocols. Special budgetary provisioned shall be added in APO for various activities related to corridors described. CSS APO of MHTR should act as a helping hand for the budget crunch facing divisions falling in the corridor to develop the corridor into its expected ecological values.

Table 8.1: Budget

Sl. No	**Activity**	**Requirement**	**Per unit cost (Estimate)**	**Target per year**	**Budget Projections/Year**
1.	Tiger Reserve to announce available eligible candidates for dispersal to all the corridor forest divisions. on the ground.	-	-	-	-
2	Placing camera traps during the monsoon period and other times to take photo evidence of migrating tigers	**100 cameras Traps/Forest Dvn (11 divisions in all)**	**15.00 lakhs/Dvn**	**45.00**	**45.00/yr (for four years) and replacement budget of Rs.** **20.00 lakhs/yr after second year**

3	Identifying suitable meta populations sites and stepping stones	**-**	**-**	**-**	**-**
4	Declaring them as Conservation Reserves	**-**	**-**	**-**	**-**
5	Taking up habitat improvement measures including developing water holes and improving existing water holes	**1100.00 lakhs**	**100.00 lakhs/dvn**	**110.00 lakhs**	**110.00 lakhs/yr**
6	Taking up plantation in the degraded areas both at meta population sites and stepping stone sites	**1000ha/dvn**	**0.30 lakhs/Ha**	**3300 lakhs**	**3300 lakhs/year (300 lakhs/dvn/yr)**
7	Awareness programmes for people through PRIs and JFM committees	**10** lakhs**/yr/dvn**	**-**	**1100 lakhs**	**1100 lakhs/yr**
8	Timely cattle compensation payments	**10** lakhs**/yr/dvn**	**-**	**1100 lakhs**	**1100 lakhs/yr**
9	Organizing a minimum of two meetings of Steering committee to coordinate the things	**-**	**-**	**-**	**-**
Total Requirement			**56,440 lakhs for 10 years**		

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Annexure 5.1 List of Forest Blocks falls under the corridor Ranthambhore-Ramgarh Vishdhari-Mukandra hills

S.no.	District	Range	Block	Area (ha.)	Remark
1	Bundi	Ramgarh	Vishdhari	4004.98	Ramgarh vishdhari sanctuary
2	Bundi	Hindoli	Umarmata	1974.29	territorial
3	Bundi	Ramgarh	Shikarburj	1062.56	Ramgarh vishdhari sanctuary
4	Bundi	Bundi	Sathoor	1917.76	territorial
5	Bundi	Indergarh	Sakhavda	103	RTR buffer
6	Bundi	Dabi	Rampuriya	2670.06	territorial
7	Bundi	Ramgarh	Ramgarh	2904.79	Ramgarh vishdhari sanctuary
8	Bundi		Polghata	443	RTR buffer
9	Bundi	Ramgarh	Pipalya manak chowk	5138.34	Ramgarh vishdhari sanctuary
10	Bundi	Hindoli	Pipaljhar	33.52	territorial
11	Bundi		Papra	1080.6	RTR buffer
12	Bundi	Hindoli	Owan	2316.89	territorial
13	Bundi	Bundi	Nursery bundi	6	territorial
14	Bundi	Ramgarh	Jharpeer	2217.54	Ramgarh vishdhari sanctuary
15	Bundi	Indergarh	Kailashpura	60.25	Ramgarh vishdhari sanctuary
16	Bundi	Bundi	Kanti astoli	2356.57	territorial
17	Bundi	Ramgarh	Kathiyadi rajwas	676.69	Ramgarh vishdhari sanctuary
18	Bundi	Ramgarh	Khatkad	2307.39	Ramgarh vishdhari sanctuary
19	Bundi	Indergarh	Lakheri	2174.44	RTR buffer
20	Bundi	Dabi	Lakshmipura	859.46	territorial
21	Bundi	Hindoli	Maradi bandi ka kheda	2030.52	territorial
22	Bundi	Indergarh	Matajiwala	454.54	RTR buffer
23	Bundi	Bundi	Munder	2640.65	territorial
24	Bundi	Hindoli	Nahargarh bhojgarh	3640.99	territorial
25	Bundi	Nainwa	Nandgaon	18.01	territorial
26	Bundi	Dabi	Gunwar	4629	territorial
27	Bundi	Jawaharsagar	Gudha rajpura	2943.44	Jawaharsagar sanctuary
28	Bundi	Bundi	Gudha neem ka kheda	3746.22	territorial
29	Bundi	Ramgarh	Gudha makduka	176.56	Ramgarh vishdhari sanctuary
30	Bundi	Keshoraipatan	Gopalpura	10.55	territorial
31	Bundi		Ghazipur	649.04	RTR buffer
32	Bundi	Dabi	Gararda	1452.21	territorial
33	Bundi	Indergarh	Gaindoli	1880.07	RTR buffer

34	Bundi	Indergarh	Folai	2038.94	Ramgarh vishdhari sanctuary
35	Bundi		Dobarli	6.02	RTR buffer
36	Bundi	Hindoli	Diwanji ka baag	29.55	territorial
37	Bundi	Dabi	Dhorela gararda	3053.28	territorial
38	Bundi	Hindoli	Datunda	2646.44	territorial
39	Bundi	Dabi	Dasaliya a	1739.93	territorial
40	Bundi	Dabi	Dabi palkan	3510.35	territorial
41	Bundi	Bundi	Champabaag	13.38	territorial
42	Bundi	Bundi	Bundi ki nangi pahadiya	47.54	territorial
43	Bundi	Bundi	Bhimlat	1491.46	territorial

S.no.	District	Range	Block	Area (ha.)	Remark
44	Bundi	Ramgarh	Bhaironpura	4313.22	Ramgarh vishdhari sanctuary
45	Bundi	Indergarh	Bankliya mahadev	259.31	RTR buffer
46	Bundi	Indergarh	Arial bud karwar	1589.53	RTR buffer
47	Bundi	Indergarh	Andhaura	9.07	territorial
48	Bundi	Dabi	Amlat anarkhoh	4326.45	territorial
49	Bundi	Jawaharsagar	Ambarani	6710.6	Jawaharsagar sanctuary
50	Bundi	Bundi	Talabgaon	0.54	territorial
51	Bundi	Indergarh	SalamDarrah c	243.96	RTR buffer
52	Bundi	Indergarh	SalamDarrah b	151.55	RTR buffer
53	Bundi	Indergarh	SalamDarrah a	49.62	RTR buffer
54	Bundi	Bundi	Phoolsagar	111.41	territorial
55	Bundi	Dabi	Parana	913.28	territorial
56	Bundi	Indergarh	Kankra	1365.4	RTR buffer
57	Bundi	Bundi	Kesarpura	245.07	territorial
58	Bundi	Hindoli	Khinya	1873.94	territorial
59	Bundi	Dabi	Lambakhoh	1040.2	territorial
60	Bundi	Dabi	Maradi	3071.25	territorial
61	Bundi	Nainwa	Marah fatehpura e	1428.67	territorial
62	Bundi	Nainwa	Marah fatehpura d	101.09	territorial
63	Bundi	Indergarh	Mohanpura	1952.6	RTR buffer
64	Bundi	Bundi	Nayabaag	128.73	territorial
65	Bundi	Dabi	Golpur	455.7	territorial
66	Bundi	Indergarh	Garhwala	957.27	RTR buffer
67	Bundi	Dabi	Gararda b	101.97	territorial
68	Bundi	Dabi	Dhaneshwar	1636.13	territorial

69	Bundi	Dabi	Dasaliya b	348.27	territorial
70	Bundi	Bundi	Borkhandi	193.22	territorial
71	Bundi	Dabi	Banki	203.28	territorial
72	Bundi	Indergarh	Balwan	941.15	RTR buffer
73	Bundi	Keshoraipatan	Balapura	107.12	territorial
74	Bundi	Dabi	Dora	6.28	territorial
75	Bundi	Indergarh	Papdi	353.14	territorial
76	Bundi	Dabi	Kachalia	4409.98	territorial
77	Bundi	Dabi	Maradi b	21.24	territorial
78	Bundi	Nainwa	Meeno ka jhopadiya	225.8	territorial
79	Bundi	Nainwa	Talwas	4323.89	RTR buffer
80	Bundi	Indergarh	SalamDarrah d	193.49	RTR buffer
81	Bundi	Dabi	Khadipur	1225.51	territorial
82	Bundi	Dabi	Karondi	2663.36	territorial

Annexure 5.2

List of Revenue Area falls under the corridor Ranthambhore-Ramgarh Vishdhari-Mukandra hills

S.No	District	Village	Area in Ha
1	Bundi	Barodiya	0.79
2	Bundi	Dhakni	143.96
3	Bundi	Nadhahet	3.96
4	Bundi	Borkhandi	0.25
5	Bundi	Rampuriya	25.16
6	Bundi	Nathawa	479.89
7	Bundi	Solaki Jhonpariyan	176.29
8	Bundi	Talab Gaon	726.1
9	Bundi	Haripura	86.98
10	Bundi	Shahpura	376.99
11	Bundi	Gurha Nathawatan	260.97
12	Bundi	Bisanpura	220.56
13	Bundi	Neem Ka Khera	753.59

14	Bundi	Mohanpura	134.44
15	Bundi	Onarji Ki Jhonpariyan	353.18
16	Bundi	Megharawat Ki Jhonpariyan	266.88
17	Bundi	Anoppura	817.54
18	Bundi	Megharawat Ki Jhonpariyan	36.27
19	Bundi	Parana (Bheelonwala)	177.91
20	Bundi	Holaspura	131.79
21	Bundi	Golpur	662.01
22	Bundi	Lorda	3.81
23	Bundi	Parana (Bheelonwala)	46.52
24	Bundi	Holaspura	51.18
25	Bundi	Loicha	164.97
26	Bundi	Golpur	8.25
27	Bundi	Kewariya	451.13
28	Bundi	Guwar	1200.9
29	Bundi	GarDarrah	857.76
30	Bundi	Kalyanpura	41.34
31	Bundi	Dora	388.68
32	Bundi	Kachhalya	1049.62
33	Bundi	Palka	106.32
34	Bundi	GarDarrah	0.95
35	Bundi	Palka	1996.71
36	Bundi	Kanwarpura	1551.31
37	Bundi	Dabi	804.86
38	Bundi	Parana (Karadonka)	5.37

39	Bundi	Bijari	251.07
40	Bundi	Thari	837.51
41	Bundi	Bhawani Pura	76.54
42	Bundi	Beodiya	296.38
43	Bundi	Dhaneshwar	1391.01

S.No	District	Village	Area in Ha
44	Bundi	Bhagwanpura @Chainpuriya	511.84
45	Bundi	Sootra	852.01
46	Bundi	Dasalya	26.46
47	Bundi	Gurha	32.88
48	Bundi	Bakchanch	44.21
49	Bundi	Budhpura (CT)	1.11
50	Bundi	Barfoo	739.35
51	Bundi	Ganeshpura	107.19
52	Bundi	Dasalya	478.99
53	Bundi	Daboosar	2.34
54	Bundi	Chhant Ka Khera	374.21
55	Bundi	Gurha	339.83
56	Bundi	Ratanpura	136.68
57	Bundi	Peepalda	501.74
58	Bundi	Naroli	617.69
59	Bundi	Rajpura	805.85
60	Bundi	Lambakhoh	1370.53
61	Bundi	Bakchanch	3.04

Annexure 5.3

कार्यालय उप वन संरक्षक (वन्यजीव) मुकन्दरा राष्ट्रीय उद्यान, कोटा

वर्ष 2019–20						
S. No.	**Name of Range**	**Forest Block**	**Name of the Person**	**Hunting by wildlife**	**Date of Application**	**Amount**
1	गागरोन	नोलाव	श्री विष्णु कुमार पुत्र श्री सुल्तान सिंह निवासी नोलाव	गाय के बछडे का शिकार	03-05-2019	4,000.00
2	गागरोन	नोलाव	कालुलाल पुत्र श्री कानासी भील	गाय के बछडे का शिकार	20-05-2019	4,000.00
3	दरा	घाटी माता वन क्षेत्र अमझार नदी के पास	श्री मुकेश कुमार पुत्र श्री जगन्नाथ धोबी	बैल का शिकार	30-05-2019	20,000.00
4	गागरोन	मशालपुरा	रघुराज सिंह पुत्र जसंवत सिंह	गाय के बछडे का शिकार	03-06-2019	4,000.00
5	गागरोन	लक्ष्मीपुरा से 100 मीटर उपर	श्री भंवरलाल गुर्जर पुत्र श्री मांगीलाल	भैस का शिकार	11-11-2019	20,000.00
6	गागरोन	मशालपुरा	रामचन्द्र पुत्र भैरूलाल	बकरी का शिकार	25-10-2019	2,000.00
7	गागरोन	मण्डीवारा से घाटी माता जी वाली पहाडी पर	श्री रमेशचन्द्र पुत्र श्री भॅवरलाल निवासी मशालपुरा	बकरी का शिकार	25-10-2019	2,000.00
8	गागरोन	मण्डीवारा से घाटी माता जी वाली पहाडी पर	श्री राजेन्द्र सिंह पुत्र श्री भैरू सिंह निवासी मशालपुरा	1 बकरा व 1 बकरी का शिकार	25-10-2019	4,000.00
9	गागरोन	मण्डीवारा से घाटी माता जी वाली पहाडी पर	श्री भैरूलाल पुत्र श्री भंवरलाल निवासी मशालपुरा	2 बकरी का शिकार	25-10-2019	4,000.00
10	गागरोन	लक्ष्मीपुरा	श्री रामश्वेर पुत्र श्री कनीराम गुर्जर निवासी लक्ष्मीपुरा	1 पाडे का शिकार	05-09-2019	20,000.00
11	गागरोन	लक्ष्मीपुरा	श्री सियाराम गुर्जर निवासी लक्ष्मीपुरा	गाय के बछडे का शिकार	14-11-2019	4,000.00
12	गागरोन	लक्ष्मीपुरा	श्री सियाराम गुर्जर निवासी लक्ष्मीपुरा	गाय का शिकार	14-11-2019	10,000.00
13	गागरोन	मशालपुरा	श्री दौलतराम पुत्र रामदयाल गुर्जर मशालपुरा	गाय का शिकार	22-11-2019	10,000.00
14	गागरोन	मशालपुरा	कालूलाल पुत्र भंवर लाल	भैस का शिकार	09-07-2019	20,000.00
15	गागरोन	दरा ग्राम घाटी माता	श्री जुगराज सिंह पुत्र श्री भीमसिह निवासी घाटी माता	गाय का शिकार	18-11-2019	10,000.00

16	गागरोन	मशालपुरा वन क्षेत्र	श्री रमेशचन्द्र पुत्र श्री भॅवरलाल निवासी मशालपुरा	गाय का शिकार	20-11-2019	10,000.00
17	गागरोन	मशालपुरा वन क्षेत्र	श्री सुखराम पुत्र श्री रामदयाल गुर्जर निवासी मशालपुरा	गाय का शिकार	01-01-2020	10,000.00
18	गागरोन	लक्ष्मीपुरा प्रेमपुरा वन क्षेत्र	श्रीमती कस्तूरी बाई जाति गुर्जर निवासी लक्ष्मीपुरा झालावाड	गाय के बछडे का शिकार	13-02-2020	4,000.00
19	गागरोन	लक्ष्मीपुरा प्रेमपुरा वन क्षेत्र	श्रीमती संजू पत्नी श्री रामचन्द्र निवासी लक्ष्मीपुरा	गाय के बछडे का शिकार	04-03-2020	4,000.00

वर्ष 2020–21

S.No.	Name of Range	Forest Block	Name of the Person	Hunting by wildlife	Date of Application	Amount
1	गागरोन	मशालपुरा	श्री राजूलाल पुत्र श्री रूपचन्द्र जाति भील निवासी गागरोन	गाय का शिकार	27-04-2020	10,000.00
2	गागरोन	मशालपुरा	श्री रघुराज सिंह पुत्र जसंवत सिंह झालरापाटन	बैल का शिकार	25-01-2020	20,000.00
3	गागरोन	प्रेमपुरा पहाडी वन क्षेत्र	श्री नाथूराम पुत्र श्री बालाराम निवासी सहरिया बस्ती प्रेमपुरा	बकरी का शिकार	22-06-2020	2,000.00
4	गागरोन	लक्ष्मीपुरा	श्री पप्पूलाल पुत्र श्री किशोर निवासी लक्ष्मीपुरा	गाय का शिकार	10-08-2020	10,000.00
5	जवाहर सागर	श्री पुरा	श्री गोपाल पुत्र श्री किशन लाल निवासी भैसरोडगढ	1 गर्भवती गाय का शिकार	01-01-2021	10,000.00

वर्ष 2021–22

S.No.	Name of Range	Forest Block	Name of the Person	Hunting by wildlife	Date of Application	Amount
1	निल	निल	निल	निल	निल	निल

वर्ष 2022–23

S.No.	Name of Range	Forest Block	Name of the Person	Hunting by wildlife	Date of Application	Amount
1	रावठां	दामोदपुरा	मोडूलाल पुत्र बालाजी दामोदपुरा तह0 लाडपुरा कोटा	भैस की पाडी का शिकार	25-11-2022	5,000.00
2	रावठां	दामोदपुरा	देवकरण पुत्र जगन्नाथ दामोदपुरा	भैंस के पाडे का शिकार	21-12-2022	5,000.00
3	रावठां	दामोदपुरा	भोजराज पुत्र श्री जगन्नाथ गुर्जर दामोदपुरा	गाय के बछडे का शिकार	20-12-2022	5,000.00

4	कोलीपुरा	कोलीपुरा	तेजमल पुत्र श्री प्रभूलाल मीणा	गाय का शिकार	08-08-2022	12,500.00
वर्ष 2023–24						
S.No.	**Name of Range**	**Forest Block**	**Name of the Person**	**Hunting by wildlife**	**Date of Application**	**Amount**
1	रावठां	दामोदपुरा	बनवारी पुत्र मोहनलाल	गाय का शिकार	21-10-2023	12,500.00
2	गागरोन	झिलारा	श्रीमती रोडी बाई पत्नी स्व0 सोहन लाल	गाय का शिकार	17-03-2024	12,500.00
3	रावठां	हरिपुरा	राधेश्याम पुत्र देवीलाल भील	बैल का शिकार	02-02-2024	25,000.00

COMPENDIUM OF GUIDELINES, ADVISORIES & ORDERS

NATIONAL TIGER CONSERVATION AUTHORITY

MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE

GOVERNMENT OF INDIA

Volume II

JANUARY 2020

Prepared Under Guidance of:

Dr. Anup Kumar Nayak,
ADG (PT) & Member Secretary (NTCA)

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Shri Surender Mehra,
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AIGF, NTCA, Regional Office,
Nagpur

COMPENDIUM OF GUIDELINES, ADVISORIES & ORDERS

Volume-II
JANUARY 2020

NATIONAL TIGER CONSERVATION AUTHORITY
Ministry of Environment, Forest and Climate, Change Government of India

राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण
National Tiger Conservation Authority
(पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार के अंतर्गत सांविधिक निकाय)
(Statutory Body under Ministry of Environment, Forest and Climate Change, Govt. of India)

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Preface

National Tiger Conservation Authority has been constituted under the Wild Life (Protection) Amendment Act, 2006. Further section 38 O of the Act empowers to exercise the powers conferred on and to perform the functions assigned to it under the said Act for Tiger Conservation. Salient powers and functions of the National Tiger Conservation Authority as envisaged under Section 38O includes approval of the Tiger Conservation Plan, providing support to Tiger Reserve management, Evaluation and assessment of various aspects of sustainable ecology, Laying down normative standards for tourism activities & guidelines for Project Tiger and Approving & co-coordinating research and monitoring on tiger, co-predators, prey & habitat.

The National Tiger Conservation Authority, in the exercise of its powers and performance of its functions has issued certain directions, guidelines, protocols and Technical documents dealing with scientific management of Tiger Reserves in specific and tiger management in general. First Volume of Compendium released by National Tiger Conservation included all such Guidelines, Orders, Advisories, and notifications issued till 2010. Present volume of compendium not only includes all these important Guidelines, Protocols and orders issued after that, but also excerpts of certain judgments pronounced by Hon'ble Supreme Court and High Courts related to tiger reserve and tiger conservation.

I sincerely believe that this volume of compendium shall definitely help the officers in states while dealing scientific management of Tiger Reserves and other tiger bearing areas at landscape level.

(Dr. Anup Kumar Nayak)

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PART A:

IMPORTANT GUIDELINES, ADVISORIES & ORDERS

NATIONAL TIGER CONSERVATION AUTHORITY
Ministry of Environment, Forest and Climate, Change Government of India

Dr. RAJESH GOPAL
Additional Director General of Forest (PT) &
Member Secretary (NTCA)

Annexe No. 05 Bikaner House,
Shahjahan Road, New Delhi-110011
Telefax: 23384428
E-mail: dirpt-r@nic.in

F. No. 15-9/2013-NTCA **Dated the 5th September, 2013**

To,

The Additional Chief Secretary/Principal Secretary,
Forest Department,
All Tiger Range States.

Sub: Posting and tenure of Field Directors of tiger reserves-reg.

Sir,

As you are aware, the status of protection and field implementation largely depends on the leadership shown by the Field Director. A Tripartite Memorandum of Understanding (MOU), linked to fund flows has also been implemented since 2009-10, between the National Tiger Conservation Authority (NTCA)/ Project Tiger (PT), State Government and the Field Director, to strengthen field delivery.

The issue was discussed in the 9th meeting of the National Tiger Conservation Authority held on 19th June, 2013, under the Chairmanship of the Minister for Environment and Forests. The Authority has decided for advising the States under section 38-O (2) of Project Tiger / NTCA for obtaining recommendation vis-à-vis the professional competency of the officers included in the said panel. Further, it was also decided that a minimum tenure of three years should be ensured for such officers while posting them as Field Directors of Tiger Reserves (except in cases involving disciplinary action etc.). The professional reasons, not amounting to concurrence and the minimum tenure would strengthen field delivery vis-à-vis the tripartite MOU.

In this context, it is requested that necessary action may please be ensured for due compliance of the decision taken by the NTCA as above.

Yours Sincerely,
Sd/-
(Dr. Rajesh Gopal)
Additional Director General of Forest (PT) & Member Secretary (NTCA)

Copy to:

1. PCCF(S)/HOFF, All Tiger Range States.
2. Chief Wildlife Warden(s), All Tiger Range States.

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Government of India
Ministry of Environment, Forest and Climate Change
National Tiger Conservation Authority
B-1 Wing, 7th Floor, Pt. Deendayal Antyodaya Bhawan,
CGO Complex, Lodhi Road, New Delhi-110003

F. No. 15-24/2019-NTCA **New Delhi, the August 16, 2019**

OFFICE MEMORANDUM

Subject: Guidelines for Reward to frontline staff for extra ordinary performance in field.

In exercise of its powers and performance of functions under Chapter IVB of the Wildlife(Protection) Act, 1972, as amended in 2006, the National Tiger Conservation Authority under section 38 O(2) of the said Act, issues following guidelines in respect of the subject cited above;

1. The frontline staff of a **Tiger Reserves and tiger-bearing Landscapes** is responsible for actually implementing the protection/security plan in such areas. In fact, the frontline staff is most vulnerable not only to poachers or forest offenders but also to wild animals. National Tiger Conservation Authority (Normative Standards for Tourism activities and Project Tiger) Guidelines, 2012 also envisages for not only providing funding support for staff welfare but also recognising the effort put in by the frontline staff in protecting the tiger and the forests. The proposal to give reward to such frontline staff in the ranks of Forester, Forest Guard and Watchers for extra ordinary performance in field was recommended by 2nd Technical Committee meeting of National Tiger Conservation Authority held on 19.07.2019. Consequently, the Competent Authority has approved a reward of Rs. 1 lakh each to two Foresters, two Forest Guards and two Watchers/ Protection Assistants/ Tiger Trackers (or any other frontline staff holding equivalent rank/position) from **Tiger Reserves and Tiger Bearing Areas/ Divisions.**
2. This reward is mainly for extraordinary efforts put in by the frontline staff in overall Tiger conservation in tiger bearing areas including following fields;
   (i) Wildlife Protection and Anti-Poaching Activities
   (ii) Wildlife habitat management
   (iii) Wildlife crime detection, investigation and prosecution
   (iv) Wildlife Monitoring
   (v) Village Relocation works
   (vi) People's participation &Eco development activities
   (vii) Tourism Management/Regulation
3. For selection of frontline staff for this reward following criteria and general principles shall be followed;
   (i) This reward is proposed to be given to frontline staff for performing extraordinary work continuously for at least two years in any of the fields mentioned in para 2.
   (ii) The nomination may be initiated by the frontline staff by themselves or by a Range Officer under whom such frontline staff is working.

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(iii) The nomination shall be further forwarded by DFO/ Dy Director, Field Director/ Conservator of Forests/ Chief Conservator of Forests to Chief Wildlife Warden State.

(iv) The nomination of frontline staff shall be duly recommended and forwarded by Chief Wildlife Warden of the State in the format as suggested by NTCA.

(v) There are two awards each for Foresters, Forest Guards, and Watchers level frontline staff to the maximum limit of six. More number of awards can be given to a particular level of frontline staff nominees, in case of non-availability of enough or suitable nomination from other levels of frontline staff.

(vi) The reward to all such frontline staff selected for the award includes Rs. One lakh and a Commendation Certificate.

4. Following Selection Committee shall give its recommendation to Member Secretary, NTCA for the purpose of this reward;
   (i) Inspector General of Forests, NTCA – Chairman.
   (ii) Nominee of ADG, Wildlife, MoEF&CC- Member.
   (iii) Representative of WWF-India-Member.
   (iv) Deputy Inspector General of Forests, NTCA- Convener.
5. The nomination with duly filled format given in Annexure-I should reach office of Member Secretary, National Tiger Conservation Authority, New Delhi on or before 30th November.

This issues with the prior approval of Competent Authority.

Sd/-
(Surender Mehra)
Dy. Inspector General (NTCA)

Copy to

1. PS to MEF&CC/ Chairman, NTCA
2. PS to MoS EF&CC/ Vice Chairman, NTCA
3. PPS to Secretary, MoEF&CC
4. PPS to DGF and SS, EF&CC
5. PS to MS, NTCA
6. PS to ADG (Wildlife), EF&CC
7. PCCF and HoFF (Tiger Range States)
8. Principal Secretary, Forests (Tiger Range States)
9. Chief Wildlife Wardens (Tiger Range States)
10. IGF, DIGF, AIGF, NTCA HQ
11. IGF and AIGF, NTCA Regional Offices (Guwahati, Bengaluru and Nagpur)
12. Guard file

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ANNEXURE-I

NATIONAL TIGER CONSERVATION AUTHORITY

Format for nomination for reward to frontline staff for extra ordinary performance in field.

1. Name of frontline staff (to be nominated) _____
2. Designation/Level _____
3. Place of posting (Range/Division/Circle/Tiger Reserve) _____
4. Brief description of extraordinary work done by frontline staff in last three years. (not more than 200 words) _____
5. Whether frontline staff (being nominated) has been awarded before, (if Yes, give brief details) _____
6. Recommendations by Range Officer/ Asst. Conservator of Forests (Not more than 100 words) _____
7. Recommendations by DFO/Dy. Director (Please give additional information/comments). _____ _____
8. Recommendation by Field Director /Conservator of Forest / Chief Conservator of Forest _____ _____
9. Recommendation by Chief Wildlife Warden _____

Name and Signature of
Chief Wildlife Warden
(With official stamp)

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भारत सरकार
Government of India
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest and Climate Change
राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण
National Tiger Conservation Authority

F. No. 15-37/2012-NTCA (Vol. I) **New Delhi, the November 28, 2019**

To,

The Chief Wildlife Warden,
All Tiger Range States

Sub: Services of Veterinary Doctors in Tiger Reserves.

Ref: Letter No. 8-6/2012-NTCA (ROSZ)/290 dated 03.10.2019, Regional Office, Bengaluru (copy enclosed).

Sir,

Please find reference to the subject cited above. Inspector General of Forest, Regional Office (Southern Zone), NTCA has informed this office regarding the need for placement of full time Veterinary Doctors in Tiger Reserves. You are also aware that while managing the situations of Human Animal Conflict, the role of Veterinary Doctors is very important. Further, there are certain Guidelines and Standard Operation Procedure (SOPs) issued by this Authority for dealing with cases of tiger death, disposal of carcass and management of tiger in human dominated area where it is mandatory to have a veterinary doctor in the concerned team/committee.

In view of this, I am directed to request you to take note of above and take necessary action for ensuring appointment of full time veterinary doctors in tiger reserves in your state.

Encl: As above.

Yours Sincerely,
Sd/-
(Surender Mehra)
Deputy Inspector General of Forest, NTCA
Email: dig1-ntca@nic.in
Tel. (EPABX): + 91 11 24367837-39
FAX: +91 11 24367836

F. No. 15-37/2012-NTCA (Vol. I)

Copy to:

1. Additional Chief Secretary/Principal Secretary, Forests of All Tiger Range States.
2. Principal Chief Conservator of Forest & HoFF, All Tiger Range States.
3. IGs & AIG, Regional Offices, NTCA (Guwahati, Bengaluru & Nagpur).
4. Field Director(s), All Tiger Reserve.
5. PS to ADG (PT).

Sd/-
(Surender Mehra)
Deputy Inspector General of Forest, NTCA

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A PROTOCOL ON PHASE-IV MONITORING
(Continuous Monitoring of Tiger Reserves/Tiger Source Areas)

SECTION-1

1. BACKGROUND

1.1 The Tiger Task Force constituted by the National Board for Wildlife (2005) has endorsed the revised methodology/approach propounded by the erstwhile Project Tiger Directorate (now the National Tiger Conservation Authority-NTCA) and the Wildlife Institute of India (WII) for country level estimation / monitoring of tiger / prey status and its habitat. The said approach, interalia, comprises of the following:

(a) Country level assessment of tiger, co-predators, prey and habitat in 17 tiger States once in every four years using the double sampling method having three phases (Phase-I: Spatial mapping and monitoring of tigers, prey and habitat; Phase-II: Assimilation of spatial and attribute data; and Phase-III: Estimating the population of tigers and its prey).

(b) Intensive monitoring of tiger source populations in tiger reserves and protected areas in each tiger landscape complex (Phase-IV), and maintenance of a centralized photo-database of tigers at NTCA obtained from camera traps deployed across all tiger reserves.

(c) Routine management-oriented monitoring, which, inter alia, comprises of regular monitoring of tiger signs at beat level, which can potentially be integrated with monitoring of law enforcement and patrolling.

(d) Survey Design (for all tiger reserves except Sundarbans) for spatially explicit mark-recapture study involving research workers / scientists is at Appendix-I.

1.2 The above endorsement of the Tiger Task Force is being implemented and has also been reiterated in the guidelines issued by the NTCA (Technical Document: NTCA/01/07). In a country level meeting of Chief Wildlife Wardens / Field Directors held in May, 2011, it was decided to taken to implement the Phase-IV monitoring from November, 2011. This was followed by a discussion with experts/NTCA members and a meeting with Chief Wildlife Wardens / Field Directors in October, 2011.

As per the decision taken, the minimum standards for the Phase IV protocols were:-

(1) Camera trap density one pair per 4-5 sq.km.

(2) Minimum trap nights of a 1000 per 100 sq.km. (i.e. 25 pairs of cameras in 100 sq.km. for 40 days)

(3) Minimum area coverage of 400 sq.km.

(4) Closure period of 40 to 60 days

(5) Minimum of 20 spatial replicates of line transects each of a minimum of 2 km length (for the entire reserve)

(6) Entire reserve needs to be sampled. Each sampling occasion should cover minimum area of 400 sq.km (100 pairs of cameras) and in case of larger reserves, the area should be covered by dividing the area into 400 sq.km blocks and camera trapping should be done successively, within the closure period of 60 days.

The objective of the NTCA exercise is to, at the least, obtain a minimum number of tigers in a Tiger Reserve (Section-2), but aims to estimate the tiger population size and prey densities

(Section-3) in a reserve using spatially-explicit capture-recapture approaches using software tools such as SPACECAP / DENSITY for estimating tiger population size & DISTANCE for estimating densities of prey.

In brief, the Phase-IV protocol of NTCA contains six components:

(a) Maintaining daily patrolling log (described in Section-2)

(b) Carrying out beat-wise monitoring of sign encounters twice a year (described in Section-2)

(c) Recording from PIP (described in Section-2)

(d) Obtaining minimum tiger number using camera traps (described in Section-2)

(e) Obtaining tiger numbers using camera traps (40-60 days closure period) (described in Section-3)

(f) Obtaining minimum tiger numbers through DNA analysis from Scats (described in Section-3)

The field managers are familiar with some of these components. Under Phase-IV monitoring, emphasis have been given on the use of camera traps for obtaining minimum tiger numbers or preferably, tiger population size estimation and using line transect sampling for estimating prey densities. It must be borne in mind that for data analysis using camera trap data in a mark recapture framework as well as in DISTANCE sampling, the 'detection probability' or 'probability of detecting animals' is important. Further, it is important to note that more animals in an area may not result in enhanced detection probability, since the latter is governed by terrain features, cover, visibility etc. However, more animals in an area may result in more detections on a line transect or more captures during a camera session.

The phrase 'detection probability' is used in line transects, whereas 'proportions of animals captured' is used in the context of camera traps. The 'proportion of capture' or 'capture probability' facilitates estimation of true population size. To illustrate the importance of a detection probability, a simple example is given below:

- 100 spotted deer were introduced in a known area
- The same area was traversed by a team of two persons six times resulting in a count of 62 spotted deer (mean)
- Here, the detection probability = $p\hat{}$ = 62/100 = 0.62
- After a year, the area was again counted along the same trail resulting in a count of 90 spotted deer
- The population estimation is done as below:
  90/0.62 = 145 spotted deer, with the assumption that detection probability has remained constant over the two years.

Thus a generic formula is given for population estimation:

$$\hat{N} = \frac{\hat{C}}{\hat{P}}$$

where, $\hat{N}$ = population

$\hat{C}$ = court/index

$\hat{P}$ = probability of detection

In the above example, the initial figure of 100 spotted deer was known, which is not the situation under wild conditions. Further, two counts / indices can be compared only if we know the probability / estimate the probability of detection. Thus, both in camera trap as well as distance sampling, the analysis part requires estimation of the probability of detection / capture.

Quick Reference Guide

Phase IV involves monitoring of Tiger and its prey on annual basis at Tiger Reserve level, while Phase I to III is done at every 4 year interval for country level monitoring. The following needs to be kept in mind while planning the Phase IV:

Carnivore Population Estimation

1) Camera trap density one per 4-5 sq km
2) Minimum trap nights of a 1000 per 100 sq km
3) Minimum area coverage of 400 sq. km or whatever is the reserve size
4) Closure period of 40 to 60 days

Trap night are number of days of operation multiplied by number of pair of cameras. Closure period is time frame within which animal movement in and out of study area, birth and death are going to have no or negligible effect.

Given the importance of estimating detection probability as outlined above, this concept is central to intensive monitoring under Phase IV, unlike in Phases I, II, and III where 'encounter rates and indices' were employed more prominently.

However, since at the reserve or source population level tiger and prey density estimation methods which can rigorously deal with detection probability require substantial scientific expertise to design and deploy, it may not always be possible for reserve managers to have access to and be guided by adequately qualified scientists. Therefore, Phase IV intensive monitoring is being seen as a "ladder process" in which tiger reserves will gradually move up the ladder from routine management oriented monitoring to the intensive scientific monitoring scheme.

States/Reserve managers who do not have ready access to trained scientists with expertise in design and deployment of intensive scientific methods may use the first step of the ladder described here under Section-2, as routine management oriented activities. These routines will involve a wide range activities covered under parts A, B, C, D under Section 2 of this protocol and will be generally helpful in management of reserves. One aim of this is to generate minimum number of tigers in each reserve, each year without violating important closure assumptions described later. This routine management oriented monitoring is described in Section 2 of this document.

The next step in the "ladder process" involves use of rigorous distance sampling (for prey) and capture-recapture sampling (for tigers). These may require collaboration with adequately qualified scientists in survey design, implementation and data analysis stages. Here the goal is to generate valid estimates of population density and population size for tigers and important prey species in each reserve, fully meeting all the minimum standards and approaches described in Section 3 of this document.

Where such intensive scientific monitoring of tiger and prey populations is undertaken as described in Section 3, there may be no need for deploying other kind of line transect or camera trap surveys, to avoid unnecessary duplication of work.

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SECTION-2
PHASE-IV MANAGEMENT-ORIENTED MONITORING

I. For all tiger reserves except Sundarbans

Part-A
Maintaining Daily Patrolling Log in Patrolling Camp/Chowki Registers

While on regular or targeted patrolling duties the personnel shall record the following information:

1) Each patrolling team shall be equipped with a GPS unit and a digital camera besides the regular equipment (e.g. firearms, wireless, torch, etc).
2) The date, time and GPS coordinates of the beginning of the patrol recorded.
3) Preferably the GPS unit shall be switched on throughout the patrol in a track log mode. However, due to constraints of technical knowhow or other issues if this is not possible then a GPS coordinate recorded and written down in the record form every 30 min or at major deviations from a straight line path.
4) The total number of persons on the patrol are recorded along with number of armed personnel and type of arms. The mode of patrol is also recorded, e.g. on foot, bicycle, motorcycle, 4WD, elephant, boat, etc.
5) A record of all illegal activities is entered in the data sheet along with time, date and coordinate stamp. A photograph is also taken of the site with a time date stamp.
6) A record of signs and sightings or highly endangered species while on Patrol is also maintained by entering the GPS coordinate, date and time of the sighting /sign as well as recording a digital picture of the same if possible.
7) After the end of the Patrol, the GPS track log is either downloaded onto a computer (in MSTrIPES program if this is applicable at the site) or the datasheet with the recorded information deposited at the Range Head Quarters. Data formats for recording Patrol data are provided in Annexure-I.

Part-B
Carrying Out Beat-Wise Monitoring of Signs and Encounters of Animals/Vegetation/Habitat Disturbances Following Phase-I Protocols Twice a Year

The entire tiger reserve would be covered at the beat level, by considering the latter as a sampling unit, as done in Phase-I of the country level assessment by following the standardized eight day protocol (the data collection needs to be done twice a year in the formats provided at Annexures-VII, VIII, IX and X). This would involve beat wise collection of data (in the standardized formats) twice a year relating to tiger/ carnivore signs survey, ungulate, encounter rates, habitat status, human presence and pellet / dung counts. Based on such data, beat level maps indicating the spatial presence / relative abundance (index) of prey / predators species should be prepared in the GIS domain for record.

(i) Beat-wise collection of data in the standardized formats of Phase-I country level assessment process.

(ii) The data collection should be done twice a year (summer and winter).

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(If the tiger reserve is following advanced protocols as described in Section-3 in collaboration with scientific institutions, then the routine monitoring of prey animal signs/encounters, vegetation features and habitat disturbance features should be carried out along transect lines designed based on protocols described in Part-E of Section-3. There may be no need for laying of transect lines in each beat as per Phase-I protocol.)

Part-C
Recording Data from 'Pressure Impression Pads' (PIP)

As a part of intensive monitoring of source populations of tigers, data will be recorded from pressure impression pads (PIP's, track plots) in every beat.

- A minimum of 5 PIPs will be permanently maintained in each beat. The dimension of the PIP shall not be less than 6m in length the width of the PIP should equal the foot path, jungle trail or dry nullaha's width on which the PIP is made. GPS coordinates of all PIP's need to be recorded.
- The location of the PIPs within the beat should be such that they maximize the possibility of recording carnivore tracks. Minimum distance between any 2 PIPs should be more than 1.5km.
- The PIPs should be cleaned of debris, leaf litter, gravel and covered with fine dust of about 0.5cm depth. After preparing the PIP, data should be recorded the next morning and the PIP cleared of all tracks. The PIPs should be sampled thrice every month during summer and winter. In case a prepared PIP is disturbed due to rain, traffic etc. then it should be set again before data is collected. The topography and forest type should be recorded for each PIP.
- Trails of all carnivore and mega herbivores species should be recorded e.g. tiger one track set, leopard two track sets, several dhole track sets (as it may not be possible to identify individual track sets due to many tracks by a passing dhole pack), one small cat track (as species level identification may not be possible).
- It is important to note that a track set is constituted by one to many pugmarks made by a single animal traversing the track plot (PIP). One need not identify the gender or individual animal (tiger), but if this information is known, it should be entered in the remarks column. If there are more than one track sets of "same" animal eg. a tiger moving up and down the trail several times, they should be recorded as separate track sets. Data sheet for recording are provided in Annexure-III.

Part-D
Obtaining the Minimum Number of Tigers in the Tiger Reserve

(i) Three pairs of camera traps to be deployed per beat and should be left open within a closed period of 40-60 days depending on the reserve.

(ii) The period of leaving the camera traps open (closure period) is important owing to the fundamental assumption of "population closure" (no deaths / births / immigrations / emigrations in the population). Leaving the cameras open for longer duration will lead to over estimation of tiger numbers.

(iii) The photographs obtained from camera trapping should be submitted to NTCA for analysis for fixing individual IDs of tigers.

(iv) A digital camera trap tiger photo database should be prepared for the reserve with location ID, Date and Time Stamps as per format to be provided by NTCA.

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(v) The minimum number of tigers should be ascertained based on individual camera photo traps of tigers obtained within the closure period specified to be 45-60 days.

(vi) Details of new captures / missing tigers should be recorded.

(vii) The format for recording the camera trap capture data will be provided by NTCA

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SECTION-3
(Advanced Protocol Involving Scientists)
PHASE-IV INTENSIVE MONITORING OF SOURCE POPULATIONS AND TIGER RESERVES

Part-E
Obtaining Tiger Population Size for the Reserve Using Spatially-Explicit Capture Recapture Framework and Obtaining Prey Population Size Using Line Transect Sampling.

(A) Obtaining tiger population size.

(i) The camera traps deployed as per the survey design in Appendix-1. should be left open for a period of 40-60 days (depending on the areas). Where possible the entire Tiger Reserve must be surveyed. If the survey area is very large, tiger population size can be obtained by sampling a minimum block of 400 square kilometers at a time, but following all other minimum standards in section 3. If deployment of camera traps in an entire reserve or parts of it is not feasible for any reason, fecal DNA samples may be collected over the entire Tiger Reserve for Capture-Recapture analysis. The tiger population size may then be estimated over the entire Tiger Reserve using Mark-recapture methodology.

(ii) The analysis of the data needs to be done in collaboration with a technical expert / scientist conversant with spatially- explicit capture-recapture process / analysis.

(iv) The period of leaving the camera traps open (closure period) is important owing to the fundamental assumption of "population closure" (no deaths / births / immigrations / emigrations in the population). Leaving the cameras open for longer duration may lead to over estimation.

(v) The format for summary record of camera captures and the basics of mark recapture process using camera traps are provided at Annexures-V & VI.

(vi) The analysis of capture data between years (using open population models) should also be done in collaboration with technical experts / scientists/ WII.

(B) Obtaining prey densities

(i) Line transects must be systematically placed with a random start according to the survey design mentioned in Appendix-1 and implemented in program DISTANCE.

(ii) The line transect data should be analysed using the "DISTANCE" software for prey density. The analysis of the data needs to be done in collaboration with a technical expert / scientist conversant with the DISTANCE SAMPLING analysis.

(iii) The format for collecting line transect data to facilitate analysis using "DISTANCE" software and the basics of DISTANCE sampling using line transects are provided at Annexure-II.

Part-F
Using Scats for DNA Analysis to Obtain the Minimum Tiger Numbers in Reserves Where Camera Trapping is not Possible

(i) Collection of tiger scat samples: a) Use disposable surgical gloves to handle scat samples, b) for each scat a new set of gloves should be used to avoid cross contamination, used gloves should be discarded in an environmentally friendly way c) about 20 gms of fresh scat sample should be taken and stored

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in a vial/tube containing buffer& / or 70% alcohol. Tubes should be prepared in duplicate with GPS coordinates and date clearly recorded on the tube (alcohol erases permanent marking pens).

(ii) Obtaining the minimum number of tigers in the area through DNA analysis of tiger scats involving an institution having the domain expertise.

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SURVEY DESIGN (For all tiger reserves except Sundarbans) for spatially explicit mark-recapture study involving research workers/scientists

Minimum Standards for monitoring tiger source populations were: Sampling area:

Minimum area of 400 km^2 or entire Tiger Reserve, if area is smaller than 400 km^2.

(i) Tiger monitoring by camera trap sampling:

Camera density = 25 double-sided cameras per 100 km^2.

Sampling effort = 1000 trap nights/100 km^2.

Closure period = 40-60 days

NOTE: The period of leaving the camera traps open (closure period) is important owing to the fundamental assumption of "population closure" (no deaths / births / immigrations / emigrations in the population). Leaving the cameras open for longer duration may lead to gross over estimation.

(ii) Prey monitoring by line transect sampling:

1) Straight or square line transects will be systematically placed with a random start over the study area. These designs must be generated using program DISTANCE.
2) At least 20 spatial replicates must be laid out.
3) Each transect must be walked at least 4 times during sampling to generate >40 detections for each important prey species.

DESIGN OF SURVEYS ANALYSES OF DATA

(i) The survey design and analysis of these data needs to be done in collaboration with a technical expert / scientist conversant with the advanced open and closed model mark-recapture and advanced distance sampling methodologies.

(ii) The format for recording camera capture data and the basic ideas of the mark-recapture process using camera traps are provided at Annexures- V & VI and in published scientific literature.

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ANNEXURE-I

Data Sheet - 6
Patrol Form

Name of Guard: _____ Date: _____ Forest Division _____ Range: _____

Beat: _____ No. of Persons on Patrol: _____ Armed _____ Unarmed _____

Patrol Type: General Duties, Investigations, Surveillance, Others Patrol Method: Foot, Jeep, Motorbike, Bicycle, Elephant and Others

Dt	*Tm*	*L*			*Lg*			*Pl*	*Anml n*	*Gpn*	*mglA*				*Anm 1M 1YR*					
		Dg	*M*	*S*	*Dg*	*M*	*S*				*Typ*	*Dtl*	*Attk*	*Sp*	*Gl (M/F/U)*	*Ag (Y/Al/U)*	*C*	*Cf 1th*	*Cf 1th*	*S mPl Tk*

M – Male, F – Female, Un – Unknown, Y – Young, Ad – Adult.

Field Formats for Data Collection in Distance Sampling

I. Line Transect Data Sheet for monitoring of ungulate population by DISTANCE sampling:

Observer name: ..... Start time: ..... Date: .....

End time: ..... ID no. of line transect: ..... Total length: ..... km TR/

Forest division: ..... Range: ..... Beat: .....

Weather condition: Cloudy/Clear sky

Beginning GPS Lat: ..... N; Long: ..... E

End GPS Lat: ..... N; Long: ..... E

Sighting No	*Time*	*Species**	*Total Nos. (Adults & Young)*	*Young*	*Sighting Distance*	*Compass Bearing*	*Forest Type*	*Terrain Type*	*Remarks*
1									
2									
3									
4									
5									
6									
7									
8									

*Species that need to be recorded on the transect: chital, sambar, nilgai, gaur, barking deer, elephant, rhino, wild buffalo, swamp deer, hog deer, chowsingha, blackbuck, chinkara, wild pig, langur, peafowl, hare, cattle (live stock), and other mammalian species seen.

II. Location of transects in relation to Vegetation and Terrain features

Transect No.	*Total length (km)*	*Name*	*Bearing*	*GPS location*		*Vegetation type*	*Terrain category*
				Start	End		
T1							
T2							
T3							
T4							
T5							
T6							
T7							

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ANNEXURE-II

(Basic Information)

Assessment of prey using line transects following survey design as described in Par t - E of Section- 3 and analyzing the data with DISTANCE

Software

(i) The use of line transect in estimation of prey density is known as 'line transect sampling'. This technique of abundance estimation is included under 'distance sampling'.

(ii) It provides a direct estimate of density, provided its assumptions are met.

(iii)It also accounts for the probability of detection.

(iv)In 'Distance Sampling', the fact that the 'probability of detection decreases with increasing distance from the observer' is modelled by developing a function, which is used to estimate the 'probability of detection' ($\hat{\beta}$). The density ($\hat{D}$) is estimated as below:

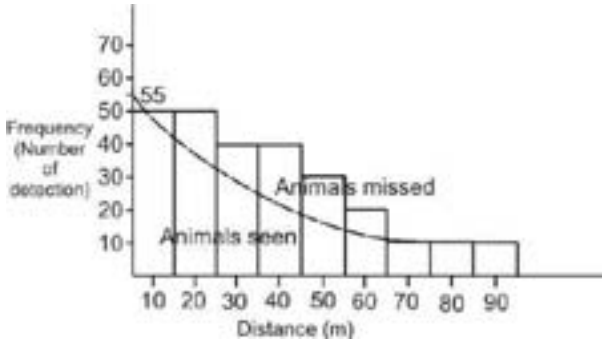
$$\hat{D} = \frac{n}{\alpha \hat{\beta}}$$

where, n = total number of detections

α = total area sampled

(v) The observer travels along a line of length 'L', located randomly in the study area, and counts all the animals which are seen. There is no assumption that all animals are counted, and the counts are assumed to be incomplete. More often, a maximum observation distance 'w', which is perpendicular to the transect line on each side, is established. Beyond this distance, no count is made. In some cases, counting of all animals is done without establishing a distance.

(vi)Let us consider the common approach of establishing the 'maximum observation distance' (w). Here, it is important to estimate the 'detection probability' or the proportion of animals that are actually seen (β). This is required to correct the actual counts.



(Hypothetical from the transect line histogram plot of the number of detections against the distance from the transect line, with a smooth function fit.)

(vii) If the number of detections are plotted against distance from the transect line, a smaller number of detections are seen as the distance increases. The detection function to the observed distances is fitted to estimate the detection probability ' $\hat{\beta}$ ':-

$$\hat{b} = \frac{\text{Area under the curve}}{\text{Total area}} = \frac{3500}{4950} = 0.70$$

(viii) Once the detection probability ($\hat{\beta}$) is computed, animal abundance in the survey area can be calculated, as in the case of the strip sampling, using the canonical estimator as before:

$$\hat{N} = \frac{An}{2wL\hat{\beta}}$$

(ix) For animal density ($\hat{D}$), the abundance needs to be divided by area, resulting in:

$$\hat{D} = \frac{n}{2wL\hat{\beta}}$$

(x) The salient features of this estimation technique are as below:-

a. From the transect line, the perpendicular distances (x) to each detected animal of interest are computed by measuring the detecting angles 'M' and detection distances 'r'.
b. This computation is done as x = r sin M.
c. Imagine a situation where 'k' transect lines have been laid in some randomized design, having lengths l_1..... l_k, with a total length 'L'.
d. Further, suppose that 'n' animals are seen at perpendicular distances x_1, x_2……x_n, and animals beyond a distance (w) from the transect (truncation distance) are not taken into account.
e. In the above situation, the area surveyed (a) is given by: a = 2wL.
f. Say 'n' animals are seen/detected within this area.
g. Estimation of animal density (D) is given by:

$$\hat{D} = \frac{n}{cwLP_a}$$

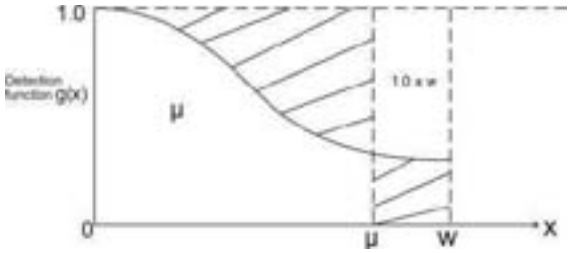
where, P_a = probability of detection of a randomly chosen animal within the area surveyed;

P_a = estimate of P_a

h. Thus, it becomes necessary to give a framework to estimate Pa. In this context, the 'detection function' 'g(x)' is defined as the probability of an animal at distance x from the transect line being detected, given that x is between w and 0 (i.e. $0 \leq x \leq w$). Further, it is also assumed that animals on the transect are certainly detected (i.e. g (0) =1).
i. A new parameter 'μ' is now defined, which is known as the 'effective strip (half) width'. It is the distance from the transect 'for which as many objects as are detected beyond μ as are missed within μ '.

(Defining a detection function g(x), where g(0) = 1; μ = the effective strip width).

j. If the detection function g(x) is plotted against perpendicular distances 'w' as a histogram, a model for g(x) needs to be specified, and fitted to the distance data.

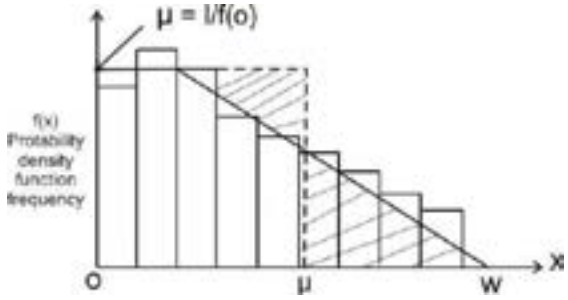


P_a is related to μ. If the definition for $\mu = \int_o^w g(x)dx$, then P_a = μ/w.

$$\hat{D} = \frac{n}{aP_a} = \frac{n}{2wL\hat{\mu}/w} = \frac{n}{2\hat{\mu}L}$$

k. Now μ (hat), an estimate of μ is required. For this another function known as the 'probability density function' (pdf) of perpendicular distances f(x) to detected animals is used. This is the rescaled detection function g(x) for integrating into unity; i.e. f(x) = g(x)/ μ. Since it is assumed that g(0) = 1, hence f(0) =1/μ.

$$\hat{D} = \frac{n}{2w\hat{\mu}} = \frac{n\hat{f}(0)}{2L}$$



[Fitting the probability density function (pdf) to the data. The area under this function is 1].

f(x) is the pdf of perpendicular distance p frequencies, plotted on a histogram of perpendicular distance frequencies. These are scaled so that the area of the histogram is 1. By definition, the area below the curve is unity (1). The two shaded areas in the above curve are equal in six, hence the area of the rectangle, μ f(0) is also unity, resulting in μ=1/f(0).

l. Thus the pdf of perpendicular distances are modeled, and the fitted function is evaluated at x=0. The DISTANCE Software address this standard statistical issue. A parametric 'key' function is selected. However, if the fit provided by it is not adequate, adjustment are done using polynomial or cosine series, till the fit is judged satisfactory by one or more criteria.

m. Usually, the data are grouped into distance categories before analysis and such grouped data is fitted using standard likelihood methods from the multinomial data.

(xi) The distance software calculates variance and confidence in interval inherently and also besides addressing the estimation of cluster size.

(xii) The data from a line transects includes: (a) number of individual animals / number of individual animals in a cluster, (b) the perpendicular distance of the animal / centre of the cluster from the transect, (c) name / identity of the transect line where count was made / detected, (d) total length of the transect line.

(xiii) The transects should be made in all the beats (at least two line transects of 2 km each per beat).

(xiv) The transect lines may be straight lines or conforming to a continuous shape leading to the starting point. The transects should be randomly laid, separated by at least a distance of 2 to 3 km. and physically marked using GPS for replication.

(xv) The total walks on a transect (total effort) is computed by adding all the walks done on a transects, and totaling up such walks on all the transects laid in the area.

(xvi) For low density areas, more efforts may be required on the transects.

(xvii) Laser range finders and compass should be used for measuring distance and angle respectively.

Assumptions in Line Transect Sampling:

The critical assumptions in line transect sampling, which should be met for a reliable density / abundance estimation are as below:

A. Random location of transect lines with respect to distribution of animals:

This assumption helps in estimating the detection function from the observed distribution of perpendicular distances, leading to the average probability of detection (p). To ensure this assumption, the transect lines should be laid randomly, causing minimum disturbance to the habitat.

B. Detection of animals with certainty on the transect line:

This assumption is fundamental for deriving the density estimator, wherein detection of all objects at 0 perpendicular distance are assumed (i.e. g(o) = 1). The density would be under estimated if objects / animals falling on the transects are missed, since bias is a simple function of g(o). Thus, by missing 15% of the animals on the transect line, the density estimate on an average would be less by 15%.

C. Detection of animals at their initial location:

This assumption can be easily met for stationary objects like plants or dung piles of wild animals, but it is difficult to meet for moving animals. It has been pointed out that movement does not create much problem provided it is not in response to the observer. Further, comparatively faster movement of observers also reduces the problem. However, the observers should move as silently as possible to avoid evasive movement of the animals before detection, while trying to detect them. A considerable evasive movement of animals would lead to under estimation.

D. Exact measurements are made:

Proper field measurements are essential to record reliable measurements. Erroneous recordings relating to animals on transect line from a distance makes analysis difficult.

Apart from the above, the other assumptions include:

(a) Detections are independent events.

(b) Animals should not be counted twice on the same line.

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Hypothetical example of distance sampling:

Effort	:	126.0000
#samples	:	42
Width	:	256.0000
Left	:	0.0000000
#observations	:	447

Model

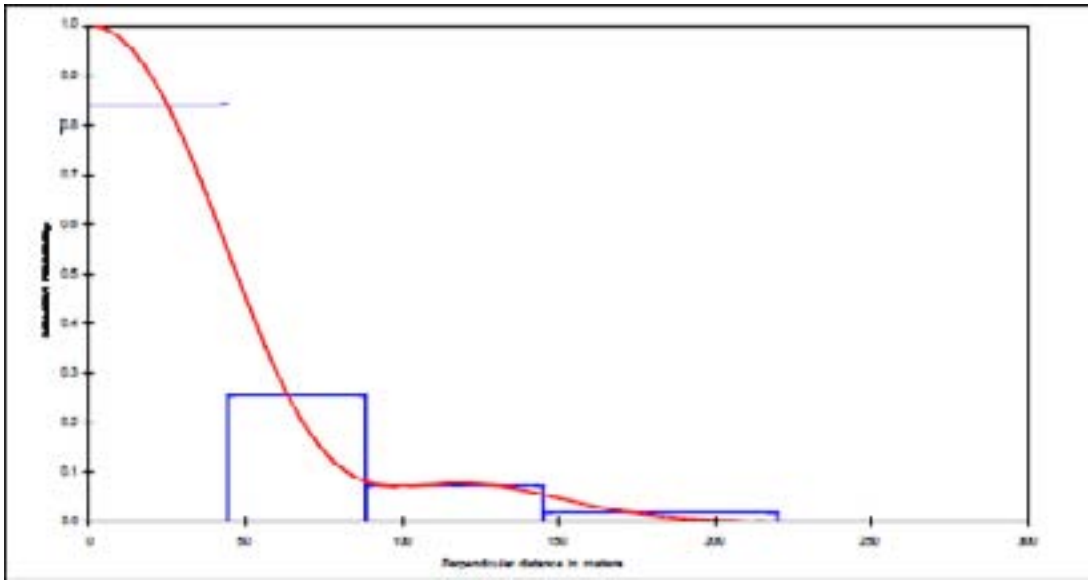
Half-normal key, k(y) = Exp(-y**2/(2*A(1)**2))

Simple polynomial adjustments oforder(s): 4, 6

Parameter	*Point Estimate*	*Standard Error*	*Percent Coef. of Variation*	*95 Percent Confidence Interval*	
A (1)	43.57	1.680			
A (2)	-115.6	34.19			
A (3)	755.9	242.4			
f (0)	0.18600E-01	0.77638E-03	4.17	0.17136E-01	0.20190E-01
p	0.21001	0.87661E-02	4.17	0.19348	0.22796
EWS	53.763	2.2441	4.17	49.531	58.358

Sampling Correlation of Estimated Parameters

	A(1)	*A(2)*	*A(3)*
A(1)	1.000	0.427	-0.742
A(2)	0.427	1.000	-0.886
A(3)	-0.742	-0.886	1.000



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Cell	*Cut Points*	*Observed Values*	*Expected Values*	*Expected values*	*Chi-square Value*
1	0.000	44.2	309	308.43	0.001
2	44.2	88.3	93	93.78	0.007
3	88.3	145.	34	34.07	0.000
4	145.	220.	11	10.67	0.011
5	220.	240.	0	0.05	0.054
6	240.	256.	0	0.01	0.007

Total Chi-square value = 0.08 Degrees of Freedom = 2.00

Probability of a greater chi-square value, P = 0.96098

The program has limited capability for pooling. The user should judge the necessity for pooling and if necessary, do pooling by hand.

There is a need for some pooling to achieve a reliable chi-square test However, the pooling algorithm built into this program would result in no degrees of freedom left. Therefore pooling is left to the user.

One or more expected values is < 1.

Try pooling some some cells by hand to obtain a more reliable test.

Model

Half-normal key, k(y) = Exp (-y**2/(2*A(1)**2))

Simple polynomial adjustments of order(s): 4, 6

Parameter	*Point Estimate*	*Standard Error*	*Percent Coef. of Variation*	*95% Percent Confidence Interval*	
f(0)	0.18600E-01	0.77638E-03	4.17	0.17136E-01	0.20190E-01
p	0.21001	0.8761E-02	4.17	0.19348	0.22796
ESW	53.763	2.2441	4.17	49.531	58.358
n/L	3.5476	0.39480	11.13	2.8355	4.4386
DS	32.993	3.9214	11.89	26.017	41.839
E(S)	3.7964	0.22495	5.93	3.3794	4.2649
D	125.26	16.635	13.28	96.287	162.94
N	125.00	16.601	13.28	96.000	163.00

Measurement Units	
Density: Numbers/Sq. Kilometers ESW: Meters	
Component Percentages of Var (D)	
Detection Probability:	9.9
Encounter rate:	70.2
Cluster size:	19.9

ANNEXURE-III

Data Sheet-5
Track Plot for Carnivores and Mega Herbivores
(Pressure Impression Pad)

Name of Observer: ……..…..... Date: .....…… Forest Division …..…… Range: ...……...
Beat: …….....

PIP No.	*Forest Type*	*Terrain Type*	*Tiger*		*Leopard*		*Sloth Bear*	*Dhole*	*Hyena*	*Jackal*	*Small Cat*	*Gaur*	*Elephant*	*Rhino*	*Water Buffalo*	*Others*	*Others*	*Deg N*	*Min N*	*Sec N*	*Deg E*	*Min E*	*Sec E*
			Adult	Cub	Adult	Cub																	
1																							
2																							
3																							
4																							
5																							

If track of young carnivores (eg. tiger cubs) are observed, please mention in remarks.

Remarks: .....…….

…….....……

Details of Digital Photographs taken .....……..

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ANNEXURE-IV

Format for recording camera trap capture data to obtain tiger numbers at the reserve level

1) Place double-sided camera traps at the best locations within a beat to photograph tigers.
2) The distance between camera traps within and between beats should be over 1.5 km.
3) A minimum of 3 camera traps (consisting of double sided cameras) per beat should be deployed. The number of camera trap will increase as the size of the beat increases, keeping the strategy of one pair of camera traps for 4 sq.km. area (2 km x 2 km).
4) The GPS coordinates of each camera location and the dates of deployment should be recorded as given below:

Camera Trap Station ID	*Degree, Min, Sec North*	*Degree, Min, Sec South*	*Dates deployed*	*Dates not operating*
1 – main Rd nalla				
2- River Junct				
3- temple jnct				
4-…..				

5) Format for daily monitoring of camera traps (beat-wise)

Date	*Camera Unit*	*Camera Trap Station 1*			*Camera Trap Station 2*			*Camera Trap Station 3*			*Remarks**
		Tiger	*Leopard*	*Other*	*Tiger*	*Leopard*	*Other*	*Tiger*	*Leopard*	*Other*	
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										

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	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										
	A – Right Side Camera										
	B – Left Side Camera										

* Non-functioning of camera traps or missing of tiger capture, etc. to be recorded in the Remark column.

6) Photographs of tigers, leopards and all mammal species should be downloaded and saved as folders for each species. Each photograph should have a time and date stamp recorded digitally, the camera trap station identity stored in the filename. An appropriate format is to have a species folder e.g. tiger, sub folder for camera trap station id, within which photographs of each of the cameras (from the double sided camera traps) is stored as separate folders. A CD with the above data (points 4, & 5) should be sent to NTCA every 2 months.

7) All Photographs of tigers and leopards should be printed and compared visually based on their stripe and spot patterns to identify individuals. In case of >15 tigers/leopard captures the need of software assisted identification may become essential.

8) For estimation of the tiger/leopard population after individual identification using closed capture estimators the data needs to be arranged in the format given below:

Trap Occasion (Day)

Tiger/ Leopard ID	***Day 1***	***Day 2***	***Day 3***	***…….***	***Day 35***	***……..***	***Day 48….***
T-1							
T-2							
T-3							
T-4-…..							

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CAMERA TRAP: CAPTURE DATA
(Range Level)

Division……..... Range……..... Species: Tiger/Leopard …….....…

Sl.No.	*Beat Name*	*Observer Name*	*Camera ID*	*Tiger ID / Leopard ID*	*Date of Capture*	*Remarks*

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ANNEXURE-V

(Basic Information on Mark Recapture)

Assessment of tiger population at beat level using photographic mark-recapture camera trapping while analyzing the data with an appropriate softwares like MARK, CAPTURE and CARE. This should result in the preparation of a reserve-level photo- capture database of individual tigers, to be shared with the Chief Wildlife Warden / NTCA / WII.

(I) The capture–recapture methodology is largely derived from the classical Peterson-Lincoln Estimator which is highlighted below:

Peterson Estimate (Lincoln Index)

The mark-recapture methods based on Peterson Estimate constitute the most important pseudo-sample methods. A large number of variations of this basic method have been evolved, which have been further complicated since the technique is simultaneously utilised to measure movement or mortality.

Here the sample of a population is marked after it is caught and then released; subsequently, samples are again taken from the population after recapturing and the proportion of marked individuals are recorded. Using the proportion of marked individuals in the subsequent samples, the total population is estimated. The capture-recapture sampling facilitate estimation of the 'proportion' of animals captured which facilitates estimation of true population size.

The simplest form of the mark-recapture estimator is the Lincoln-Peterson estimator; this is known variously as 'Peterson index', 'Lincoln index' or 'thePeterson estimate'. This method gives an estimate of actual numbers and hence it is a sample census rather than an index. Peterson, in 1896, described this method for fish populations; however it was first applied for wildlife in 1930 by F.C. Lincoln, for populations of waterfowl.

The model can be derived from the ratio: $\frac{M}{\hat{N}} = \frac{m}{n}$

where, M = total number of individuals marked and released during the first capture period;

$\hat{N}$ = estimated population size (unknown);

n = total sample taken during the second capture period;

m = number of individuals captured in the second capture which were marked.

The above ratio can be rewritten as an estimator:

$$\hat{N} = \frac{Mn}{m}$$

Theoretically this is a very elegant and simple method and can be applied to any vertebrate which can be captured, viz. from fish to cats. However, it is time consuming, laborious and costly and becomes impractical for large areas. Apart from this, several critical assumptions of this method act as constraints:—

1. Each animal has an equal chance of being captured.
2. The behaviour of animals is not influenced by marking.
3. No marks are lost.

4. The individuals which are marked mix randomly in the population after release.
5. There are no immigrations or births in the area under study between the first and second trapping seasons.
6. There is no emigration or differential mortality between the marked and unmarked members of the population.
7. The population is closed; if mortality occurs, then the estimate of N is valid for the initial size of the population. If recruitment occurs then N is valid for the time of recapture.
8. The time spent in sampling is small relative to the inter-sampling period.

The model assumptions can be re-written concisely as follows:

Assumption 1. A well defined population of animals having N individuals exists.

Assumption 2. M of these individuals are marked.

Assumption 3. There exists a sample of n 'observations' of animals from the population, having x 'observations' marked animals.

Assumption 4. The average probability $\overline{p_m}$ of observing an animal that is marked is equal to $\overline{p_u}$ which is the average probability of observing an unmarked animal.

$$\text{i.e. } \overline{p_m} = \overline{p_u}$$

The formula $\hat{N} = \frac{nM}{m}$ can be used satisfactorily with appropriate assumptions.

Use of Lincoln-Petersen Sample Estimator in camera trapping of tigers

The sample periods can be aggregated into two groups – viz. in a session of 30 days, the first 15 days can be denoted as 'occasion-1' and the next fortnight as 'occasion-2'.

In general, for photo trapping of tigers, the camera traps are set in the study area, covering the animals so that the tigers in the area can encounter the traps at least once (preventing 'holes' so that tigers are not missed). The traps are set for several days in succession, and each day is considered as a 'sample period'. In large areas, the traps can be 'rotated' over the area as per a prescribed scheme, and the data collected over the number of days taken to cover the entire area defines the sampling period.

The camera trap data is summarised in 'capture-history' data sheets, consisting of rows of 'i' and 'o', which indicate the periods when an animal was camera trapped. Thus, a history of '100101', indicates that a tiger was trapped in periods 1, 4 and 6 of a study having 6 periods.

Example

m_1 = number of tigers, with known identity, trapped on occasion 1

m_2 = number of tigers trapped and released on occasion 2

m = number of tigers recaptured in period 2 (i.e. trapped at both occasions 1 and 2)

1. The unknown quantity of interest (total number of tigers in the sampled population) is defined as 'N'.
2. The model parameters are then defined as:

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p_1 = probability of a tiger exposed to sampling efforts in the sampled area is trapped on occasion i (i = 1, 2)

3. $p=1-(1-p_1)(1-p_2)$ = the probability that a tiger, from the total number of tigers in the sampled population N, is trapped at least once during the study.
4. The 'detection probabilities' for the two sampling periods are estimated, by ascertaining the proportion of tigers which were trapped in one occasion are also trapped in the other occasion. Since the population is "closed", it can be said that the tigers caught during occasion 1 are also present during occasion 2. Thus by "conditioning" tigers trapped in occasion 2, and ascertaining the number of these tigers which were also trapped during occasion 1, p_1 and p_2 can be estimated:

$$\hat{p}_1 = \frac{m}{n_2}, \hat{p}_2 = \frac{m}{n_1}$$

$$\hat{p}_1 = 1 - \left(1 - \hat{p}_1\right)\left(1 - \hat{p}_2\right)$$

The general equation for estimating abundance is:

$$\hat{N} = \frac{C}{\hat{p}},$$

where, $\hat{N}$ = estimate of abundance N (true number of tigers)

C = Number of tigers counted

p = estimate of capture probability 'p' (probability that a tiger exposed to sampling efforts in the sampled area is captured on occasion i (i=1, 2)

For period 1, the following estimator is obtained:

$$\hat{N} = \frac{n_1}{\hat{p}_1} = \frac{n_1}{m/m_2} = \frac{n_1 n_2}{m}$$

For period 2, the following estimator is obtained:

$$\hat{N} = \frac{n_1}{\hat{p}_2} = \frac{n_2}{m/m_1} = \frac{n_1 n_2}{m}$$

The assumptions of the Lincoln-Peterson model are again stated below:-

1. The population is a 'closed' one.
2. It is likely that all animals are equally captured in each sample (equal probability of capture).
3. The marks are not overlooked, gained or lost.

A short interval between samples can meet the first assumption. The second assumption is often relaxed, while the last one can be met with proper marking techniques.

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Example of Lincoln-Peterson estimate

(camera trapping exercise)

50 camera traps are placed in a tiger habitat along trails, and for two consecutive nights photographs are taken, resulting in the following data:

n_1 = 10 tigers camera trapped during the first night

n_2 = 8 tigers camera trapped during the second night

m = 2 tigers camera were photographed on both the nights

Estimation of Capture Probabilities and Abundance

Capture probabilities of each night (sampling occasion) and for both nights (combined) are calculated as below:

$$p_1 = \frac{2}{8} = 0.25$$

$$p_2 = \frac{2}{10} = 0.20$$

$$\hat{p} = 1-(1-p_1)(1-p_2)$$

$$\text{i.e. } \hat{p} = 1-(1-0.25)(1-0.20)$$

$$= 1-(0.75)(0.80)$$

$$= 0.40$$

Using the Chapman estimator for abundance:

$$\hat{N}_c = \frac{(n_1+1)(n_2+1)}{(m_2+1)}$$

$$= \frac{(10+1)(8+1)}{(2+1)} - 1$$

$$= 32$$

The Variance and Standard Error for the estimate are as below:

$$\text{var}\,\hat{N}_c = \frac{(10+1)(8+1)(10-2)(8-2)}{(2+1)^2(2+2)}$$

$$= \frac{(10)(9)(8)(6)}{(3)^2(4)} = \frac{4752}{36} = 132$$

$$= \hat{SE}\left(\hat{N}\right) = \sqrt{132} = 11.49$$

Thus, the estimated number of tigers in the sampled area is 32.

An approximate 95% confidence interval for this estimate is given by:

$$\hat{N} = \pm 1.96 SE\left(\hat{N}\right) = 32 \pm 22.52 = (54.52, 9.48)$$

The above estimate is not precise and is highly uncertain, perhaps owing to small sample size in studies of elusive animals like the tiger.

(II) Broadly, the mark recapture methods have been categorised on the basis of population 'closure' as below:-

(1) Closed Population Models – Where the total number of individuals in a population does not change due to birth, deaths, immigration or emigration. There are no 'gains' or 'losses' in the population between sampling occasions. Hence, these are most suitable for short-time period estimators like abundance estimation.

(2) Open Population Models – Where the population is changing during the study due to births, deaths, immigration or emigration. These gains or losses or both occur between the sampling periods. The time interval between sampling occasions is longer. These models provide scope for estimation of abundance, survival rate and recruitment.

(III) In the Indian context, both models are applicable. The closed population models are good for abundance estimation of tigers and its prey in the country level estimation was carried out after every four years. The open population models are suitable for long term studies (e.g. Phase IV of the new methodology at source sites for monitoring tiger and its prey). In this chapter, the focus would be on the 'closed population model' owing to their relevance in the context of tiger estimation.

Capture-Recapture Models for Closed Population Capture-Recapture Data

In the capture-recapture approach, the capture history of the individual animal is maintained as a series of "non-captures" (0's) and "captures" (1's).

Hypothetical Individual Capture History of 10 tigers with four Capture (camera trap) occasions

Tiger	*Occasion 1*	*Occasion 2*	*Occasion 3*	*Occasion 4*
1	1	1	1	1
2	1	1	0	0
3	1	1	1	0
4	1	1	1	1
5	0	1	0	0
6	0	0	1	0
7	0	0	0	1
8	0	0	0	1
9	0	0	1	0
10	0	1	0	0

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The first tiger has a capture record of (1111), and was photo captured on all four occasions. The second tiger, having a photo capture record of (1100), was captured on occasions 1 and 2. Rest of the capture history data can be interpreted similarly. Since the capture-recapture data involving a number of animals becomes large, it is usually represented in the form of summary statistics for statistical analysis:-

k = number of capture occasions;

n_j = number of animals captured on the j^{th} occasion (j = 1, ... k);

u_j = number of unmarked animals captured on the j^{th} occasion (j = 1, ... k);

m_j = number of marked animals captured on the j^{th} occasion (j = 1, ... k);

M_j = number of destrict animals captured before the j^{th} occasion (j = 1, ... k);

(M_1=0, and M_{k+1} is the total number of distinct animal captured in the exercise);

f_j = number of animals captured exactly j times (j=1, ……k);

The statistics pertaining to thehypothetical capture history data is provided as a summary below:

Summary Statistics for the Capture History of tigers

J	n_j	m_j	u_j	M_j	fl_j
1	4	0	4	0	6
2	6	4	2	4	1
3	5	3	2	6	1
4	4	2	2	8	2
				10 (M_5=10)	
TOTAL	19	9	10		10

Description of the statistics:

n_j = column sum for the j^{th} occasion (column) in the capture data (history matrix), with (n_1, n_2,…..n_4).

u_j = first captures out of n_j animals, with (u_1, u_2,…..u_4)=(4,2,2,2).

m_j = recaptures out of n_j animals, with (m_1, m_2,…..m_4)=(0,4,3,2).

($u_j + m_j = n_j$ i.e. 19)

M_j = cumulative number of first recaptures on the first j-1 occasions, thus $M_j = u_1+u_{2+}…..u_{j-1}$) and ($M_1$, M_2,……, M_5)=(0,4,6,8,10);

i.e. there is a progressive increase of marked animals in the population from $M_1 = 0$ to $M_5 = 10$.

The capture frequency of an animal is denoted by its row sum. Thus (f_1, f_2, ….., f_k) denote the frequency counts of all the animals which were capture (6, 1, 1, 2). Thus, 6 tigers were photo captured once, one tiger photo captured twice, one tiger photo captured thrice and two on all the four occasions.

The number of animals which are never captured is represented by 'f_0', so that $f_1 + f_2 + ……., f_k = M$ and $f_0 + f_1 + ……., f_k = N$.

Thus estimation of population size 'N' becomes equivalent to estimation of f_0, the number of missing animals ($N=M_{t+1} + f_0$).

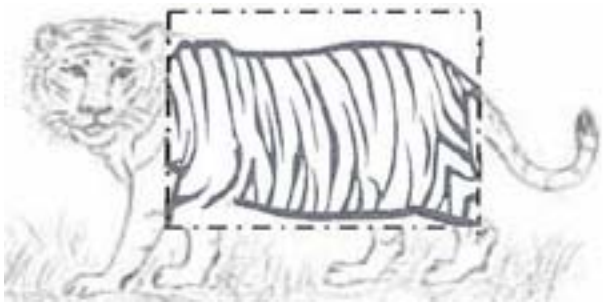
(IV)There are a number of models to address different sources of variation in capture probabilities, which are available in the software (CAPTURE):

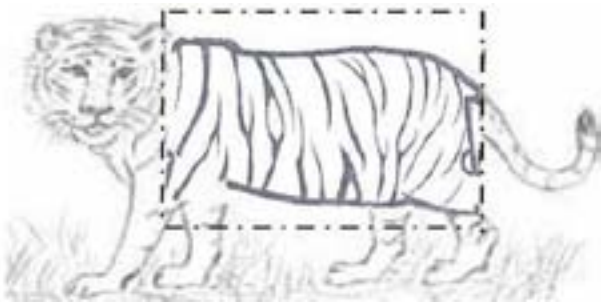
1. M_o: equal probability of capture model
2. M_h: Heterogeneity Model
3. M_{bh}: Behaviour-heterogeneity Model
4. M_t: Time Variation (Schnabel) Model
5. M_{th}: Time-Heterogeneity Model
6. M_{tb}: Time-behavioural Response Model
7. M_h: Heterogeneity Model

(V) Issues relating to survey design (for camera trapping of tigers) Some general considerations are as below:

1. The sampling time in camera trapping of tigers should be 'short' vis-à-vis the tiger populations turn over for meeting the assumptions relating to 'close models'. It has been stated that four to six weeks of sampling through camera trapping may be needed which may be stretched to eight to twelve weeks. Experience in general indicates that a period of six to eight weeks of sampling may be required.
2. The space should provide scope for every animal in the study area to have some chance of being captured.
3. The camera traps should be adequately spread through out the study area and should be checked each day during the sampling period to get a good capture history data.
4. The study area may be divided into a number of potential sampling units, whose size should be just sufficient to set up a single camera trap. Each sampling unit can be considered as a 'grid cell' which can be randomly selected to place camera traps at sites which are promising. In the following day, the camera can be moved to other such sites in the grid cell and the process can be repeated between five to thirty days to get a standard capture history data.
5. If the area is difficult or the number of camera traps are not adequate, then smaller portions of the area can be covered (block-wise) for camera trapping for a short period of time before moving successively to other portions. The total number of days used for camera trapping to cover the entire area (all blocks) is denoted as sample occasion 1. The procedure is repeated to get the capture occasion 2.

The other considerations in camera trapping of tigers include choice of the equipment (camera and the tripping device), choice of sites to set up the traps, spacing of traps and a standard data collection protocol. The tigers are identified visually from photographs using their unique stripe patterns:





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Hiby et. al. have used a three dimensional model to match images of living tigers and tiger skins.

The identified individual tigers are numbered and every capture of an individual tiger is assigned to a particular secondary sampling occasions.

The capture history of individual tigers consist from the database in the standard history matrix and are analysed through a suitable computer program CAPTURE or MARK. During analysis, the results are checked to ascertain the violation / non-violation of the closure assumption and finally the statistical tests 'between models' is done to indicate the best fitting model vis-à-vis the data, from which the parameters are obtained. Since tigers are territorial, models which address heterogeneous capture probabilities (like M_h) should be used for tigers.

Hypothetical Data relating to individual capture history of 10 tigers with 6 camera trap (capture) occasions: Analysis with software CAPTURE

Tiger	Occasions
1.	100101
2.	101001
3.	010110
4.	100010
5.	101010
6.	101101
7.	001010
8.	101101
9.	010101
10.	101001

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Program version of 16 May 1995 9-Dec-2010
Input and Errors Listing Input---title='rg2'
Input---task read captures x matrix occasions=6 captures=6 Input---data='Group 1'
Input---format='(a6,6f1.0)' Input---read input data
Summary of captures read
Number of trapping occasions 6
Number of animals captured 10
Maximum x grid coordinate 1.0
Maximum y grid coordinate 1.0
Input---task model selection
Input task population estimate appropriate
** Warning ** Appropriate model has been selected, but no estimator is available.
Processing will be attempted.
*** ERROR *** Population estimator was not specified.

Scanning for a new task card.
Input task population estimate null
Input task population estimate darroch
Input task population estimate zippin
Input task population estimate jackknife
Input task population estimate mh-chao
Input---task population estimate mth-chao
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rg2
Model selection procedure. See this section of the Monograph for details. Group 1

Occasion	j=	1	2	3	4	5	6	
Animals caught	n(j)=	7	2	6	5	4	6	
Total caught	M(j)=	0	7	9	10	10	10	10
Newly caught	u(j)=	7	2	1	0	0	0	
Frequencies	f(j)=	0	2	6	2	0	0	

1. Test for heterogeneity of trapping probabilities in population.
   Null hypothesis of model M(o) vs. alternate hypothesis of model M(h)
   Expected values too small. Test not performed.
2. Test for behavioral response after initial capture.
   Null hypothesis of model M(o) vs. alternate hypothesis of model M(b)
   Chi-square value = 3.819 degrees of freedom = 1 Probability of larger value = 0.05068
3. Test for time specific variation in trapping probabilities.
   Null hypothesis of model M(o) vs. alternate hypothesis of model M(t)
   Chi-square value = 8.687 degrees of freedom = 5
   Probability of larger value = 0.12223
4. Goodness of fit test of model M(h)
   Null hypothesis of model M(h) vs. alternate hypothesis of not model M(h)
   Chi-square value = 5.581 degrees of freedom = 5
   Probability of larger value = 0.34910

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rg2
Model selection procedure. See this section of the Monograph for details. Group 1

5. Goodness of fit test of model M(b)
   Null hypothesis of model M(b) vs. alternate hypothesis of not model M(b)
   Chi-square value = 7.262 degrees of freedom = 4
   Probability of larger value = 0.12265

5a. Contribution of first capture homogeneity across time Expected values too small. Test not performed.

5b. Contribution of recapture homogeneity across time

Chi-square value = 7.252 degrees of freedom = 4

Probability of larger value = 0.12316

6. Goodness of fit test of model M(t)

Null hypothesis of model M(t) vs. alternate hypothesis of not model M(t)

Expected values too small. Test not performed.

7. Test for behavioral response in presence of heterogeneity.

Null hypothesis of model M(h) vs. alternate hypothesis of model M(bh)

Chi-square value = 0.667 degrees of freedom = 1

Probability of larger value = 0.41422

Model selection criteria. Model selected has maximum value.

Model	M(o)	M(h)	M(b)	M(bh)	M(t)	M(th)	M(tb)	M(tbh)
Criteria	0.89	0.68	0.44	0.91	0.00	0.75	0.43	1.00

Appropriate model probably is M(tbh) No estimator results from this model.

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rg2

Population estimation with constant probability of capture. See model M(o) of the Monograph for details.

Group 1

Number of trapping occasions was 6

Number of animals captured, M(t+1), was 10

Total number of captures, n., was 30

Estimated probability of capture, p-hat = 0.5000

Population estimate is 10 with standard error 0.4189

Approximate 95 percent confidence interval 10 to 10

Profile likelihood interval 10 to 11

Mark-recapture population and density estimation program Page 5

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rg2

Population estimation with time specific changes in probability of capture.

See model M(t) of the Monograph for details.

Group 1

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Occasion j= 1 2 3 4 5 6
Animals caught n(j)= 7 2 6 5 4 6
Total animals captured 10
p-hat(j)= 0.70 0.20 0.60 0.50 0.40 0.60

Population estimate is 10 with standard error 0.0053
Approximate 95 percent confidence interval 10 to 10
Profile likelihood interval 10 to 11
Histogram of n(j)

Frequency	7	2	6	5	4	6
7	*					
6	*	*	*			
5	*	*	*	*		
4	*	*	*	*	*	
3	*	*	*	*	*	
2	*	*	*	*	*	*
1	*	*	*	*	*	*

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rg2

Population estimation with constant probability removal estimator.
See model M(b) of the Monograph for details.
Group 1

Occasion j = 1 2 3 4 5 6
Total caught M(j) = 0 7 9 10 10 10 10
Newly caught u(j) = 7 2 1 0 0 0

Estimated probability of capture, p-hat = 0.714281
Estimated probability of recapture, c-hat = 0.434783
Population estimate is 10 with standard error 0.0751
Approximate 95 percent confidence interval 10 to 10
Profile likelihood interval 10 to 10
Histogram of u(j)

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Frequency	7	2	1	0	0	0
7	*					
6	*					
5	*					
4	*					
3	*					
2	*	*				
1	*	*	*			

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rg2
Population estimation with variable probability of capture by animal.
See model M(h) of the Monograph for details.
Group 1

Number of trapping occasions was	6
Number of animals captured, M(t+1), was	10
Total number of captures, n., was	30

Frequencies of capture, f(i)

i = 1	2	3	4	5	6
f(i) = 0	2	6	2	0	0

Computed jackknife coefficients

S.No	*N(1)*	*N(2)*	*N(3)*	*N(4)*	*N(5)*
1	1.833	2.500	3.000	3.333	3.500
2	1.000	0.467	-0.233	-0.833	-1.167
3	1.000	1.000	1.225	1.542	1.750
4	1.000	1.000	1.000	0.956	0.914
5	1.000	1.000	1.000	1.000	1.001

The results of the jackknife computations

i	*N(i)*	*SE(i)*	*.95 Conf.*	*Limits*	*Test of N(i+1) vs. N(i)*
0	*10*				*Chi-square (1 d.f.)*
1	10.0	0.00	10.0	10.0	2.250
2	8.9	0.00	8.9	8.9	0.002
3	8.9	1.49	6.0	11.8	0.261
4	9.5	2.83	4.0	15.0	0.488
5	10.0	3.57	3.0	17.0	0.000

The data are ill-conditioned. As a best guess, use Average p-hat = 0.5000
Interpolated population estimate is 10 with standard error 0.4567
Approximate 95 percent confidence interval 10 to 10
Histogram of f(i)

Frequency	***0***	***2***	***6***	***2***	***0***	***0***
6		*				
5		*				
4		*				
3		*				
2	*	*	*			
1	*	*	*			

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rg2
Population estimate under individual heterogeneity in capture probabilities.
See model M(h) of Chao (1988). Group 1
Number of trapping occasions was 6
Number of animals captured, M(t+1), was 10
Total number of captures, n., was 30
Frequencies of capture, f(i)

i=	1	2	3	4	5	6
f(i)=	0	2	6	2	0	0

Average probability of capture = 0.5000
Population estimate is 10 with standard error 0.0000
Approximate 95 percent confidence interval 10 to 10
Mark-recapture population and density estimation program Page 9
Program version of 16 May 1995 9-Dec-2010
rg2
Population estimate under time variation and individual heterogeneity in capture probabilities.
See model M(th) of Chao et al. (1992).
Group 1

Number of trapping occasions was 6
Number of animals captured, M(t+1), was 10
Total number of captures, n., was 30

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Frequencies of capture, f(i)

i =	1	2	3	4	5	6
f(i)=	0	2	6	2	0	0

Estimator	*Gamma*	*N-hat*	*se(N-hat)*
1	0.0000	10.00	0.00
2.	0.0000	9.74	0.00
3.	0.0000	10.34	0.67

Bias-corrected population estimate is 10 with standard error 0.6687
Approximate 95 percent confidence interval 10 to 13
Mark-recapture population and density estimation program Page 10
Program version of 16 May 1995 9-Dec-2010
rg2
Successful Execution

Capture Matrix of the tiger capture data analysed above:

Tiger	*Occasions*					
	1	*2*	*3*	*4*	*5*	*6*
1	1	0	0	1	0	1
2	1	0	1	0	0	1
3	0	1	0	1	1	0
4	1	0	0	0	1	0
5	1	0	1	0	1	0
6	1	0	1	1	0	1
7	0	0	1	0	1	0
8	1	0	1	1	0	1
9	0	1	0	1	0	1
10	1	0	1	0	0	1

(VI) Analysis

- Every tiger captured was given a unique identification number viz. (MT-002), after examining stripe pattern on flanks, limbs, forequarters
- Following tiger identification, capture histories (X matrix) were developed and analyzed using the program MARK, CAPTURE and CARE.
- CAPTURE gives various probabilities models of the underlying capture-recapture process, that are likely to have generated the observed capture histories

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- Analysis of capture history involves comparison between competing models using a series of hypothesis tests and results of an overall discriminant function test, in order to select the most appropriate abundance estimation model
- Assumption: sampled population was demographically and geographically closed during the sampling period
- Since the entire tiger reserve is camera trapped the total population within the reserve is estimated. Also the same area is camera trapped in consecutive years therefore the population is directly comparable and there is no need to compute density of tigers which adds variability and loss of precision to detect trends.

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Capture-recapture Sampling using Camera Trapping [Mark Software Format]

Tiger ID	*Trap Occasion (day)*						
	1	*2*	*3*	*4*	*5*	*6*	*n*
1							
2							
3							
4							
5							
6							
7							
N							

Data to be entered as 01 format.

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ANNEXURE-VII

Data Sheet for Tiger, Other Animals & Human Sign Encounter Rate

Observer Name:_____ Date:_____ Start Time:_____ End Time: _____
Begin GPS: Lat: _____ N, Long: _____E End GPS: Lat: _____ N, Long: _____E
Forest Circle _____ Forest Block & Range: _____ Beat_____
Approx. Kms. travelled: _____ Km. Time Spent in any other activity _____ Min.

SL No	Time	GPS Location (only for tiger sign)						*Animal Species	^Sign Type	Mangrove Type			Creek Bank Type			Sign		Width of mud flat (water to Mangrove edge)
		Lat.			Long.					Tall >10'	Medium 4-10'	Small <4'	Steep	Moderate	Gentle	Fresh	Old	
		D	M	S	D	M	S											
1.																		
2.																		
3.																		
4.																		
5.																		
6.																		
7.																		
8.																		
9.																		
10.																		
11.																		
12.																		
13.																		
14.																		
15.																		

* Animal species to be recorded: tiger, fishing cat, jackal, monitor lizard, crocodile, chital, wild pig, rhesus macaque, humans and others.

^ Sign types to be recorded are pugmark/hoof mark/foot print, scat/pellet (with condition), vocalization and direct sighting.

Data sheet 1 ctd...

1) Has any tigress with cubs been reported during the past 12 months?
   Yes _____ No _____ Approximate date/month _____
   a) Seen by staff, b) Pug Marks,
   c) Reported by local persons, d) Seen by officials (√ the appropriate)
   How many cubs_____, approximate age of cubs _____ .
2) In case tigers are known to be present in the beat, but no sign was obtained during the sampling period then mention on what evidence was this conclusion made (pugmark, direct sighting, scat, other sign) .
   Approximate date/month _____ Tiger presence was last recorded in the beat.
3) How many livestock predation events have been recorded in the past 3 months, _____by tigers, which carnivores if known _____, _____, _____.
4) GPS Coordinates at all creek/channel junctions in serial order of survey

Sl.No.	*Time*	*Lat*			*Long*		
		Degree	*Minutes*	*Second*	*Degree*	*Minutes*	*Second*
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

5) Comments & Remarks:

_____

_____

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ANNEXURE-VIII

Encounter Rate on Line Transects

Observer Name:_____ Date:_____ Start Time:_____ End Time: _____
Begin GPS: Lat: _____ N, Long: _____E End GPS: Lat: _____ N, Long: _____E
Forest Circle _____ Forest Block & Range: _____ Beat_____
Approx. Kms. travelled: _____ Km.

S. No	*Time*	*Species**	*Total Number (Adults & Young)*	*Young*	*Mangrove Type*			*Bank Type*			*Perpendicular Distance of animal from water's edge*	*Activity of the animal(s) Basking, foraging, moving, etc.*
					Tall >10'	*Medium 4-10'*	*Small <4'*	*Steep*	*Medium*	*Gentle*		
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

* Species that need to be recorded on the transect: chital, rhesus, macaque, wild pig, monitor lizard and estuarine crocodile and other mammalian species seen.

ANNEXURE-IX

VEGETATION

(To be recorded at every 15 minute travel interval)

Name of Observer:_____ Date: _____ Forest Circle: _____
Forest Division_____ Range: _____ Beat:_____
ID No. of Line Transect: _____.

Sl No	*GPS Reading at every plot from beginning of creek transect*						*Location of Plot- Left side/ Right side*	*Tree Species (Descending Order of Abundance, (Give Names)*					*Grass/Herbs/Sedges Species (Descending Order of Abundance including reg. mangroves, all vegetation < 4 ft.)*					*Density of Vegetation 0 to 4 0- Open 4- very dense*	*Remarks*
	Lat			*Long*															
	Deg	*Min*	*Sec*	*Deg*	*Min*	*Sec*		*1*	*2*	*3*	*4*	*5*	*1*	*2*	*3*	*4*	*5*		

ANNEXURE-X

Human Disturbance

Name of Observer:_____ Date: _____ Forest Circle: _____
Forest Division_____ Range: _____ Beat:_____
ID No. of Line Transect: _____.

Sl No	*GPS locations of the beginning of creek transect and at every 15 min. travel interval thereafter Wood Cutting 0-4 Lopping 0-4 Fishing evidence seen from the vegetation plot Y/N People Seen from the plot Y/N*						*Human Disturbances 0-4 Rating, 0-None, 4-Very high*			
	Lat			*Long*						
1	*Deg*	*Min*	*Sec*	*Deg*	*Min*	*Sec*				
2										
3										
4										
5										
6										
7										
8										
9										
10										

Are there any permanent human settlements in the beat? (Yes/No). If Yes, how many?_____. Approximate human population_____, Is there NTFP collection in the beat _____ (Yes/No). If yes, what NTFP is collected _____, _____, _____,_____, Rate NTFP collection on a scale of 0-4, 0-No to 4-Very high ___ _____,_____,_____,_____.
Intensity of fishing _____and tiger prawn seed collection _____ in the beat at 0-4 scale (0 is nil, 4 is very high)

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पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest and Climate Change
राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण
National Tiger Conservation Authority

F. No. 15-4/2012-NTCA (Vol.III) **New Delhi, the September 3, 2019**

To,

Chief Wildlife Warden (s)
Tiger Range States

Sub: Advisory for Phase IV Monitoring- reg.

Sir**,**

You are aware that, The Tiger Task Force constituted by the National Board for Wildlife (2005) has endorsed the revised methodology / approach propounded by the erstwhile **Project Tiger Directorate (now the National Tiger Conservation Authority-NTCA)** for country level estimation / monitoring of tiger / prey status. The **All India Tiger Estimation** exercise is one of the most crucial components of our national tiger conservation efforts. Monitoring efforts began in 2006, and are undertaken every four years, through a three-phase approach. The said approach *inter alia*, also comprises of **Intensive monitoring of tiger source populations in tiger reserves and protected areas in each tiger landscape complex known as Phase-IV Monitoring,** and maintenance of a centralized photo-database of tigers at NTCA obtained from camera traps deployed across all tiger reserves.

The objective of the **Phase IV Monitoring** is to, at the least, obtain a **minimum number of tigers** in a Tiger Reserve. But, with a passage of time, it has been felt that the areas outside Tiger Reserves are equally important, especially from viewpoint of gene flow in tiger bearing landscape. Therefore, it's very important to conduct this monitoring beyond the boundaries of Tiger Reserves also.

Further, it has also been observed during the **All India Tiger Estimation, 2018 (4th Cycle)** that there are certain ***low density Tiger Reserves*** and other tiger bearing areas, which have recorded no tiger presence during the survey period. But there are reports of tiger presence of in such areas beyond survey period. It has also been observed that certain states could not cover the tiger bearing areas during 4th Cycle of AITE as compared to previous cycles.

As per the Analysis of AITE, 2018 data more than **80% of Tigers of the total estimated population were individually identified/photo-captured** as minimum number of Tigers in country. Therefore, Phase IV Monitoring is an opportunity for all the Tiger States to conduct this exercise for the current year in order to bring the minimum number more close to the estimated population of Tiger.

The funds are being allocated to tiger bearing states for procurement of field equipments for conducting Phase IV monitoring, other field surveys and capacity building of field staffs under **CSS-Project Tiger**.

As per the mandate given in **Protocol on Phase IV monitoring (Technical Document No. 1/2011),** this field exercise is expected to be conducted by the state forest departments themselves. Though, support for capacity building, training and handholding of field staff may be provided by this Authority through its Regional Offices, other Technical Institutes and Non Governmental Partners. In All India Tiger Estimation 2018 a Grid size of 2 km^2 has been taken for placing the camera traps, therefore the **same 2 km^2 Grids** may be taken up for conducting Phase IV Monitoring.

The Tiger Cell of NTCA at WII, Dehradun that act as a data center may also be contacted in case of any information such as grid locations; animal occupancy etc. is required by the states.

All the Tiger Range States are expected to start **Phase IV Monitoringfrom 15th October 2019** in order to finish the exercise **15th May 2020**. In view of above, the timeline and proposed action may be informed to this Authority while providing information on following points by **30th September 2019**.

1. Tiger Reserve/Forest Division
2. Coordination/Preparatory meetings
3. Capacity Building/Training
4. Field Surveys including camera trappings
5. Data analysis
6. Report Submission

Yours Sincerely,

Sd/-

(Surender Mehra)

Deputy Inspector General (NTCA)

E-mail: dig1-ntca@nic.in

Tel. (EPABX): + 91 11 24367837-39

FAX: +91 11 24367836

Copy to:

1. Principal Chief Conservator of Forest & HoFF, All Tiger Range States
2. Inspector General, Regional Offices, NTCA (Guwahati & Bangalore)
3. Field Director(s), All Tiger Reserves
4. Director, Wildlife Institute of India, Dehradun
5. AIG, Regional Office, Nagpur

Sd/-

(Surender Mehra)

Deputy Inspector General (NTCA)

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Government of India
Ministry of Environment, Forest and Climate Change
National Tiger Conservation Authority

B-1 Wing, 7th Floor,
Pt. Deendayal 'Antyodaya Bhawan',
CGO Complex, Lodhi Road, New Delhi-110003.
E-mail: aig3-ntca@nic.in
Tel (EPABX): 011-2436 7837-42
Fax: 011 - 2436 7836

Dated: 20.12.2017

To,

The Chief Wildlife Warden(s),
All Tiger Range States

Sub: Advisory to emergent situation of tiger and sympatric species mortality due to electrocution-reg.

Sir,

Please find enclosed herewith an advisory to deal with the emergent situation of tiger and sympatric species mortality due to electrocution. In this context, I am directed to request you to comply with suggested actions and take action as appropriate, in the matter.

End: As above.

Yours Faithfully,
Sd/-
(Dr. Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

Copy for Information & Necessary Action:

1. The Field Director(s), All Tiger Reserve.
2. The IGFs/AIGs, Regional Office, NTCA, Nagpur, Bangalore and Guwahati.

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Title: Advisory to prevent tiger and sympatric species mortality due to electrocution
Subject: To deal with the emergent situation of tiger and sympatric species mortality due to electrocution
Reference: Generic guidelines for preparation of Security Plan for Tiger Reserves
Purpose: To ensure that dispersing tigers do not fall victim to electrocution in human dominated landscapes

Suggested Actions:

Field Level

- Identification of threat posed by villages based on (i) their distance from Protected Area, (ii) Habitat quality available and (iii) Proportion of forested area in a villages
- Mapping of transmission lines and electric stations/sub stations should be carried out and identify officials manning them. (Maps may be prepared using open source data like Open Street map, Google layers etc., if required)
- Analysis of cropping patterns and land tenure dynamics of tigers to assess when tiger movement shall be intense outside Protected Areas
- Constitution of joint teams comprising Forest officials, Electricity Department officials and members of PRIs/NGOs
- Special patrolling by aforesaid teams along transmission lines in buffer and corridor areas wearing appropriate safety gear
- Instituting a reward system to encourage people to report illegal power fences in operation
- Evolve a mechanism to separate electricity supply for household and agriculture use so as to shut down agriculture supply line during sensitive periods (Dusk to Dawn)
- Installation of sensitive circuit breakers to pin location of electrocution
- Promotion of solar powered fencing around agricultural fields
- Special emphasis for surveying electricity connections to agricultural pumps and similar equipment. Further, an undertaking should be taken from the end user by the agricultural pump/equipment provider and the Electricity Department that the pump/equipment shall be used for legitimate purposes only, failing which confiscation and /or termination of connection shall be carried out.
- Explore possibility of stone wall fencing which shall restrict ungulate movement but are permeable to wild carnivores
- Timely payment of compensation for crop and/ or livestock damage
- Penal action as deterrent for future in form of temporary/permanent disconnection of electricity besides action in accordance with provisions of the Wildlife (Protection) Act, 1972, besides other prevalent Acts of the Electricity Department.

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Administrative Level

- Periodic meetings between Forest and Electricity Department, frequency of which may be decided based on sensitivity of seasons, to share information on tripping and action taken in this regard by respective Departments
- Zone wise nodal officials of Departments concerned, should be identified to communicate on a regular basis
- Mass awareness programmes to be organized using extension media, local press clubs, radio and television stations by Departments concerned
- Steps be taken to promote and facilitate crop and livestock insurance schemes
- Possibility of insulating transmission lines, besides routing cables underground should explored in all sensitive areas in discussion with the electricity department

F. No. 15-38/2010-NTCA
Government of India
Ministry of Environment, Forest and Climate Change
National Tiger Conservation Authority

B-1 Wing, 7th Floor,
Pt. Deendayal 'Antyodaya' Bhawan,
CGO Complex, Lodhi Road,
New Delhi-110003
EPABX No. +91 11 2436 7837-42
Fax: +91 11 2436 7836
E-mail: aig3-ntca@nic.in

Dated: 28th October, 2016

To,

The Chief Wildlife Warden (s),
All Tiger Range States.

Sub: Advisory on Avian Influenza - reg.

Sir,

Reference is invited to the subject cited above. In this context, I am directed to bring to your kind notice, the recent avian deaths due to Avian Influenza virus in the country.

As advised by the Office des International Epizooties (OLE), early detection and warning are keys to effectively dealing with the disease, which necessitates stepping up animal health surveillance in and around tiger reserves. This shall involve observation and documentation of any avian illness and mortality and reporting the same to the nearest Veterinary Health establishment.

Frontline staff dealing with sick and/or dead birds or their parts should exercise due precaution owing to the diseases' public health importance. Protective clothing like gloves, boots and masks are highly advisable.

In view of the migratory bird season, it is important to conduct a stakeholder meeting at tiger reserve level involving State Veterinary health officials to contain the disease if detected.

Yours faithfully,
Sd/-
(Dr. Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

Copy to: The Secretary General, Global Tiger Forum, New Delhi, in view of migratory birds of the East Asia/Australian flyway.

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NATIONAL TIGER CONSERVATION AUTHORITY

(Statutory Body under the Ministry of Environment and Forest, Govt. of India)

Member Secretary

Annexe No. 5, Bikaner House,
Shahjahan Road, New Delhi-11,
Telefax: 2338 4428
E-mail: dirpt-r@nic.in

No. PS-MS (NTCA)/ 2009-Misces **Dated the 18th March, 2009**

To,

All Field Director(s),
All Tiger Reserves

Sub: Fire protection.

Sir,

As you are aware, under the ongoing Centrally Sponsored Scheme of Project Tiger, considerable central assistance is being provided for preventive / control fire protection measures in tiger reserves, based on reserve-specific Annual Plan of Operation (APO) received from your end. In the recent past, several incidents of forest fire have been highlighted in the print-media which is a cause for great concern. In this context, an update on the forest protection measures / monitoring system in vogue may please be sent to this office by return fax, along with details of any recent fire in the tiger habitat.

Yours Sincerely,

Sd/-
Member Secretary (NTCA)

Copy to:

1. The Principal Secretary (Forests), All Tiger Range States.
2. The Principal Chief Conservator of Forests, All Tiger Range States.
3. The Chief Wildlife Warden, All Tiger Range States.

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भारत सरकार
Government of India
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest and Climate Change
राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण
National Tiger Conservation Authority

F.No.15-59/2009-NTCA (Part) **New Delhi, the April 8, 2019**

To,

The Chief Wildlife Warden(s)
All Tiger Range States

Sub: Fire protection.
Ref.: This Authority letter no. F.No.1-14/2011-NTCA (Part.II) dated April 2, 2019

Sir,

In continuation of this Authority letter referred above, I am directed to say that considerable financial assistance is being solicited under the ongoing Centrally Sponsored Scheme of Project Tiger for preventive/control fire protection measures in tiger reserves, based on reserve specific Annual Plan of Operations.

It is requested that the same may be implemented on a war footing keeping in view the predisposition during the hot summer months.

Detailed action taken in this regard may kindly be intimated on a fortnightly basis to this Authority.

Yours faithfully,

Sd/-
(Dr. Vaibhav C. Mathur)
Assistant Inspector General (NTCA)
Email: aig3-ntca@nic.in
Tel. (EPABX): + 91 11 24364837-39
FAX: +91 11 24367836

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F.No.15-59/2009-NTCA(Part)

Copy to:

1. The Field Director(s), All Tiger Range States
2. The Regional Offices (NTCA), Guwahati, Nagpur & Bengaluru

Sd/-
(Dr. Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

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IMPORTANT

F. No.15-38/2010-NTCA (Part)
Government of India
Ministry of Environment, Forest & Climate Change
National Tiger Conservation Authority

B-I Wing, 7th Floor,
Pt. Deendayal Antodaya Bhawan,
CGO Complex, Lodhi Road, New Delhi – 110003
Email: aig3-ntca@nic.in
Tel. (EPABX): + 91 11 24364837-42
FAX: +91 11 24367836

Dated: 03.10.2018

To,

The Chief Wildlife Warden(s),
All Tiger Range States

Sub: Lion deaths in Gujarat.

Ref: 1. This Authority letter of even number dated 20.10.2015 (copy enclosed)
2. This Authority letter of even number dated 14.06.2013 (copy enclosed)

Sir,

Reference is invited to the subject and letter cited above. In this context, I am directed to say that as reported in the media, certain number of lion deaths in the State of Gujarat have been attributed to Canine Distemper, a viral disease where in dogs (feral on domestic) act as a transmitting host.

In this regard, advisories communicated through letters referred above are hereby reiterated to reduce likelihood of tigers acquiring the said infection.

Action as appropriate may kindly be taken on an urgent basis.

End: As above.

Yours faithfully,
Sd/-
(Dr. Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

Copy to:

1. Field Director(s), All Tiger Reserve(s).
2. All Regional Offices, NTCA.

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No. 15-38/2010-NTCA
Government of India
Ministry of Environment and Forests
National Tiger Conservation Authority
****

Annexe No. 5, Bikaner House,
Shahjahan Road, New Delhi-I 10011.
Telefax: 2338 983
E-mail: jdntca@gmail.com

Dated the 14 June, 2013

To,

The Chief Wildlife Warden(s),
All Tiger Range States.

Sir,

Recently there has been media coverage regarding spread of lethal Canine Distemper Virus (CDV) in tiger, in countries like Indonesia and Russian Federation. The said disease is incurable, causing high fever, watery eyes, lethargy, vomiting, diarrhea, progressing to seizures, paralysis and death. The infected animals have also been observed to display strange behaviour, with disorientation, inability to predate, besides logs of fear.

As a precaution, the following preventive measures are suggested:

1. Vaccination of Stray cattle, cats and dogs living around tiger reserves should be done on a regular basis.
2. Incidents of wild animals showing abnormal behavior, as above, must be reported immediately.
3. Tissues of dead animals (brain tissue for CDV) should be collected for pathological analysis.
4. Facilities of deep fridge for storing samples should be ensured in each tiger reserve.
5. Record of each sample collected and their analysis should maintained.
6. Periodic checking of water quality in tiger reserves (pre and post monsoon) alongwith their chemical analysis should be undertaken.

The Field Directors and field staff may please be directed accordingly. A research paper on the detection of `Peste des Petits Ruminants Virus' (PPRV) in tissues of Asiatic Lion is also, enclosed herewith for your kind perusal.

Yours Faithfully,

End: As above,

Sd/-
(S. P. Yadav)
Deputy Inspector General (NTCA)

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Copy to:

1. The Director, Wildlife Institute of India, Dehradun.
2. Field Director, All Tiger Reserves.
3. IG/AIG, NTCA Regional Offices – Bengaluru / Guwahati / Nagpur.

Copy for Information to:

1. PS to MEF.
2. PPS to Secretary (E&F), MoEF.
3. PPS to DGF & SS, MoEF.
4. PS to ADG (WL), MoEF.

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F. No. 15-38/2010-NTCA (Part III)
Government of India
Ministry of Environment, Forest and Climate Change
National Tiger Conservation Authority

First Floor, East Tower,
NBCC Place, Bhishma Pitamah Marg,
New Delhi-110003
Tele: +91 11 24362445
Fax: +91 11 24364250
E-mail: aig3-ntca@nic.in

Dated the 17th December 2014

To,

The Chief Wildlife Warden (s),
Madhya Pradesh and Uttarakhand

Sub: Special Drive in respect of Canine Distemper
Ref: This Authority letters of even no. Dated 14.6.14. and 18.6.14

Sir,

Reference is invited to the subject and letters cited above. In this context, I am directed to request you to kindly expedite framing a proposal to create immunity buffers around Panna and Corbett Tiger Reserves, in consultation with district veterinary officials, Indian Veterinary Research Institute (IVRI) and the Wildlife Institute of India, for soliciting financial support under the ongoing CSS-Project Tiger. This needs to be launched as a special, time bound drive.

In this context, the following points are suggested for guidance;

The concept of creating immunization buffers around Tiger Reserves should be initiated keeping in mind the principles of herd immunity; the latter is briefly discussed as follows:

i. Herd immunity concept proposes that in contagious diseases such as Canine Distemper (CD), the chain of infection is likely to be disrupted when large numbers of a population are immune (vaccinated) or less susceptible to the disease (due to vaccination).
ii. The rationale behind this is that the exposure of unvaccinated /susceptible animals (tigers in the case of tiger reserves) to infected animals shall be substantially reduced. Hence, greater the proportions of individuals which are vaccinated/ resistant/immune to the disease, lesser are the chances of its transmission. In essence vaccinated animals act as a firewall between tigers and stray animals
iii. Therefore, a policy of herd immunity can be formulated for stray dogs and cats around Tiger Reserves to prevent the spread of CD and provide a level of protection to a vulnerable, unvaccinated group like tigers

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iv. However, the Nerd immunity threshold i.e. proportion of immune individuals in a population (in the instant case population includes all animals susceptible to CD including tigers) above which a disease may no longer persist needs to be arrived at in and around Tiger Reserves. Possible source of information can be retrospective data available with the local Veterinary & Animal Husbandry office or Veterinary Colleges, which shall help to see secular tends of CD cases in the said geographical area. Analysis of disease data can help establish

   - o Virulence of the CD virus prevalent in the area and
   - o The efficacy of commonly used vaccines to see number of cases contracting the disease in spite vaccination

     Empirical data of different diseases however, has shown that vaccinating 70 to 80% of the population helps in reduction of transmission of the disease. This shall help in designing a vaccination protocol for the envisaged immunization buffers with optimum costs as the entire population need not be vaccinated

v. If retrospective data is not available, then support from Veterinary Colleges/Animal Husbandry Departments needs to be solicited in conducting a sero-prevalence study of stray dogs and cats around the TR for CD. The sylvatic presence of CD in tiger reserves can be established by;

   - Retrospective data on wild animal mortality available with TR management
   - Screening of serum samples of tigers after blood collection subsequent to immobilization

vi. Site specific preventive measures can be taken keeping in mind the following factors:

   - The CD virus is fragile and will perish above 20-25 degrees C in sunlight. Therefore, drying of fomites after washing is sufficient
   - Any case of death if detected in the buffer/adjoining areas, the carcass should be removed and the area disinfected by flaming or 1:30 solution of bleach
   - The CD virus is susceptible to chemicals such as 0.75% phenol, 1:30 bleach solution and detergents
   - Accordingly disinfectant baths can be put up at all entry points to the Park for vehicles coming from outside, staff should be advised to maintain strict hygiene of their premises inside the Reserve
   - Advisories in the form of hoardings, posters, leaflets in dailies can be issued highlighting common signs and forms of CD with graphics with contact numbers for reporting if a CD case is suspected in and around the Reserve

Yours Faithfully,
Sd/-
(Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

Copy to:

1. The Inspector General of Forests (NTCA), Regional Office, Nagpur
2. The Field Director(s), Corbett and Panna Tiger Reserve.

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F. No. 15-38/2010-NTCA
Government of India
Ministry of Environment, Forest and Climate Change
National Tiger Conservation Authority

B-1 Wing, 7th Floor,
Paryavarati Bhawan,
CGO Complex, Lodhi Road,
New Delhi 110003
Email: aig3-ntca@nic.in
Tel (EPABX): +91 11 24367837-42
Fax: +91 11 24367836

Dated the 20th October 2015

To,

The Chief Wildlife Warden (s),
All Tiger Range States

Sub: Special Drive in respect of Canine Distemper
Ref: This Authority letters of even no. dated 14.6.13 and 18.6.13 and 15-38/2010-NTCA (Part III)

Sir,

Reference is invited to the subject and letters cited above. In this context, I am directed to request you to kindly expedite creation of immunity buffers around Tiger Reserves' under your jurisdiction, in consultation with district veterinary officials, Indian Veterinary Research Institute (IVRI) and the Wildlife Institute of India. Funding support in this context may be solicited under the ongoing CSS-PT. This needs to be done as a special, time bound drive.

In this context, the following points are suggested for guidance;

The concept of creating immunization buffers around Tiger Reserves should be initiated keeping in mind the principles of herd immunity; the latter is briefly discussed as follows:

i. Herd immunity concept proposes that in contagious diseases such as Canine Distemper (CD), the chain of infection is likely to be disrupted when large numbers of a population are immune (vaccinated) or less susceptible to the disease (due to vaccination).
ii. The rationale behind this is that the exposure of unvaccinated /susceptible animals (tigers in the case of tiger reserves) to infected animals shall be substantially reduced. Hence, greater the proportions of individuals which are vaccinated/ resistant/immune to the disease, lesser are the chances of its transmission. In essence vaccinated animals act as a firewall between tigers and stray animals
iii. Therefore, a policy of herd immunity can be formulated for stray dogs and cats around Tiger Reserves to prevent the spread of CD and provide a level of protection to a vulnerable, unvaccinated group like tigers

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iv. However, the herd immunity threshold i.e. proportion of immune individuals in a population (in the instant case population includes all animals susceptible to CD including tigers) above which a disease may no longer persist needs to be arrived at in and around Tiger Reserves. Possible source of information can be retrospective data available with the local Veterinary & Animal Husbandry office or Veterinary Colleges, which shall help to see secular tends of CD cases in the said geographical area. Analysis of disease data can help establish
   - o Virulence of the CD virus prevalent in the area and
   - o The efficacy of commonly used vaccines to see number of cases contracting the disease in spite of vaccination

   Empirical data of different diseases however, has shown that vaccinating 70 to 80% of the population helps in reduction of transmission of the disease. This shall help in designing a vaccination protocol for the envisaged immunization buffers with optimum costs as the entire population need not be vaccinated

v. If retrospective data is not available, then support from Veterinary Colleges/Animal Husbandry Departments needs to be solicited in conducting a sero-prevalence study of stray dogs and cats around the TR for CD. The sylvatic presence of CD in tiger reserves can be established by;
   - Retrospective data on wild animal mortality available with TR management
   - Screening of serum samples of tigers after blood collection subsequent to immobilization

vi. Site specific preventive measures can be taken keeping in mind the following factors:
   - The CD virus is fragile and will perish above 20-25 degrees C in sunlight. Therefore, drying of fomites after washing is sufficient
   - Any case of death if detected in the buffer/adjoining areas, the carcass should he removed and the area disinfected by flaming or 1:30 solution of bleach
   - The CD virus is susceptible to chemicals such as 0.75% phenol, 1:30 bleach solution and detergents
   - Accordingly disinfectant baths can be put up at all entry points to the Park for vehicles coming from outside, staff should be advised to maintain strict hygiene of their premises inside the Reserve
   - Advisories in the form of hoardings, posters, leaflets in dailies can be issued highlighting common signs and forms of CD with graphics with contact numbers for reporting if a CD case is suspected in and around the Reserve

Further, advisories of this Authority on the said subject of Canine Distemper virus are reiterated for taking action as appropriate.

Yours Faithfully,

Sd/-
(Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

Copy to:

1. The Inspector General of Forests (NTCA), Regional Office, Nagpur, Bengaluru and Guwahati
2. The Field Director(s), All Tiger Reserves

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F. No.15-38/2010-NTCA
Government of India
Ministry of Environment & Forests
National Tiger Conservation Authority
***

Annexe No.-V, Bikaner House,
Shahjahan Road, New Delhi-110011.
Telefax: 2338 9883
E-mail: jdntca@gmail.com

Dated: 18th June, 2013

To,

The Chief Wildlife Warden (s),
All Tiger Range States.

Sub: Threat to Asian Tigers from Canine Distemper Virus-reg.

Sir,

In continuation to this Authority's letter No. 1-12/2003-PT dated 14th June, 2013 and letter of even number dated 14/06/2013 regarding Canine Distemper Virus, I am directed to send inputs received from Indian Veterinary Research Institute, Izatnagar, Bareilly, Uttar Pradesh vide their letter No. 2-19/DI/NRC/2013-14/CWL dated 17/06/2013 (copy enclosed) for your kind perusal and necessary action.

Yours Faithfully,

Encl: As above.

Sd/-
(S. P. Yadav)
Deputy Inspector General (NTCA)

Copy to:

1. The Additional Chief Secretary/Principal Secretary, Forest Department, All Tiger Reserve.
2. The Principal Chief Conservator of Forests, All Tiger Range States.
3. The Field Director(s), All Tiger Reserves.

Copy to Information to:

1. PS to MEF.
2. PPS to Secretary (E&F), MoEF.
3. PS to DGF & SS, MoEF.
4. PPS to ADGF (WL), MoEF.

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F. No. 2-19/DI/NRC/2013-14/CWL **Dated: 17/06/2013**

To,

Dr. Rajesh Gopal
ADG (PT) & Member Secretary
National Tiger Conservation Authority
Bikaner House, Annexe-V
Shahjahan Road, New Delhi-110011
Fax: 011 -23074272

Sub: Threat to Asian Tigers from canine distemper virus
Ref: No. 1-16/93- PT (Vol.II) dated 11th June, 2013.

Sir,

With reference to above mentioned subject and query raised vide your letter referred above, a meeting was held under the Chairmanship of Dr. Rishendra Verma, Joint Director (CADRAD) in his chamber on 14.06.2013 at 11:00 A.M. Dr. A. K. Sharma, Principal Scientist (Pathology) & Incharge, Centre for Wildlife Section and Dr S. Nandi, Principal Scientist (Virology), CADRAD were present. The matter was discussed at length in the light of previous publications and the investigation work carried out at IVRI.

The following points emerged out of the discussion.

1. The canine distemper virus (CDV) member of morbillivirus of paramyxoviridae family is widely prevalent among domestic dog population in our country.
2. Chronic encephalomyelitis caused by canine distemper virus has been reported in Bengal tiger in India.
3. Seropositivity of CDV was reported in 87.5% Asiatic lions from Western India in 1998-1999.
4. Evidence of CDV infection has been reported in all families of terrestrial carnivores: felldae, hyaenidae, mustelidae, procyonidae, ursidae and viveridae including red or lesser panda and giant panda.
5. Recently, occurrence of CDV has been detected by PCR in a tigress, two tiger cubs and Red Panda in Virology lab of CADRAD, IVRI.

Thus, it is apparent that canine distemper virus is circulating not only in dog population but also in wild felids in our country.

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Recommendations:

1. There is an urgent need to conduct monitoring of sero prevalence of CDV in large cats (endangered species) both in captivity and in wild. It should be made mandatory to look for CDV infection while conducting postmortem of any large felid.
2. The stray dogs should be prohibited from entering the buffer zones of National Parks or in the vicinity of the zoos.

Materials to be collected for diagnosis from sick animals.

1. Heparinized whole blood about 10-15 ml in cold chain at 40 C (Not frozen).
2. Serum 1.0 ml in cold chain (frozen).

From Dead Animals:

1. Tissues for virus isolation: spleen, lymph nodes, lung and brain in cold chain (frozen) or in 50% buffered glycerol.
2. Above tissues (0.5 cm thick) in 10% neutral buffered formalin for histopathological examination.

These materials may be sent to Incharge, National Referral Centre on Wildlife Healthcare, IVRI, Izatnagar in person so as to reach the laboratory at the earliest.

Sd/-
(A.K. Sharma)
Incharge, CWL

Copy to:

1. Director, IVRI, for information.
2. Dr. Rishendra Verma, Joint Director (CADRAD), IVRI, Izatnagar.

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PROTOCOL FOR TIGER RE-INTRODUCTION
NATIONAL TIGER CONSERVATION AUTHORITY
(Adapted from the IUCN Guidelines for Re-introductions)

Capture and Translocation of tigers could be undertaken to address the following two Goals:

Re-introduction means an attempt to establish a tiger population in an area which was once part of its historical range, but from which it has been extirpated or become extinct.

Re-inforcement/Supplementation: addition of tigers to an existing population to enhance its long-termviability.

AIMS AND OBJECTIVES OF RE-INTRODUCTION

a. **Aims:**

The principle aim of any re-introduction should be to establish a viable, free-ranging population in the wild, of tigers which has become locally extinct in the wild. It should be re-introduced within the tigers' former natural habitat and range and should require minimal long-termmanagement.

b. **Objectives:**

The objectives of a re-introduction may include: to enhance the long-term survival of wild tigers in a manner that they could potentially perform their ecological and evolutionary role.

At no times should tiger translocations be viewed as an alternatives to, or compromise on habitat connectivity's for sustaining and promoting natural dispersal between populations.

TEAM CONSTITUTION

The Team will consist of representatives from Wildlife Institute of India, State Forest Departments, Qualified Veterinarian and a Qualified Wildlife Biologist. The Team leader would be responsible for coordination between the various bodies and provision should be made for publicity and public education about the project. The provisions of the Wildlife Protection Act shall be adhered to at all times. The proposal, progress, and activities of the translocation exercises should be transparent and communicated through appropriate forum and media so as to gain public support.

The National Tiger Conservation Authority (NTCA) will keep an oversight on the translocation process and may also depute a representative as and when considered necessary.

PRE-PROJECT ACTIVITIES BIOLOGICAL
Feasibility Study and Background Research

- An assessment should be made of the taxonomic status of tigers to be re-introduced. They should preferably be of the same evolutionary significant unit as those which were extirpated, unless adequate numbers are not available. Potential source/founder populations should be identified, assessed and prioritized based on a) genetic and geographical closeness to the proposed reintroduction population, b) Impact of removals on the host/founder population (assessed by a PVA if necessary). Preference should be given to tigers obtained from wild stock for reintroduction. If appropriate wild stock is not available then captive stock should be considered. An investigation of historical information about the loss and fate of individuals from the re- introduction area, as well as molecular genetic studies, may be undertaken in case of doubt as to individuals' taxonomic status.

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- In the absence of genetic data tigers from the nearest population that likely had habitat connectivity in the historical past with the area where reintroduction is to be made should be the preferred founder population.
- A Population and Habitat Viability Analysis will aid in identifying significant environmental and population variables and assessing their potential interactions, which would guide long-term population management and reintroduction. Population and management plans for the long term (>25 years) should be prepared on the basis of the above analysis. It should be clear from the onset of the reintroduction program that some reintroduced populations will require continuous management and/ or supplementation for long term viability. Commitments from the concerned authority and funding support for this sustained effort are a prerequisite for reintroduction.

Choice of Release Site and Type

- Site should be within the historic range of tigers. For an initial reinforcement there should be few remnant wild individuals. For a re- introduction, there should be no remnant population to prevent disease spread, social disruption and introduction of alien genes. In some circumstances, a re-introduction or re-inforcement may have to be made into an area which is fenced or otherwise delimited, but it should be within the species' former natural habitat and range.
- The re-introduction area should have assured long-term protection (whether formal or other wise).

Evaluation of re-introduction site

- Availability of suitable habitat: re-introductions should only take place where the habitat and land scape requirements of tigers are satisfied, and likely to be sustained for the for-seeable future. The possibility of natural habitat change since extirpation must be considered. Likewise, a change in the legal/ political or cultural environment since species extirpation needs to be ascertained and evaluated as a possible constraint. The area should have sufficient carrying capacity to sustain growth of the re-introduced population and support a viable (self-sustaining) population in the long run.
- Identification and elimination, or reduction to a sufficient level, of previous causes of decline: could include disease; over-hunting; poisoning; competition with or predation by introduced species; commercial poaching, habitat loss; and adverse effects of earlier management programmes;,. Where the release site has undergone substantial degradation caused by human activity, a habitat restoration programme and/or programmes to resettle humans should be initiated before the re-introduction is carried out.

Suitability of Release Stock of Tigers

- It is desirable that source tigers come from wild populations. If there is a choice of wild populations to supply founder stock for translocation, the source population should ideally be closely related genetically to the original native stock and show similar ecological characteristics to the original population.
- Removal of individuals for re-introduction must not endanger the wild source population. Stock must be guaranteed available on a regular and predictable basis, meeting specifications of the project protocol.

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- Individuals should only be removed from a wild population after the effects of translocation on the donor population have been assessed, and after it is guaranteed that these effects will not benegative.
- To minimize impact on the founder / host population, preferably tigresses between the age of 2-3 years (Sub-adults) who have become independent of their mother but are yet to establish their own territories should be targeted. This cohort also has the highest reproductive potential and therefore ideal for starting a new population. Male tigers become sexually mature at the age of 2 years but rarely can they breed till 4 years of age in the wild. This age group (2-3 years) is ideal for translocation for reintroduction as their removal from the host population will not result in male turnovers and subsequent infanticide episodes. All effort should be made not to translocate established breeding individuals from the host population. Potential individual tigers that are to be translocated should be monitored prior to their capture to ascertain their social status, health, and behavior.

Release of Captive Tigers

- Tigers rely heavily on individual experience and learning as juveniles for their survival; they should be given the opportunity to acquire the necessary information to enable survival in the wild, through training in their captive environment; a captive bred individual's probability of survival should approximate that of a wild counterpart.
- Care should be taken to ensure that potentially dangerous captive bred tigers that might be a danger to local inhabitants and/or their livestock are not released. All tigers should be equipped with radio collars and monitored intensively. If the newly released tiger shows behavior that is likely to cause problems for the local people, it should be removed immediately.

SOCIO-ECONOMIC REQUIREMENTS

- Re-introductions are generally long-term projects that require the commitment of long-term financial and political support.
- Socio-economic studies should be made to assess impacts, costs and benefits of the re-introduction programme to local human populations.
- A thorough assessment of attitudes of local people to the proposed project is necessary to ensure long term protection of the re-introduced population, especially if the cause of species' decline was due to human factors (e.g. over-hunting, over-collection, loss or alteration of habitat). The programme should be fully understood, accepted and supported by local communities.
- Where the security of the re-introduced population is at risk from human activities, measures should be taken to minimise these in the re-introduction area. If these measures are inadequate, the re-introduction should be abandoned or alternative release areas sought.
- If tigers pose potential risk to life or property, these risks should be minimised and adequate provision made for compensation where necessary; where all other solutions fail, removal of the released individual should be considered.

PLANNING, PREPARATION AND RELEASE STAGES

- Construction of a multidisciplinary team with access to expert technical advice for all phases of the programme.

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- Identification of short- and long-term success indicators and prediction of programme duration, in context of agreed aims and objectives as per the PVA and population management plan.
- Securing adequate funding for all programme phases.
- Design of pre- and post- release monitoring programme so that each re- introduction is a carefully designed experiment, with the capability to test methodology with scientifically collected data. Monitoring the health of individuals, as well as the survival, is important; intervention may be necessary if the situation proves unforeseeable unfavourable.
- If release stock is wild-caught, care must be taken to ensure that: a) the tigers are free from infectious or contagious pathogens and parasites before translocation and b) the stock will not be exposed to vectors of disease agents which may be present at the release site (and absent at the source site) and to which it may have no acquired immunity.
- If vaccination prior to release, against local endemic or epidemic diseases of wild stock or domestic livestock at the release site, is deemed appropriate, this must be carried out during the "Preparation Stage" so as to allow sufficient time for the development of the required immunity.
- Appropriate veterinary measures as required to ensure health of released stock throughout the programme. This is to include adequate quarantine arrangements, especially where founder stock travels far or crosses international boundaries to the release site.
- Development of transport plans for delivery of stock to the site of re-introduction, with special emphasis on ways to minimize stress on the individuals during transport.
- Determination of release strategy (acclimatization of release stock to release area; behavioural training - including hunting and feeding; group composition, number, release patterns and techniques; timing). Preferably "Soft release" should be the norm.
- Development of conservation education for long-term support; professional training of individuals involved in the long-term programme; public relations through the mass media and in local community; involvement where possible of local people in the programme.

POST-RELEASE ACTIVITIES

- Post release monitoring is required of all tigers. This most vital aspect may be by direct (e.g. telemetry/ Satellite tracking) methods as suitable.
- Demographic, ecological and behavioural studies of released stock must be undertaken.
- Study of processes of long-term adaptation by individuals and the population.
- Collection and investigation of mortalities.
- Interventions (e.g. supplemental feeding; veterinary aid) when necessary.
- Decisions for revision, rescheduling, or discontinuation of programme where necessary.
- Habitat protection or restoration to continue where necessary.
- Continuing public relations activities, including education and mass media coverage. Evaluation of cost-effectiveness and success of re- introduction techniques. Regular publications in scientific and popular literature.

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NATIONAL TIGER CONSERVATION AUTHORITY
(Statutory Body under the Ministry of Environment and Forest, Govt. of India)

Bikaner House, Annexe-V
Shahjahan Road, New Delhi- 110011
Telefax: 23384428
E-mail: dirpt-r@nic.in

Most Urgent

No.1501/11/2007-PT (Part) **Dated the November 16, 2007**

To,

The Chief Wildlife Warden
(All Tiger Reserve States)

Sub: Identification and notification of core or critical habitats in Tiger Reserves.

Sir,

Section 38V (Chapter IV B) of the Wildlife (Protection) Act, 1972 (as amended in 2006) provides for establishing core or critical tiger habitat in tiger reserves on the basis of scientific and objective criteria by the State Government, in consultation with an Expert Committee constituted for the purpose.

Section 38V of the Wildlife (Protection) Act, 1972 involves three distinct processes- (i) identification/delineation of core or critical tiger habitat as per scientific/objective criteria involving an Expert Committee; (ii) identification/delineation of the buffer or peripheral area in consultation with the concerned Gram Sabha and the Expert Committee; (iii) creation of inviolate area on the basis of identified core or critical tiger habitat through relocation, as per the statutory process.

The core or critical tiger habitat are among the most sensitive areas in the country vis-à-vis tiger conservation and hence their identification as well as notification have to be expedited by according topmost priority. You are requested to identify/delineate such areas within the Tiger Reserves of your State by the following process:

(i) An Expert Committee may be constituted under the Chairmanship of the Chief Wildlife Warden comprising of two experts (one governmental and the other non-governmental).

(ii) The Committee, in consultation with respective Field Directors shall finalize and delineate the core or critical tiger habitats of tiger reserves using the criteria at para (iii) below, within 10 days from the receipt of this letter.

(iii) A minimum inviolate space of 800-1000 sq. k.m. should be maintained as the core or critical tiger habitat to support a viable population of tiger in landscape, which is based on tiger life history parameter, territory sizes and population viability analysis, as per the assessment made by Project Tiger (National Tiger Conservation Authority) and Wildlife Institute of India in 2006.

(iv) The draft proposal containing the reserve-wise delineated core or critical tiger habitats (soft/hard copies along with maps) may be brought for discussion/needful action from this end during the meeting of Chief Wildlife Wardens convened on 29-11-2007

The buffer or peripheral area may be delineated after due consultation process between the Expert Committee and concerned Gram Sabha as required under Section 38V of the Wildlife (Protection) Act, 1972, as amended in 2006. Proposal in this regard maybe sent subsequently by 31-01-2008, along with identified tiger corridors.

A timeframe for subsequent process would be discussed and finalized during the meeting under reference. An early action in this regard is solicited.

Yours Sincerely,
Sd/-
Member Secretary,
National Tiger Conservation Authority

Copy to:

1. PPS to Secretary (E&F)
2. PPS to DGF &SS
3. Principal Secretary, Forest Department (All Tiger Reserve States)
4. Principal Chief Conservator of Forests (All Tiger Reserve States)
5. All Field Directors

Sd/-
Member Secretary,
National Tiger Conservation Authority

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NATIONAL TIGER CONSERVATION AUTHORITY

(Statutory Body under the Ministry of Environment and Forest, Govt. of India)

Member Secretary

Annexe No. 5, Bikaner House,
Shahjahan Road, New Delhi-11,
Telefax: 2338 4428
E-mail: dirpt-r@nic.in

F. No. PS-MS (NTCA)/2009-Misces **Dated the April 22, 2009**

To,

The Field Director
(All Tiger Reserve)

Sub: Field interventions in core/critical tiger habitats.

Sir,

As you aware, the core/critical tiger habitats have been notified by States under section 38V of the Wildlife (Protection) Act, 1972 as amended in 2006. The core/critical tiger habitats are areas of National parks and Sanctuaries where field interventions should be very minimum, as per the directives issued by the Hon'ble Apex Court on 25-11-2005, in IA No. 1220 (Interim Report of CEC in IA No. 548) and IA No. 994. A copy of the said order is enclosed for ready reference.

The Following are important to note vis-à-vis the directives of the Apex Court under reference:

(i) The field interventions should be as per the approved Management Plan (Tiger Conservation Plan) of the Tiger Reserve.

(ii) No outside agency can undertake any field work inside the core/critical tiger habitat without the prior permission of the Hon'ble Apex Court.

(iii) No individual donor can prescribe a field activity of his choice inside the core/critical tiger habitat.

(iv) The Tiger Conservation Plan for the tiger reserve should be prepared as per the guidelines issued vide NTCA Technical Document 01/07, duly approved by the competent authority as prescribed in the Wildlife (Protection) Act, 1972 as amended in 2006.

(v) Since the core/critical tiger habitats are meant to be kept inviolate for tiger, artifacts like foundation stone, commemorative exhibits/signages should be constructed in such areas at any cost.

The above directions may strictly be followed in compliance of the Hon'ble Apex Court's directives under reference to ensure the sanctity of our core/critical tiger habitat.

Yours Sincerely,

End: As above.

Sd/-
Member Secretary (NTCA)

Copy to:

1. PPS to Secretary (E&F) MoEF.
2. PPS to DGF & SS, MoEF.
3. PPS to Addl. DG (Wildlife), MoEF.

Sd/-
Member Secretary (NTCA)

Copy also to:

1. Additional Chief Secretary/Principal Secretary (Forests) (All Tiger Reserve States).
2. Principal Chief Conservator of Forests (All Tiger Reserve States).
3. Chief Wildlife Warden (All Tiger Reserve States).

Sd/-
Member Secretary (NTCA)

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F.No.1-12/2008-NTCA

Government of India
Ministry of Environment, Forest and Climate Change
National Tiger Conservation Authority

Annexe No. 05 Bikaner House,
Shahjahan Road, New Delhi-110011
Telefax: 23384428
E-mail: dirpt-r@nic.in

Dated the 26th May, 2009

To,

The Chief Wildlife Warden
All Tiger Range States

Sub: Creation of Buffer Area – regarding

Sir,

On several occasions clarification has been sought on the status of buffer area of a tiger reserve and collection of minor forests produce (MFP) from such areas.

In this context, I am directed to say that as per section 38V (4) (i) of the Wildlife (Protection) Act, 1972, as amended in 2006, a "tiger reserve" comprises of core/critical tiger habitat areas of National Parks and Sanctuaries which have been notified under section 35 and 18 of the Wildlife (Protection) Act, 1972 respectively. Such areas are required to be kept as inviolate for the purposes of tiger conservation. Hon'ble Supreme Court of India vide its order dated 14.2.2000 in IA No. 548 in W. P. No. 202/1995 *Godaverman v. Union of India* has also prohibited removal of dead, dying diseased, drift wood and grasses from National Parks and Sanctuaries. Hence, collection of MFP should not be allowed from the core areas of tiger reserves.

Further, the buffer area consists of the area peripheral to core area (not having the status of a National Park/Wildlife Sanctuary), identified and established in accordance with the provisions contained in Explanation (i) of section 38 V (4), where a lesser degree of habitat protection is required to ensure the integrity of the critical tiger habitat with adequate dispersal of tigers, and which aim at promoting co-existence between wildlife and human activity with due recognition of the livelihood, developmental, social and cultural rights of the local people. Hence, collection of MFP like bidi leaf (tendu patta) and other forestry operations may be allowed in the buffer area of a tiger reserve, which may comprise of forests/non forests areas, not having the status of a National Park/Wildlife Sanctuary as intended/notified under Chapter IV of the Wildlife (Protection) Act, 1972.

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It is pertinent to add that the management of the buffer area (including implementation of forestry activities) should be carried out on the broad principles laid down in para 11.3 of the NTCA Technical Document (NTCA/01/07).

Yours Faithfully,

Sd/-
(S.P. Yadav)
DIG & Joint Director (NTCA)

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Dr. RAJESH GOPAL
डॉ. राजेश गोपाल
Addl. DGF (Project Tiger) &
Member Secretary (NTCA)
अति. वन महानिदेशक (बाघ परियोजना) एवं
सदस्य सचिव (रा.व्या.सं.प्रा.)

Bikaner House, Annexe-V
बीकानेर हाउस, एनेक्सी – V,
Shahjahan Road, New Delhi-110011
शाहजहां रोड़, नई दिल्ली–110011
Tel. (दूरभाष): 011-23384428
Fax (फैक्स): 011-23074272
E-mail: (O) dirpt-r@nic.in

No. 1-14/2011-NTCA (Part-I) **Dated the 2nd April, 2014**

To,

Chief Wildlife Warden(s)
All Tiger Range States.

Sub: Supplementary guidance document for preparing the Tiger Conservation Plan.

Sir,

As you are aware, the draft Tiger Conservation Plans, as received from States, have been examined and commented upon by this Authority, followed by elaborate review and discussion in recent meetings with Field Directors. In this context, a guidance document to expedite preparation of the Tiger Conservation Plan is annexed. This is a supplement to the earlier guidelines issued by this Authority for preparation of Tiger Conservation Plan vide its Technical Document-NTCA/01/07, and is based on the provisions of the Wildlife (Protection) Act, 1972 apart from related guidelines issued from this end.

It is requested that the final version of the Tiger Conservation Plan of tiger reserves may kindly be sent to this Authority by the 15' of June, 2014, so as to enable us to apprise the Hon'ble Apex Court.

End: As above

Yours Sincerely,
Sd/-
(Dr. Rajesh Gopal)
ADG (PT)) & Member Secretary (NTCA)

Copy to:

1. ACS / Principal Secretary, Forest Department, All Tiger Range States.
2. Field Director(s) of all tiger reserves.
3. All officers of NTCA Regional Office, Guwahati/Nagpur/Bengaluru.
4. All officers of NTCA at Headquarter.

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GUIDANCE DOCUMENT FOR PREPARATION OF TIGER CONSERVATION PLAN

(A supplement to Technical Document — NTCA/01/07)

***

PART-A

FOR THE CORE /CRITICAL TIGER HABITAT

GENERAL PRINCIPLES OF MANAGEMENT

1. Exclusive tiger agenda : fostering as a reproductive surplus area.
2. Ensuring high prey productivity through protection.
3. Preventing depression of tiger density from poaching.
4. Ensuring low human disturbance through village relocation from source areas.
5. Ensuring minimal human impact and remoteness through buffering.
6. Fostering tiger population vis-a-vis the carrying capacity of the habitat.
7. Using the existing carrying capacity for tiger as a basis for habitat interventions
8. No go areas for development of any sort.
9. Promoting the process of populating promising tiger habitats in the landscape with the reproductive surplus (by habitat connectivity with core critical habitat or by active management).
10. Regulated tourism as per NTCA guidelines.

DATA COLLECTION/ANALYSIS

1. Obtain remote sensing data of forest cover (FSI, 23 m resolution) in GIS domain for the core area.
2. Incorporate layers in the GIS : administrative boundaries, topographical features, elevation, protection infrastructure (patrolling camps), rivers, water bodies (natural / man-made), grass meadows, spatial occupancy of major wild ungulates, tiger.
3. Use the Phase-I data of 2010 country level tiger assessment for obtaining beat level average data (cover below canopy) on shrubs, weed and ground cover (as average percentage for the beat), while indicating the same on respective beats in the GIS (source — WIT).
4. Develop a range for the average beat level cover values (as at Sl. No. 3) for highlighting beats falling within a similar value range with a colour code.
5. Use Phase-IV data to indicate tiger presence and relative abundance at beat level.
6. Compute the carrying capacity for tiger using the predictive equation of Hayward et. al. (2007).

   Predictive equation of Hayward et. al. (2007) is useful for large predators like tiger:

   $y = -2.158 + 0.377x$

   y = log of predicted predator density

   x = log of Preferred prey biomass

   where:

   Eg. Computing carrying capacity of Tiger in Kanha Tiger Reserve

   $y = -2.158 + 0.377x$

y = log of predicted predator density
x = log of Preferred prey biomass

Preferred Prey	*Density/Km² (Mean ± SE)*	*3/4th Avg. Female Weight (Kg.)*	*Available Biomass Kg. per Km² (Mean ± SE)*
Chital	33 ± 4.47	30	990 ± 134.1
Sambar	8.51 ± 1.11	150	1276.5 ± 166.5
Wild Pig	5.48 ± 0.96	40	219.2 ± 38.4
Gaur	4.11 ± 0.8	300	1233 ± 240

- Total Preferred Prey Biomass = 3718.7 (± 579) Kg/Km²
- Predicted Tiger Density = 16.0 ± 1.0/100 Km² (15-17)
- Current Tiger Density = 5.32 ± 0.68/100 Km²

Prey densities #/Km² (mean (SE)) from 2010 Assessment

Habitat	*Ungulates*	*Crevids*	*Chital*	*Sambar*	*Nilgai*
Mixed Forest (Shivalik)	58.04 (11.39)	54.51 (12.1)	46.71 (13.25)	7.49 (1.79)	2.22 (1.13)
Sal Forest (Terai)	19.11 (2.30)	13.12 (1.87)	13.0 (2.17)	0.14 (0.10)	3.02 (0.81)
Moist Sal-Mixed (Central India)	47.19 (9.32)	39.97 (9.09)	36.93 (10.42)	3.85 (0.74)	0.27 (0.14)
Dry Teak-Mixed (Central India)	51.24 (5.68)	42.13 (4.87)	37.00 (6.06)	5.34 (0.57)	1.38 (0.30)
Dry Thron Deciduous Forest (Central India)	51.97 (1.69)	38.46 (9.76)	31.62 (10.38)	8.24 (1.82)	11.17 (2.69)
Dry Mixed Decidous Forest (E. Ghat)	5.46 (16.9)	4.78 (1.47)	1.84 (0.97)	3.34 (1.09)	Not Assessed
Teak Mixed Forest (W. Ghat)	43.54 (5.85)	37.80 (5.63)	31.36 (6.93)	7.69 (1.18)	Not Assessed
Evergreen Forest (W. Ghat)	14.17 (4.55)	9.66 (4.46)	8.02 (6.86)	2.12 (1.08)	Not Assessed
Scrub Forest (W Ghat)	45.99 (10.33)	45.85 (11.69)	37.07 (14.91)	4.06 (1.11)	Not Assessed

7. In case wild ungulate densities for the reserve have not been computed during the **2010** country level tiger assessment, then such data as available for a similar habitat may be used, while indicating the same.

PREPARATION OF ZONE PLANS AND THEME PLANS

1. Based on generic principles of management, data appraisal and field knowledge propose appropriate zoning for management in the form of Zone Plans, besides overlapping Theme Plans. It is strongly

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advised that any proposal for habitat intervention should be based on the existing carrying capacity for tiger as computed. In case, the tiger density is near or close to the carrying capacity, no new habitat interventions should be proposed, but for continuing with the ongoing ones. In case of habitats with poor prey density it should first be determined if the poor density is due to poor protection and subsequent poaching, or due to poor food availability resulting as a consequence of competition with livestock. If these causes are ruled out then appropriate habitat interventions may be required besides in-situ augmentation of prey base. However, such interventions should not change the ecological character of the forest habitat (like providing numerous water sources in an otherwise arid habitat).

2. In case the habitat supports another endangered, endemic or localized wild fauna, it would be advisable to treat such areas of their occurrence within the habitat under a Zone Plan for providing due focus. Likewise, zoning may be considered for unique habitats, areas prone to natural flooding, areas requiring retrofitting safeguards etc.
3. In case of human settlements / villages in the core area, such areas should be dealt under a Zone Plan to facilitate time bound voluntary relocation as per NTCA / Project Tiger guidelines.
4. Portions of the core permitted for regulated tourism as per the NTCA guidelines should be dealt under a separate Zone Plan.
5. Overlapping interventions / safeguards like fire protection, general protection / antipoaching operations, tiger/wildlife monitoring, disease surveillance, capacity building of staff etc. need to be proposed as respective Theme Plans.

   Example:

   Zone Plan for Unique Habitat Zone Plan for Voluntary Relocation Zone Plan for Tourism

   Theme Plan for Protection

   Theme Plan for Habitat Intervention

   Theme Plan for Capacity Building / Staff Development and Deployment Theme Plan for Tiger / Wildlife Monitoring
6. The Theme Plan for antipoaching operations / surveillance / protection / communication should be shaped as a Security Plan with SOPs, besides a provision for periodic security auditing.

PART-B
FOR THE BUFFER / PERIPHERAL AREA OF A TIGER RESERVE

The need for ensuring ecologically compatible land uses in tiger reserves (buffer / peripheral areas) and corridors have been provided in sections 38O(g) and 38V (3)(b) of the Wildlife (Protection) Act, 1972. Further, under section 38V (3)(c) of the said Act, a provision has also been made to ensure that 'the forestry operations of regular forest divisions and those adjoining tiger reserves are not incompatible with the needs of tiger conservation'. In general, the managerial approach of buffer is applicable to tiger corridor areas as well. Intensive form of land uses like commercial mining, setting up of industries causing pollution and establishment of major hydro electric projects, and discharge of effluence / solid wastes in natural water bodies etc. needs to be avoided in such areas.

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GENERAL PRINCIPLES OF MANAGEMENT

1. Co-occurrence agenda (Wildlife and People).
2. A `no-go area' for industrial development (but retrofitting safeguards required if such infrastructure already exists).
3. The wildlife status of buffer should not be elevated to that of the core and managerial interventions should be restricted to allow tiger / wildlife gene permeability and low density occupancy while facilitating the meta-population dynamics of tiger in productive patches.
4. Factoring in the landscape context and reducing resource dependency of local people on forests through sectoral integration resulting in ecologically sustainable livelihood option.
5. Using the impact of natural / managerial interventions in the core area as a guide \for dealing with forestry practices and wildlife management in the buffer.
6. Identifying zones of influence vis-à-vis the various land uses operating in the area.
7. Overarching focus on habitat restoration/productivity, reduction of forest resource dependency, providing ecologically sustainable livelihood options to local people, permitting ecologically sustainable land uses, avoiding intensive forms of land uses like mining or heavily used infrastructure and actively addressing human-wildlife interface. In case such land uses are present or permitted appropriate mitigation measures need to be enforced so as not to compromise on the conservation objectives of the buffer.
8. Convergence of ongoing district level schemes is important to provide ecologically sustainable livelihood options for local people. This would reduce their dependency on forest resources while eliciting the much needed public support. A sizeable portion of tourism gate receipts should be recycled and earmarked to Eco development committees for village specific interventions as per the participatory micro plan, with reciprocal commitments to protect wildlife and their habitat on quid-pro-quo basis.

SCOPE OF MANAGERIAL INTERVENTIONS

(i) Providing ecologically sustainable livelihood options to local people in collaboration with various sectors/organizations.

(ii) Incentivizing local people for protecting forests and wildlife (PES, Ecotourism).

(iii) Ensuring retrofitting measures in sectors of development with reciprocal commitments.

(iv) Ensuring active management in areas where tiger / Co predators / wild ungulates co-occur with people to minimize human-wildlife interface conflicts.

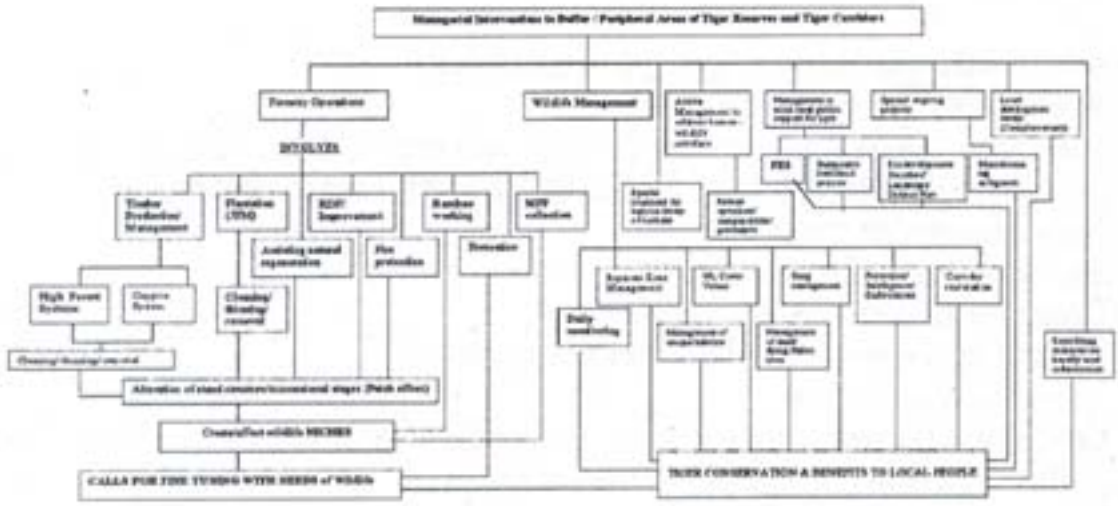
(v) Ensuring monitoring of tiger / wildlife on a periodic basis in standardized manner, amenable to scientific inference.

(vi) Ensuring surveillance and protection of tiger and wildlife.

(vii) Building up the capacity of field staff and local people as a part of an adaptive management to ensure effective implementation.

(viii) In case the buffer comprises of protected area then managerial interventions should be inconformity with the provisions of the Wildlife (Protection) Act, 1972.

Summary Chart of Managerial Interventions



DATA COLLECTION / ANALYSIS

1. Obtain remote sensing data of forest cover (FSI, 23 m resolution) in GIS domain for the core area.
2. Incorporate layers in the GIS : administrative boundaries, topographical features, elevation, protection infrastructure (patrolling camps), rivers, water bodies (natural / man-made), grass meadows, location of villages, agriculture fields, cash crops, dry nallahs, irrigation canals, roads, rail track, tourism infrastructure, location of industry / hydro power project / mine if any, besides distribution of wild animals.
3. In case of villages / agriculture field / cash crop / industrial infrastructure, use google map (1 m resolution) to get the details, especially with respect to the forest edges.
4. Use the Phase-I data of 2010country level tiger assessment for obtaining beat level average data (cover below canopy) on shrubs, weed and ground cover (as average percentage for the beat), while indicating the same on respective beats in the GIS (source — WIT).
5. Develop a range for the average beat level cover values (as at Sl. No. 3) for highlighting beats falling within a similar value range with a colour code.
6. Use Phase-IV data to indicate tiger presence relative abundance at beat level.
7. Conduct regeneration surveys of important MFP species in the core area for using as reference data.
8. Conduct regeneration surveys of important MFP species in the buffer area and indicate their beat level status.
9. Obtain a relationship between canopy class interval and mean wild ungulate density (in various forest types as relevant) in the core/critical tiger habitat for using as a reference data.
10. Appraisal of ongoing working plan prescriptions.

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APPRAISAL

1. Macro level (larger spatial scale)
   - Appraisal for interventions at a larger spatial scale
     - —Buffer area vis-à-vis the core size
     - —Intensity (need to progressively increase from the source area boundary) of managerial effects across the buffer and corridor
     - —Natural species composition
     - —Age structure of forest stands
     - —Presence of old stands / trees
     - —Spatial heterogeneity (different patch sizes)
     - —Edges and ecotones
     - —Corridors (forest / non-forest cultivation giving cover/ nallah beds/ gulleys/ ravines/ culverts/ bridle paths)
     - —Riparian zones
     - —Unique habitats
     - —Human settlements (villages/hamlets/rural towns, private estates, agriculture lands, tourism infrastructure, varied land uses, special projects, temples, rail/road infrastructure, mining, horticulture, thermal power plant, industries etc.)
     - —Proximity / adjacency ratings between various non-forest covers and forest areas (as relevant – eg. sugarcane cultivation to forest, villages, nallah bed etc. for computing juxtaposition / interspersion indices using GIS)
2. Micro level (finer spatial scale appraisal)
   - Appraisal for interventions at a finer spatial scale
     - —Ongoing forestry practices like selection / coppice system, plantation / JFM / bamboo working, collection of MFP
     - —Appraisal of large gaps if any
     - —Proximity of raised plantations to agricultural field
     - —Ongoing bamboo working vis-à-vis tiger presence
     - —Ongoing thinnings and ungulate presence (wild / livestock)
     - —Presence of seed bearers / old coppice growths
   - Species diversity (monoculture or otherwise)
   - Edge effect (inherent : natural openings / frost holes close to forest) (induced : presence of cover crops / young plantations close to forest)
   - Status of corridors (whether choked with infrastructure / settlements or free of them)
   - Human settlements, agriculture fields and their impact (beats / areas with rights and concessions)
   - Tourism infrastructure (location with respect to natural corridor)
   - Impact of varied land uses and projects (location of projects / infrastructure and their proximity to core area)

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FINE TUNING / MITIGATION STRATEGIES FOR VARIOUS SECTORS IN THE BUFFER

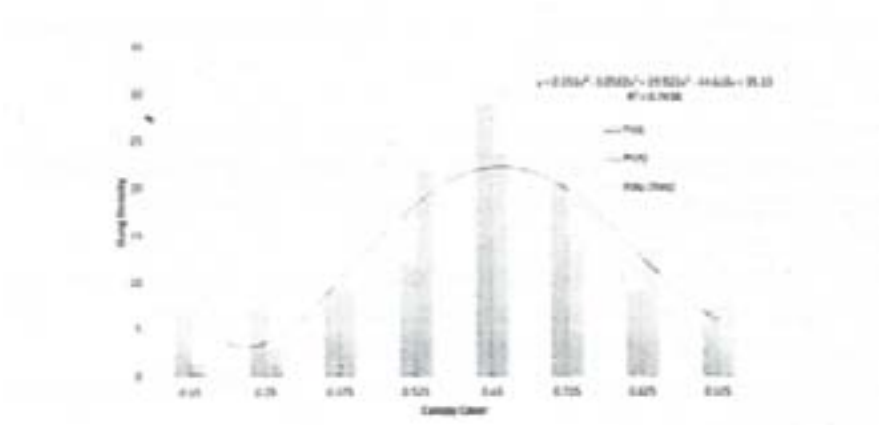
1. Forestry
   - Ecosystem management required
   - Ecological availability of a tree should be ascertained before removal
   - A tree should be considered ecologically available if
     (a) Its removal does not create a gap beyond 43 to 45%.
     (b) The regeneration of species at various formation levels within a radial distance of twice the crown radius of the tree being selected for felling should have an 'established' status.

Tree fellings/Thinnings

- No clear felling and other silviculture systems promoting concentrated regeneration
- No conversion to uniform forests
- A high forest system with diffused regeneration should be preferred
- Status of regeneration should be an over arching consideration to permit felling
- Areas having considerable disturbance should not be felled

Tree fellings/Thinnings
Canopy Class and Wild Dung Presence

Mid-Value	*Wild dung*	*SE*	*Freq.*
0.15	10.52	0.79	6
0.25	11.68	0.71	7
0.375	15.46	1.08	9
0.525	19.56	2.75	12
0.65	47.86	19.30	29
0.725	33.92	14.03	20
0.825	15.22	7.21	9
0.925	11.72		7



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- After due consideration to regeneration/status, the relationship between canopy class and wild ungulate dung presence should be used as a guide to prescribe the stem removal
- Buffer / corridor areas should be managed for wild ungulates at a level which is 30% lower than the optimal levels in core areas
- In general, the relationship between mean ungulate density and canopy class intervals in a sal / tree dominated forests, with polynomial curve fitting shows that the 80% lower bound corresponds to a canopy cover of 43% (computed for sal forests of Central India; similar relationships need to be developed for other forest types to facilitate inference)
- Thus, for sal forests of Central India, the timber harvest in the buffer/corridor area may be permitted in a selective manner so that the canopy cover does not fall below 43% during winter months. This strategy will minimize tiger-human conflict while permitting selective extraction of timber species
- More openings will permit more light while fostering more regeneration thereby attracting wild ungulates and tigers
- The idea behind buffer/corridor management is to sustain it for gene flow, while not elevating its status to that of core area in terms of wildlife abundance

Collection of NTFP

- NTFP collection should not be permitted in areas with maximum disturbance and unestablished regeneration status, as this would adversely affect the demography of such species.
- The regeneration status of NTFP species in the buffer / corridor area should be compared with its status in the core / critical habitat.
- Collection should not be permitted in areas having endangered arboreal fauna.
- No lopping / felling should be permitted during NTFP collection.
- Collection should not disturb 'canopy bridges' in an area.
- The timings for NTFP collection should be regulated while avoiding early morning or late evening.
- The patterns of NTFP collection should be studied for prescribing ecologically permissible collection.
- The quantum of NTFP collected in an area should be regulated, considering its consumption by wild animals.
- An estimation of the availability of NTFP (fruit / tuber / leaf) should be done (example: for total fruit crop estimation, considering several categories of branches and the number of fruits per branch etc.).
- Fire should not be used to promote new flush of leaves (usually done for Tendu), as this would lead to forest fire.
- Fruit removal affects frugivory, hence fruit tree should be fostered.
- The density of NTFP species in the buffer / corridor area should be compared with their densities in the core / critical tiger habitat. In low density areas such NTFP species should not be permitted for extraction.

  A chart depicting NTFPs collected in various areas within the division over months during a year should be prepared for close monitoring.

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Different parts of a tree / plant / shrub / herb are harvested as NTFP and many of them are valuable as medicinal plants. To avoid over exploitation, it is important to prescribe site specific indicators for their ecologically sustainable management, vis-à-vis the regeneration status.

- The nursery techniques of NTFP species (especially those having medicinal value) should be fostered through the community linked to incentives for growing subspecies.
- Regulation through PES (Payment for Ecosystem Services)

Collection of NTFP

Indicators to avoid over exploitation of NTFP

NTPF Particulars Harvested	*Indicators*
Fuelwood	• Regeneration status • Intensity of girdling/cutting of young trees (number of stumps per unit area) • Change in the rate of extraction • Quantum of dead/fallen twig branches on forest floor
Leaves	• Reduction in canopy cover • Reduction in leaf litter • Regeneration status • Weed invasion • Change in species composition
Fruit/flower/seed.	• Regeneration status • Annual productivity per sample tree vis-à-vis the productivity in core/critical tiger habitat • Method of harvesting Season of harvesting vis-à-vis requirements of wild animals (fruit/flower/seeds act as 'qualifiers' in a habitat, and their total harvesting would reduce such welfare factors)
Bark	• Girdling • Tree mortality • Regeneration status • Number of dead stems per unit area
Rhizome	• Regeneration status

Fuel / Fodder Collection

(a) Grazing should be regulated in a rotational manner, and prophylactic immunization should be done for village livestock.

(b) Since the unrecorded removal from forest exceeds the recorded removal in many States, fuel / fodder collection should not be permitted in disturbed areas or compartments with poor regeneration status. Such areas should be prescribed a 'recovery' period before reopening them for fuel / fodder collection.

(c) A 'safe lopping index', based on site specific studies should be prescribed for fodder removal on a rotational basis.

2. Wildlife management
   - Buffer / corridor areas require a 'coarse filter' approach for maintaining a variety of plant / animal species
   - Day to day monitoring
   - Habitat amelioration (compensatory nature)
   - Fostering indigenous fodder / fruit species
   - Maintaining existing water points
   - No drastic habitat interventions
   - Cropping pattern / harvesting to factor in cover values
   - Inherent / induced diversity indices need to be computed for maintaining the edges (without enhancing them)
   - Human-wildlife interface issues to be addressed
   - Treatment for riparian zones / unique features
   - Retention of dead trees, snags
   - Restoration / protection of existing corridors
3. Ecodevelopment / PES / Sustainable livelihood / District level local development

   a) Village level micro planning for benefits to local people on a quid-pro-quo basis (involving VFC/EDC)

   b) Innovative use of JFM / REDD+/ PES / recycling of tourism gate receipts to Ecodevelopment Committees

   c) Benefits from district level developmental works (convergence), interalia, covering
      (i) public health and family welfare
      (ii) food and nutrition security
      (iii) education
      (iv) natural resource management and water security
      (v) sanitation
      (vi) roads
      (vii) energy
      (viii) housing, and
      (ix) livelihoods
4. Mitigation strategy for mining
   - Mitigation strategy for mining should have two components :
     (i) improved / green technology and minimum ancillary development causing minimum habitat loss
     (ii) site specific mitigation measures for tiger and other wild animals, inputs for providing ecologically sustainable livelihood options to locals, besides offsite 'offsets' to achieve more tiger conservation
     - Mitigation measures for exploratory phase

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- Mitigation measures for construction / mining phases
- Site specific mitigation measures for tiger / wild animals, while providing sustainable livelihood options (this should include onsite modification of the mined area to its original form and restoration of topsoil with indigenous ground cover or through creation of water body / wetland)
- Offsite compensatory inputs in similar habitats within P2 or P1 areas to strengthen tiger conservation
- Providing livelihood options to local people within the zone of influence

5. Mitigation strategy for dams and hydro power sectors

The impacts include:

— First order impacts (barrier effects, effects on water quality, water quantity, flow regime and sediment load)

— Second order impacts (impact on terrestrial environment affecting primary production-planktons, aquatic flora), morphology (channel form, substrate composition)

— Third order impacts (impact on terrestrial environment affecting invertebrates, fish, birds and mammals)

- Mitigation measures are required to address impacts due to dams construction as well as its operation
- The mitigation plan should include onsite as well as offsite initiatives based on best global practices
- Retention of dead trees in submergence areas as 'snags' for water birds and aquatic fauna
- Prohibiting the reduction of river flow to 'zero' or 'critical' levels which would have a deleterious affect on local flora and fauna especially aquatic species permitting migration across dams through mitigation e.g. fish ladder etc.
- Mimicking the water release to the natural flooding regime
- Ensuring control of aquatic weeds and disease factors
- Safeguarding downriver flood protection
- Safeguarding against water pollution
- Appropriate fish management measures to benefit local communities through the tiger reserve management. Illegal fishing is a problem in tiger reserves like Pench and Satpura
- Site specific watershed management to safeguard against sedimentation
- Prescribing timings for use of access roads, and regulation on the maintenance infrastructure and retaining it to the minimum
- Prohibiting new, associated developmental projects in the core / critical tiger habitat
- Contributing resource support to the core / critical tiger habitat management as a 'compensatory' measure for loss of natural habitat
- Evolving and implementing a SOP, in collaboration with the tiger reserve management for rescuing wild animals from drowning

- Annual monitoring of the spatial use pattern of wild animals in the area, which should also include monitoring the development of related infrastructure
- Periodic monitoring of water quality and river ecosystem recovery
- Fostering re-vegetation of the construction site with indigenous species

6. Mitigation strategy for linear infrastructure and other projects (roads/highways/railways lines/power transmission lines/ irrigation canals/ open mills / wind mills)
   - Roads/highways: creation of overpasses / underpasses, speed regulation, closure to traffic
   - Railway lines: SOP for information exchange through wireless, speed regulation, barricades, underpasses,
   - Power transmission lines : insulation, surveillance, MOU with electricity boards, special patrolling, under ground cabling, adequate height,
   - Irrigation canals : covering, crossing for animals movement
   - Open wells: covering, closure of abandoned wells
   - Wind mills: both offsite and onsite measures are required to prevent turbine collisions with avifauna.
7. Tourism
   (Strict adherence to NTCA guidelines, while depicting the tourism areas on a map)

PREPARATION OF ZONE PLANS AND THEME PLANS

1. Based on generic principles for buffer, data appraisal (at macro and micro spatial levels) and prior knowledge, propose appropriate zoning for management in the form of Zone Plans, besides overlapping Theme Plans. It should be borne in mind that the management of buffer should foster the co-occurrence agenda (involving wild animals and people) without fostering productivity for wildlife abundance to avoid human-wildlife conflicts.
2. A smaller core area would require more focus and active management of the buffer whereas a larger core area with a patchy buffer would necessitate focus on dispersing wild animals.
3. The planning and management of buffer should be done by the Field Directors who should ensure desired sectoral integration in collaboration with DM / District Collector and other line departments.
4. In case, the tiger reserve has a Foundation with capacity for implementation, the ecodevelopment aspects should be preferably entrusted to such Foundation on a mission mode.
5. The buffer plan of the TCP should be considered as part of a larger master plan for the tiger landscape and should serve as a role model.
6. Example of a buffer plan forming part of TCP:
   Zone Plan for Forestry
   Zone Plan for Wildlife Management
   Zone Plan for Eliciting Local Public Support (Ecodevelopment / Sectoral Integration / PES)
   Zone Plan for Retrofitting Measures
   Zone Plan for Water Shed and Soil Conservation

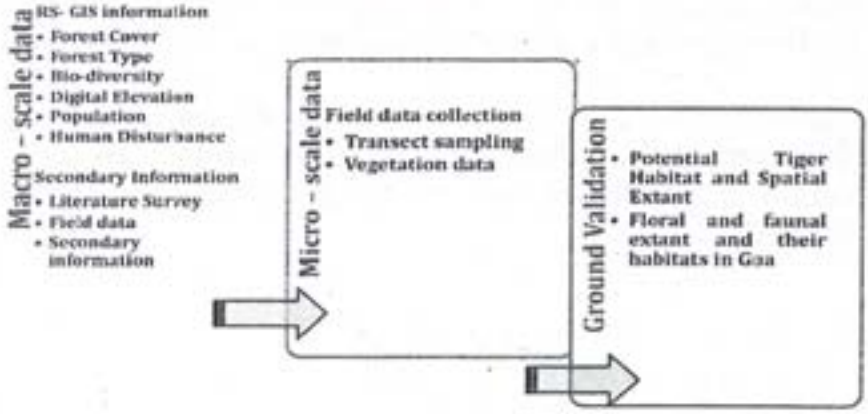
Zone Plan for Ecotourism
Theme Plan for Protection
Theme Plan for Fire Protection
Theme Plan for Addressing Human-Wildlife Conflicts
Theme Plan for Tiger / Wildlife Monitoring
Theme Plan for Fostering Awareness in Local Communities
Theme Plan for GIS based Time Series Monitoring of Land Use Change
Theme Plan for Monitoring Permitted Activities in the Ecologically Sensitive Area within the Buffer

PART-C
FOR THE CORRIDOR

The general principles of management, data collection/ analysis, macro / micro appraisal, fine tuning / mitigation strategies for various sectors would be similar to those indicated for buffer. However, the following things are important:

1. Macro level delineation as per 2010 country level tiger assessment (source : NTCA / WII)
2. Micro level ground truthing using transects for spatial presence / abundance of flora / fauna
3. Comparison of wild animal species distribution with reference to a nearest protected area (tiger reserve in the landscape)
4. Profiling of micro water sheds (if relevant)
5. Taking note of natural water courses, unique topographical features
6. For tiger bearing forests, half MMDM (MMDM 2.75 to 5.3 km) or average home range radius (3.05 km) may be taken as the width of the corridor on either side.
7. Identify the bottlenecks and areas where the corridor has been disrupted. Suggest appropriate mitigation strategy in terms of restorative management or policy that may be required to make /keep the corridor functional (eg. avoidance / protection / planting with indigenous species on community land / assisting natural regeneration in degraded forest / gap planting with indigenous species in forest areas).

DATA COLLECTION/GROUND TRUTHING/ANALYSIS
Schematic diagram of approach to data analysis



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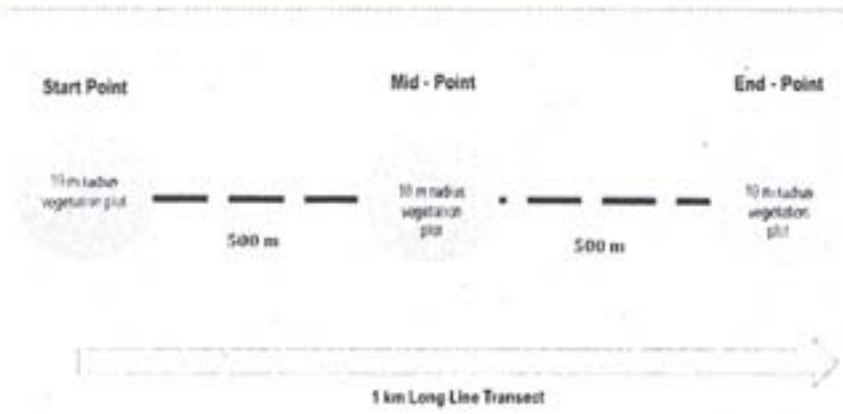
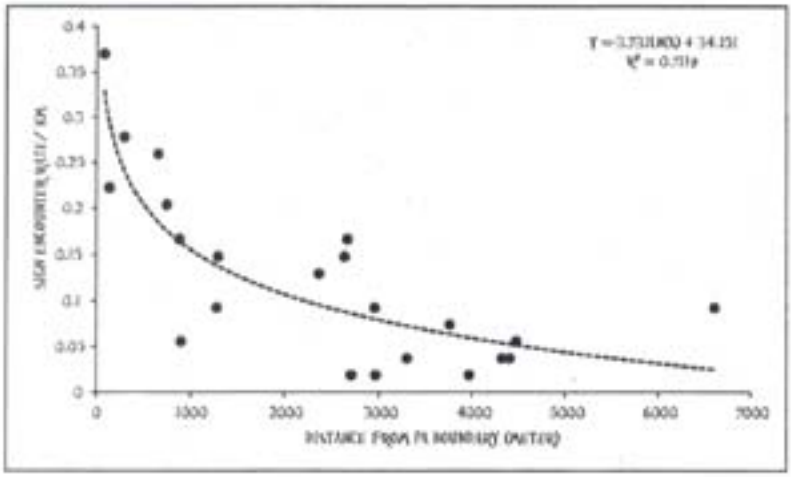
Transect sampling and vegetation plot sampling scheme (suggestive)



Sign Encounter Rate of animals with respect to increasing distance from PA



- The restorative plan for the corridor should be prepared and implemented by respective forest officers in-charge of such areas, who should ensure desired sectoral integration in collaboration with respective DM / District Collector and other line departments.
- In case, a nearby tiger reserve has a Foundation with capacity for implementation, the eco-development aspects should be preferably entrusted to such Foundation on a mission mode.
- The buffer plan of the TCP should be considered as part of a larger master plan for the tiger landscape and should serve as a role model.
- The entire buffer of a tiger reserve should form part of an ecologically sensitive area, as required to be notified under the EPA. In case, any notification of EPA has already been done, a map indicating the same should be appended.

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भारत सरकार
Government of India
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest and Climate Change
राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण
National Tiger Conservation Authority

F. No. 1-14/ 2011-NTCA (part-II) **New Delhi, the March 12, 2019**

To,

The Chief Wildlife Warden(s)
Govt. of Madhya Pradesh, Assam, Chhattisgarh, Maharashtra, Uttarakhand,
Uttar Pradesh & Arunachal Pradesh

Sub: Submission of Tiger Conservation Plan of Tiger Reserves– reg.

Sir,

You are aware that the **Tiger Conservation Plan (TCP)** is mandatory Management document as per the provisions of the Wildlife (Protection) Act, 1972 as amended in 2006. As per section 38(V) (3) (a), The State Governments are required to prepare a ***Tiger Conservation Plan including staff development and deployment plan for the proper management of each area referred to in sub-section (1), so as to ensure; protection of tiger reserve and providing site specific habitat inputs for a viable population of tigers, co-predators and prey animals without distorting the natural prey-predator ecological cycle in the habitat.***

The Act further envisages ecologically compatible land uses in the tiger reserves and areas linking one protected area or tiger reserve with another for addressing the livelihood concern of local people, so as to provide dispersal habitats and corridor for spill over population of wild animals from the designated core areas of tiger reserves or from tiger breeding habitats within other protected areas;

The National Tiger Conservation Authority is mandated to accord approval to tiger conservation plan under section 38 (O) of the said Act. Tripartite agreement has also been signed with State Government and Tiger Reserve while stating compliance of normative guidelines issued by this Authority.

As per the status of TCPs from the various states are pending as below:

1. **Madhya Pradesh**-Panna Tiger Reserve and Bandhavgarh Tiger Reserve
2. **Assam**-Kaziranga Tiger reserve and Orang Tiger Reserve
3. **Chhattisgarh**-Indravati Tiger Reserve
4. **Maharashtra**-Nawegaon- Nagzira Tiger Reserve
5. **Utter Pradesh-**Pilibhit Tiger Reserve
6. **Uttrakhand-**Rajaji Tiger Reserve
7. **Arunachal Pradesh-** Kamlang Tiger Reserve

It is also pertinent to mention here that in case of ***Ajay Dubey v. National Tiger Conservation Auth. And Ors, SLP (Civil) No(s). 21339/2011, LAWS(SC)-2012-10-104, Decided on October 16,2012*** Hon'ble Supreme Court has also directed that the respective State Governments will prepare within six month from today and submit the same the National Tiger Authority for approval in accordance with section 38(O)(1)(a) of the Act.

In this context I am directed to request you to send composite plans of aforesaid Tiger Reserves to this Authority as early as possible to ensure further central assistance under Project Tiger from next financial year i.e. 2019-20, as this is statutory requirement

Yours Sincerely,

Sd/-
(Surender Mehra)
Deputy Inspector General of Forests (NTCA)
Email: dig1-ntca@nic.in
Tel. (EPABX): + 91 11 24367837-39
FAX: +91 11 24367836

Copy to:

1. Field Director(s), Panna, Bandhavgarh, Kaziranga, Orang, Indravati, Nawegaon-Nagzira, Pilibhit, Rajaji & Kamlang Tiger Reserves.
2. PS to ADG (PT) & MS (NTCA).

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F.No.13-1/2013-NTCA (Vol. IV)

Government of India
Ministry of Environment, Forest & Climate Change
National Tiger Conservation Authority

B-I Wing, 7th Floor,
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CGO Complex, Lodhi Road, New Delhi — 110003
Email: aig3-ntca@nic.in
Tel. (EPABX): + 91 11 24364837-42
FAX: +91 11 24367836

New Delhi, the March 20, 2019

To,

The Chief Wildlife Warden (s)
All Tiger Range States

Sub: Financial assistance to areas outside tiger reserves.
Ref.: This Authority letter of even no. Dated February 28, 2018 (enclosed)

Sir,

Reference is invited to the subject and letter cited above. In this context, I am directed to request you to kindly use your good offices to secure coordination between the tiger reserves through which financial assistance is being provided to tiger bearing forests outside tiger reserves, with the territorial Circles/Divisions under whom the areas fall to ensure effective implementation as well as monitoring of the sanctioned items of work.

Yours Faithfully,
Sd/-
(Dr. Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

F.No.13-1/2013-NTCA (Vol. IV)
Copy to:

1. All Regional Offices (NTCA), Guwahati, Bengaluru and Nagpur
2. Field Director(s) all Tiger Reserves.

Sd/-
(Dr. Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

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F. No. 15-31/2012-NTCA
Government of India
Ministry of Environment, Forest & Climate Change
National Tiger Conservation Authority

B-I Wing, 7th Floor,
Pt. Deendayal Antyodaya Bhawan,
CCO Complex, lodhi Road,
New Delhi - 110003
Email: aig3-ntca@nic.in
Tel: (EPABX): + 91 11 24364837-42
FAX: +91 11 24367836

Dated 28.02.2018

To,

The Chief Wildlife Warden(s),
All Tiger Range States

Sub: Financial assistance for tiger conservation in tiger bearing forests outside tiger reserves under the ongoing Centrally Sponsored Scheme of Project Tiger (CSS-PT)

Sir,

Reference is invited to the subject cited above. In this context, I am directed to say that Part A, Chapter 1, Serial no. 7.1, of the National Tiger Conservation Authority (Normative Standards for Tourism activities and Project Tiger) Guidelines, 2012, provide for consolidating and strengthening the "source" population of tiger and its prey in tiger reserves , **protected areas and tiger bearing forests**. In addition, S. no. 10.10 of the said Chapter provides for mainstreaming wildlife concerns in tiger bearing forests and fostering corridor conservation through restorative strategy involving locals.

In order to address this, Part A, Chapter H of the said guidelines outline the details of Project Tiger wherein, S. No. 16.10 elaborates on the activities which are required to be taken up in such areas to ensure tiger conservation takes place, as follows:

(i) Redressing man-animal conflict
(ii) Capturing problematic and aberrant wild animals
(iii) Monitoring of wild animals
(iv) Anti-poaching operations
(v) Habitat improvement measures

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It has been decided that, from the Financial year 2018-19 onwards, the above activities shall be funded in territorial divisions/PAs adjoining tiger reserves, which harbor tigers, through the Annual Plan of Operations of the adjoining/nearest tiger reserve.

It is therefore, kindly requested to factor in the aforesaid activities in the APO of tiger reserve concerned for financial assistance under the CSS-PT and submit tentative requirement by **15.3.18.**

Final discretion shall rest with this Authority, as per latest available findings of the All India Tiger Estimation.

Yours Faithfully,
Sd/-
(Dr. Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

Copy to:

1. The Principal Chief Conservator of Forests and Head of Forest Force, All Tiger Range States
2. The Addl. Chief Secretary/Principal Secretary Forests, All Tiger Range States
3. All Regional Offices, NTCA
4. All Field Director(s)
5. PPS to Secretary, EF & CC
6. PPS to DC& & SS, MOEF & CC
7. PPS to ADG (WL), MoEF & CC

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GUIDELINES FOR TOURISM IN AND AROUND TIGER RESERVES

(Issued by National Tiger Conservation Authority in Part Bof the National Tiger Conservation Authority (Normative Standards for Tourism activities and Project Tiger) Guidelines, 2012 under section 38(O)(1)(c) of the Wild Life (Protection) Act,1972 vide F.No. 15-31/2012-NTCA dated 15th October 2012)

Also published in the Gazette of India, Extraordinary, Part-III, Section 4, No. 244 on November 8, 2012.

PREAMBLE

Whereas, healthy natural ecosystems are critical to the ecological well-being of all living entities, and especially for the economic security of people. Tourism in the form of ecotourism has the potential to enhance public awareness, education, and wildlife conservation, while providing nature-compatible local livelihoods and greater incomes for a large number of people living around natural ecosystem which can help to contribute directly to the protection of wildlife or forest areas, while making the local community stakeholders and owners in the process.

Whereas, the Central Government considers it necessary to lay down a framework Guidelines on the selection, planning, development, implementation and monitoring of tourism in tiger reserves of the country with a view to recognise that tiger reserves and their landscapes are diverse, specific State Tourism and Ecotourism Strategies to be developed by the concerned State Governments and Tourism and Ecotourism Plans to be developed by the concerned Authorities.

These Guidelines are framed under section 38-O (c) of the Wild Life (Protection) Act, 1972, (WLPA), the provisions of the Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights) Act, 2006, (FRA), Panchayat (Extension to Scheduled Areas) Act, 1996, (PESA) and Part IX of the Constitution of India, besides other laws in force. These Guidelines are in consonance with the Guidelines of the Centrally Sponsored Scheme of Project Tiger.

1. THE NEED FOR GUIDELINES.

1.1 The objective of these Guidelines is to move from wildlife tourism to ecotourism which is defined as 'responsible travel to natural areas that conserves the environment and improves the well-being of local people'. Given the conditions in India, it is proposed that ecotourism includes tourism that is community based and community driven. The aim should be to move towards a system of tourism around tiger reserves which is primarily community based tourism. Such tourism should be low-impact, educational and conserve the ecology and environment, while directly benefiting the economic wellbeing of local communities.

1.2 The primary objective of tiger reserves is to conserve tiger source populations that also act as an umbrella for biodiversity conservation. These areas provide a whole host of ecosystem services and opportunities for tourism.

1.3 Unplanned and unregulated tourism in such landscapes can destroy the very environment that attracts such tourism in the first place. Hence, there is a need to move towards a model of tourism that is responsible and compatible with these fragile landscapes.

1.4 Tourism, when practiced appropriately, is an important economic and educational activity. It has the scope to link to a wider constituency and build conservation support while raising awareness

about the worth and fragility of such ecosystems in the public at large. It also promotes the non-consumptive use of wilderness areas, for the benefit of local communities living around and dependent on these fragile landscapes.

1.5 In the absence of proper planning and regulation, there has been a mushrooming of tourist facilities in recent years around tiger reserves which has led to the exploitation, degradation, disturbance and misuse of fragile ecosystems. It has also led to misuse of the term 'ecotourism', often to the detriment of the ecosystems and towards further alienation of local people and communities.

1.6 These Guidelines are applicable to areas in and around tiger reserves.

1.7 PRINCIPLES OF TOURISM IN AND AROUND TIGER RESERVES.

The persons who implement and participate in tourism activities shall, *inter alia,* practice the following principles, namely:—

(a) adopt low-impact wildlife tourism which protects ecological integrity of forest and wildlife areas, secure wildlife values of the destination and its surrounding areas;

(b) engage with Gram Sabhas as defined in the Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights), Act 2006 (FRA) and Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA) to facilitate decision making;

(c) ensure free participation and prior informed consent of Gram Sabhas and all other stake holders;

(d) develop mechanisms to generate revenues from wildlife tourism for the welfare and economic up-liftment of local communities;

(e) highlight the biodiversity richness, their values and their ecological services to people;

(f) highlight the heritage value of India's wilderness and tiger reserves;

(g) build environmental, cultural awareness and respect;

(h) facilitate the sustainability of tourism enterprises and activities;

(i) provide livelihood opportunities to local communities;

(j) promote sustainable use of indigenous materials for tourism activities;

(k) promote processes for forest dwellers to control and maintain their resources, culture and rights so as to minimize negative impacts.

2. GUIDELINES FOR DEVELOPING STATE TOURISM STRATEGY FOR TIGER RESERVES.

2.1 The following paragraphs provide the broad framework for each stakeholder.

2.2 Synergy and collaboration amongst the Central Government, and relevant State Government Departments, forest dwellers, local communities and civil society institutions are vital for ensuring successful implementation of the Guidelines.

2.1. **State Governments.**

2.1.1. The State-level Tourism and Ecotourism Strategy for Tiger Reserves shall be in tune with these guidelines. Ecologically sensitive land use policies related to tourism shall be specified by the State Government for the landscape surrounding tiger reserves. Adequate provisions shall be made to ensure that ecotourism does not get relegated to purely high-end, exclusive tourism, leaving out local communities. Relevant modifications in State rules and regulations should be carried out in order to ensure adherence to these standards by tourism

developers and operators. All States Governments shall notify the State- level Tourism and Ecotourism Strategy within one year from the date of notification of these Guidelines.

2.1.2 The State Governments shall endeavour to develop a State-level policy to favour ecotourism in place of wildlife tourism as a comprehensive plan to ensure that the primary objective of tiger conservation is not compromised and inter alia, include:

(i) maintaining integrity and connectivity of tiger reserves;
(ii) local community rights, participation and benefit-sharing;
(iii) sound environmental design and sustainable use of indigenous materials;
(iv) conservation education and training;
(v) adequate machinery for monitoring and evaluation of the impact of ecotourism activities on wildlife conservation and local communities;
(vi) capacity building of local communities in planning, providing and managing ecotourism facilities;
(vii) development of appropriate land use and water management planning and regulation for maintaining the ecological integrity of landscape in and around tiger reserves.

2.1.3. No new tourist infrastructure shall to be set up within the core or critical tiger habitat of tiger reserves, in violation of the provisions of the Wild Life (Protection) Act, 1972, and the directives of the Honorable Supreme Court.

2.1.4 The State Level Steering Committee under section 38U of the Wild Life (Protection) Act, 1972 shall review the implementation of the State-level Tourism and Ecotourism Strategy in Tiger Reserves.

2.1.5. The State Governments shall develop a system to ensure that gate receipts from tiger reserves are utilised by their management for specific conservation purposes and shall not to go as revenue to the State Exchequer. This will ensure that resources generated from tourism can be earmarked for protection, conservation and local livelihood development, tackling human-wild animal conflict and welfare measures of field staff.

2.1.6. Since the tourism industry in and around tiger reserves is sustained primarily from the non-consumptive use of wildlife resources and the local communities are the ones that bear the brunt of conservation, the State Governments may charge a conservation fee from the tourism industry for eco- development and local community upliftment works. The conservation fee shall be decided on the number of beds in a facility, the duration of operation of the facility (seasonal or year round) and on a luxury classification system such as home stay (fee for which will not be charged up to a 6 bed facility), to high end (which will have the maximum quantum of the fee). The suggested fee structure may range between Rs. 500 to Rs. 3000 per room per month. The rate of conservation fee and tourist facility strata shall be determined by the State Government, and the fund thus collected shall be earmarked to address local

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livelihood development, human-wildlife conflict management and conservation through ecodevelopment and not go to the State Exchequer as specified in 2.1.5 above.

2.1.7, The fund shall be administered by the Tiger Conservation Foundations with the Tourism Industry having a say in how and where this fund is to be utilized, and mechanisms for which need to be worked out at specific tiger reserves. The fund shall be used for all the villages located within or adjacent to the tiger reserves. Every State Government shall notify the rate of local conservation fee within a year from the date of notification of these Guidelines. The rate of fee shall be revised periodically taking into consideration the cost of operation. The rationale for a local conservation fee should be clearly explained to the public at large, through clear signages at local tourist facilities. The State Government shall put in place a transparent mechanism for utilisation of these funds involving the tiger reserve management through the Tiger Conservation Foundations and Gram Sabhas.

2.1.8. A Local Advisory Committee (hereinafter referred to as LAC) shall be constituted for each tiger reserve by the State Government. The LAC shall have the following functions, namely:

(a) to review the tourism strategy with respect to the tiger reserve and make recommendations to the State Government;
(b) to ensure computation of reserve specific carrying capacity and its implementation through periodic reviews;
(c) to ensure site specific norms on buildings, and infrastructures in areas inside and close to tiger reserves, keeping in view the corridor value and ecological aesthetics;
(d) to advise local self Government and State Government on issues relating to development of tourism in and around tiger reserves;
(e) monitor regularly (at least half yearly) all tourist facilities in and around tiger reserves vis-à-vis environmental clearance, area of coverage, ownership, type of construction, number of employees, etc., for suggesting mitigation and retrofitting measures if needed;
(f) monitor regularly activities of tour operators to ensure that they do not cause disturbance to animals while taking visitors into the tiger reserves;

2.1.9. Local Advisory Committee shall consist of:

(a) Divisional Commissioner or an officer of equivalent rank to be nominated by the State Government – Chairperson;
(b) Member/s of the State Legislature representing the area comprising of the concerned tiger reserve;
(c) District Collector/s
(d) Tiger Reserve Field Director (Member Secretary) Local
(e) Territorial Divisional Forests Officers
(f) Honorary Wildlife Warden (if present)
(g) Official of State Tourism Department

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(h) Official of the State Tribal Department

(i) one Block Development Officer or Sub Divisional Magistrate to be nominated by the State Government

(j) two Members of Local Panchayats to be nominated by the State Government

(k) one Wildlife scientist to be nominated by the State Government

(l) one Social scientist to be nominated by the State Government

(m) one representative of the tourism sector to be nominated by the State Government

(n) two local conservationists to be nominated by the State Government

(o) two representative from a local, registered Civil Society Institution to be nominated by the State Government

(p) Provided that the Gram Sabhas and in case of North Eastern States, the traditional village councils shall be recognized as equivalent to Panchayat Members, wherever such councils exist.

2.1.10 For tourism in a tiger reserve, the Tiger Conservation Foundation shall be the overseeing authority.

2.1.11 Terms of reference and tenure of the Local Advisory Committees shall be determined by the State Government.

2.2. Tiger Reserve Management in the context of tourism.

2.2.1 The Chief Wildlife Warden of the State shall ensure that each tiger reserve prepares a tourism plan, as part of the Tiger Conservation Plan vis-à-vis the technical Guidelines of the National Tiger Conservation Authority. The plan shall inter alia, include identification of corridor connectivity and important wildlife habitats and mechanisms to secure them. This site-specific tourism plan forming part of the Tiger Conservation Plan shall be approved as per the provisions of the Wild Life (Protection) Act, 1972. Prior to this approval, no new infrastructure for tourism (except for minor alterations in existing modest home stays) shall be allowed to be developed in and around tiger reserves.

2.2.2 The tourism plan shall, inter alia, include a monitoring mechanism, estimated carrying capacity (a suggested model mechanism to calculate carrying capacity, is provided in Annexure-I and Annexure-II, which may be modified on a site specific basis), tourism zones and demarcation of the area open to tourism on the basis of objective and scientific criteria.

2.2.3 The tourism plan should be consistent with the State Tourism and Ecotourism Strategy and shall also be approved by the LAC and the State Government.

2.2.4 The plan shall:

(i) identify (using landscape ecological principles and tools) and monitor the ecologically sensitive areas surrounding tiger reserves, in order to ensure the ecological integrity of corridor and buffer areas, and prevent corridor encroachment;

(ii) assess carrying capacity of the tiger reserve, at three levels: physical, real and effective and permissible carrying capacity of visitors and vehicles as well as residential facilities in and around the tiger reserve (in accordance with Annexure-I, Annexure-II). On the lines of the illustrative calculation provided for vehicular tourist visitation, carrying

capacity needs to be computed on a site specific basis for tourist visitation involving elephant, boat and foot travel. Explore the possibility of technological tools (Global Positioning System, wireless, etc.) to manage traffic and spacing of tourist vehicles within tiger reserves;

(iii) set a ceiling level on number of visitors allowed to enter a tiger reserve at any given time, based on the carrying capacity of the habitat;

(iv) indicate the area open to tourism in the reserves to be designated as 'eco-tourism zone';

(v) ensure visitor entry into tiger reserves through vehicles registered with the tiger reserve management, accompanied by authorised guide;

(vi) develop a participatory community-based tourism strategy, in collaboration with local communities, to ensure long-term local- community benefit-sharing, and promotion of activities run by local communities.

(vii) develop codes and standards for privately-operated tourist facilities located in the vicinity of core or critical tiger habitats, eco-sensitive zones or buffer areas, with a view to, inter alia, ensure benefit and income to local communities;

(viii) develop monitoring mechanisms to assess impact of tourism activities on the wildlife and its habitat so as to minimize them;

(ix) develop generic guidelines for environmentally acceptable and culturally appropriate practices, and for all new constructions;

(x) set up lists of Do's and Don'ts for visitors;

(xi) provide for subsidized visits of students while fostering educational extension activities.

2.2.5 In the case of human animal conflicts, compensation shall be paid within the period as per Citizen's Charter, apart from immediate payment of ex gratia.

2.2.6 All tourism activities shall take place only in delineated 'tourism zones' indicated in the tourism plan. The vacant posts in tiger reserves shall be filled up since the staff is also required to manage some tourism in addition to their regular duties.

2.2.7 Tigers in India occur across varied habitats that range from high elevation mountain subtropical forests, tropical wet evergreen forests, mangrove swamps, tropical moist or dry deciduous forests and alluvial floodplain grasslands. The densities of large ungulates, the main prey of tigers, vary from 2 to over 60 animals per km^2 among these different habitats. Breeding tigress's are territorial, and the size of their territories adjust to prey density so as to successfully raise cubs. Male tiger territories cover the territories of two to four breeding tigress territories. Due to variation in habitat specific prey density, breeding tigress territories range from 20 to 200 km^2 in India. For a demographically viable population it is essential to have a core area that harbours a minimum of 20 to 25 breeding tigresses. For long-term genetic viability the minimum effective population size is believed to be about 500 individuals. Due to the variability in breeding tigress territory size and thus breeding tiger density, the core area needed can be generalized to be between 800-1200 km^2. This core and surrounding buffer can then sustain a population of about 75 to 100 individual tigers to attain demographic viability. However, genetic viability is possible only through corridor connectivity within the larger landscape where dispersing individual tigers ensure

genetic mixing between different source populations (tiger reserves) in a metapopulation framework. Current tourism zones where only tourist visits are permitted and there are no consumptive uses, tiger density and recruitment does not seem to be impacted. For this reason permitting up to 20% of the core/ critical tiger habitat as a tourism zone should not have an adverse effect on the tiger biology needs, which is subject to adherence to all the prescriptions made in these Guidelines.

2.2.8 There is also a need for fostering the buffer and peripheral areas for carrying out the greater part of ecotourism to benefit local communities.

2.2.9. Conservation of the tiger, our National animal, is the paramount objective of tiger reserves and generating public support through regulated tourism is an invaluable tool for harnessing public and community support for tiger conservation. Regulated tourism results in enhanced awareness and is of educational value especially for the younger generation. Non-consumptive regulated, low-impact tourism, could be permitted within core or critical tiger habitat without in any way compromising the sprit of core/critical tiger habitat for tiger conservation. With this importance of tourism in tiger conservation in mind, it is recommended that a maximum of 20% of the core or critical tiger habitat usage (not exceeding the present usage) for regulated, low-impact tourist visitation may be permitted. In case the current usage exceeds 20% the Local Advisory Committee may decide on a timeframe for bringing down the usage to 20%. Such area may be demarcated as tourism zone and there should be strict adherence to site specific carrying capacity. Restoration of buffer forest areas shall be done through its unified control under the respective Field Directors of tiger reserves vis-à-vis the Guidelines of the Project Tiger and the National Tiger Conservation Authority. Further, no new tourism infrastructure shall be created in the core areas. Existing residential infrastructure inside core or critical tiger habitats shall be strictly regulated to adhere to low ecological impacts as decided by the Local Advisory Committee on a site specific basis.

2.2.8.1. Any core area in a tiger reserve from which relocation has been carried out, shall not be used for tourism infrastructure.

2.2.10. Forest dwellers who have been relocated from core or critical tiger habitat to the Buffer shall be given priority in terms of livelihood generation activities related to community-based ecotourism in the tiger reserve. Tiger reserve management shall make a special effort in this regard, besides a periodic review to ensure its compliance.

2.2.11 Tourism infrastructure shall conform to environment-friendly, low- impact aesthetic architecture, including solar energy, waste recycling, rainwater harvesting, natural cross-ventilation, proper sewage disposal and merging with the surrounding habitat. Violations of these norms will be appropriately dealt with by the LAC. Any violation of the guidelines will be referred to the appropriate authorities under intimation to the NTCA, for taking action in accordance to the relevant provisions of the law.

2.2.12. The District Revenue and tiger reserve authorities shall ensure that all tourist facilities within a zone of influence (to be identified by the LAC) in the context of core/critical tiger habitats in tiger reserves must adhere to all environmental clearances, noise pollution norms,

and are non-polluting, blending in with surroundings. Severe penalties must be imposed for non- compliance.

2.2.13. Permanent tourist facilities located inside core or critical tiger habitat, which are being used for wildlife tourism shall be phased out on a time frame decided by the LAC. Strict plans ensuring low impact adherence by these facilities shall be developed and approved by LAC for implementation. There shall be no privately run facilities such as catering, etc., inside the core or critical tiger habitat where night stay is permitted. Such existing facilities if any, are to be run by the Tiger Conservation Foundations.

2.2.14. All tourism facilities located within the zone of influence (as determined by the LAC) in the context of the tiger reserve shall adhere to pollution norms (noise, solid waste, air and water, etc.), under the respective laws or rules for the time being in force. Outdoor high intensity illumination shall not be utilized as it disturbs nocturnal wild animal activities.

2.2.15. There shall be a complete ban on burying, burning or otherwise disposing non- biodegradable or toxic waste in and around the tiger reserve. Proper plan for disposal for degradable waste shall be developed and strictly implemented.

2.2.16. Management of habitat to inflate animal abundance for tourism purposes shall not be practiced within the core or critical habitat. Visitors shall keep a minimum distance of more than 20 meter from all wildlife; cordoning, luring or feeding of any wildlife shall be prohibited. Minimum distance between vehicles while spotting wildlife shall be maintained at 50 meters. Vehicles shall not monopolize a wildlife sighting for more than15 minutes.

2.2.17. To avoid the number of visitors and vehicles exceeding carrying capacity, tiger reserve managers shall establish an advance booking system to control tourist and vehicle numbers. Rules of booking shall be transparent and, violators shall be penalized.

2.2.18. Tiger reserve authorities shall delineate an adequate and appropriate area for the visitor facility outside the protected area.

2.2.19. Tourism activities in a tiger reserves shall be under the overall guidance of the respective Tiger Conservation Foundations and the LACs.

2.3. Tourist facilities and Tour operators.

2.3.1. Tourism infrastructure must conform to environment-friendly, low- impact, low height aesthetic architecture; renewable including solar energy, waste recycling, water management, natural cross-ventilation, no use of asbestos, discharge of only treated sewage, no air pollution, minimal outdoor lighting, and merging with the surrounding landscape.

2.3.2. The use of battery operated vehicles shall be encouraged to minimize pollution wherever terrain permits.

2.3.3. A 'curriculum' shall be developed for training of guides and drivers in the art, craft and ethics of wildlife tourism, resulting in certification. All guides and drivers shall compulsorily go through a short course in interpretation and rules and regulations followed by an oral examination before being certified by the Tiger Conservation Foundation. Courses may be scheduled during the non-tourist season. All certified guides and drivers shall wear appropriately designed uniforms with name tags and badges. This will instil a sense of pride, discipline and accountability. Prior to every tourist season, certified guides and drivers

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shall go through a refresher course or workshop. These shall also build up their capacity to identify birds and provide natural history information on other species, to slowly wean them away from a tiger-centric obsession.A periodic assessment of their performance shall be reviewed by the LAC before reissuing their licences.

2.3.4. All tourist facilities falling within the zone of influence of a tiger reserve shall be reviewed regularly by the Local Advisory Committee vis-à-vis environmental clearance, area of coverage, ownership, type of construction, number of employees, etc., for suggesting mitigation and retrofitting measures if needed.

2.3.5. All tourist facilities, old and new shall aim to generate at least 50% of their total energy and fuel requirements from alternate energy sources that may include solar and biogas.

2.3.6. The use of wood as fuel shall be prohibited, except for campfires for which wood must be procured from State Forest Department or the Forest Development Corporation depots.

2.3.7. In order to allow free passage to wildlife, developments shall be sensitive to the conservation of flora and fauna, and the corridor value of the area in and around tiger reserves.

2.3.8. Tourist facilities and tour operators shall not cause disturbance to animals while taking visitors on nature trails.

2.3.9. Any violation of the guidelines shall be referred to the appropriate authorities under intimation to the National Tiger Conservation Authority, for taking action in accordance to the relevant provisions of the law.

2.4. Temple and Pilgrimage Boards.

2.4.1. Pilgrim sites located inside tiger reserves shall be in accordance with the Forest (Conservation) Act, 1980, Wild Life (Protection) Act, 1972 and the Environment (Protection) Act, 1986 to prevent any further expansion. This shall be periodically reviewed by the LAC.

2.4.2. All transit camps and places of stay for such pilgrimage shall be restricted to nominated days in a year. The protected area managers shall work with the temple authorities to develop a system for controlling the number of pilgrims so as to maintain the ecological integrity of the area. This mechanism shall be developed within three years of the notification of these Guidelines.

2.4.3. All rules relating to tourism facilities including noise, building design, use of alternate energy and free passage to wildlife shall apply to such pilgrim facilities.

2.4.4. Temple boards shall negotiate terms of revenue sharing with local communities and channel a minimum of 10 percent of gross revenue collected into development of local communities through the Gram Sabha.

2.4.5. The tourist operators, drivers and temple controlling authorities shall be given an exposure on the value of forest ecosystem and their ecological services and alongwith the do's and don'ts during visits to forests and tiger reserves.

2.5 These Guidelines shall be applicable to the tiger reserves notified under section 38V of the Wild Life (Protection) Act, 1972. The State Government shall lay down Guidelines on similar lines for tourism in other protected areas.

2.6 Contravention of any provision of these guidelines or conditions laid therein by any person or organization shall be liable of an offence under sub- section (2) of 38-O of the Wild Life (Protection) Act, 1972.

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ESTIMATION OF CARRYING CAPACITY*
(Illustrative Calculation for vehicle based tourist visitation, Example: Kanha Tiger Reserve)

(a) **Physical Carrying Capacity (PCC):** This is the "maximum number of visitors that can physically fit into a defined space, over a particular time". It is expressed as:

PCC = A X V/a X RF

Where, A = available area for public use

V/a = one visitor / M^2

Rf = rotation factor (number of visits per day)

In order to measure the PCC to Kanha, the following criteria must be taken into account:

- Only vehicular movements on forest roads are permitted.
- The "standing area" is not relevant, but "closeness" between vehicles is important.
- There is a required distance of at least 500 m (1/2 km.) between 2 vehicles to avoid dust (2 vehicles / km.).
- At least 3 1⁄2 hours are needed for a single park excursion.
- The protected area is open to tourists for 9 months in a year and 9 hours per day.

Linear road lengths within the tourist zone are more relevant than area, and the total lengths are:

Kanha	107.2 Km
Kisli	72.56 Km
Mukki	103 Km
Total	282.76 or 283 km

Due to constant vehicular use, the entire road length of 283 km. is prone to erosion, out of which around 90 km. is affected more

Rotation Factor (Rf) = Opening period /Average time of one visit

Physical Carrying Capacity (PCC) = 283 km. × 2 vehicles/km. × 2.6 = 1471.6 or 1472 visits/day

*Hector Ceballos-Lascurain 1992-Tourism, ecotourism, and protected areas, IV World Congress on National Parks and Protected Areas, IUCN, Gland, Switzerland.

(b) **Real Carrying Capacity (RCC):**

RCC is the maximum permissible number of visits to a site, once the "reductive factors" (corrective) derived from the particular characteristics of the site have been applied to the PCC. These "reductive factors" (corrective) are based on biophysical, environmental, ecological, social and management variables.

$RCC = PCC - Cf_1 - Cf_2 \ldots\ldots Cfn,$

Where Cf is a corrective factor expressed as a percentage. Thus, the formula for calculating RCC is:

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RCC=PCC × {(100–Cf_1)/100} × {(100–Cf_2)/100}..... 100-Cf_n

Corrective Factors are "site-spcific", and are expressed in percentage as below: Cf = M_l × 100

Where: Cf = corrective factor

M_l= limiting magnitude of the variable M_t = total magnitude of the variable

(i) Road erosion: Here the susceptibility of the site is taken into account.

Total road length = 283 km. (M_t)

Medium erosion sink = 50 km. (weighting factor: 2)

High erosion risk = 40 km. (weighting factor: 3)

M_l = 50 × 2 + 40 × 3 = 100 + 120 = 220 km.

M_t = 283 km.

Cfe = (220/283) × 100 = 77.8 or 78%

(ii) Disturbance to Wildlife:

Here, species that are prone to disturbance owing to visitation are considered. The Central Indian barasingha, a highly endangered, endemic species found only in Kanha has a courtship period of about 1 month in winter, during which it is extremely sensitive to disturbance. Likewise, the peak courtship activity for spotted deer lasts for two months before the onset of regular monsoon. As far as tigers are concerned, newborns are seen between March and May and also during the rains; hence an average value of two months in a year can be considered as the matter phase.

Corrector Factor (Cf) = (limiting months/year × 100)/ (12 months/year)

Corrective Factor for barasingha;

Cf w_1 = (1/9) × 100 = 11.1%

Corrective Factor for spotted deer;

Cf w_2 = (2/9) × 100 = 22.2

Corrective Factor for tiger ;

Cf w_3= (2/9) × 100 = 22.2

Overall corrective factor for disturbance of wildlife in Kanha National Park;

Cf w = Cf_1 + Cf_2 + Cf_3 = 11.1 + 22.2 + 22.2 = 55.5 or 55%

(iii) Temporary Closing of Roads:

For maintenance or other managerial reasons, visitation to certain roads may be temporarily restricted within the Protected Area. The Corrective Factor in this regard is calculated as:

Cf_1 = (limiting weeks/year × 100)/(total weeks/year)

In Kanha, an average value of 2 limiting weeks per year may be considered as the "limiting weeks", and thus the corrective factor works out to:

Cf_1= {(2weeks/year)/ (36 weeks/year)} × 100=5.5%

Computation of RCC

RCC = 1472 × {(100-78)/100} × {(100-55)/100} × {(100-5.5)/100}

= 1472 (0.22 × 0.45 × 0.95) = 138.4 or 138 visits/day

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(c) **Effective Permissible Carrying Capacity (ECC):**

ECC is the maximum number of visitors that a site can sustain, given the management capacity (MC) available. ECC is obtained by multiplying the real carrying capacity (RCC) with the management capacity (MC). MC is defined, as the sum of conditions that protected area administration requires if it is to carry out its functions at the optimum level. Limitations in management like lack of staff and infrastructure limit the RCC.

For Kanha, owing to the paucity of staff the MC is around 30%. Hence, ECC = 138 x 0.30 = 41.4 or 40 vehicles / day.

Thus, the Effective Permissible Carrying Capacity on any single day is only 40 vehicles, which should be allowed entry as below:

(Forenoon) = 25 vehicles (inclusive of both entry points) (Afternoon) = 15 vehicles (inclusive of both entry points)

During peak season (winter months/summer holidays), the staff strength shall be increased (only 10%) by deploying "special duty" personnel; this would enhance the ECC to 55 vehicles per day. Further, increase in the number of vehicles would lead to deleterious effects on the habitat.

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BRIEF NOTE ON LIMITS OF ACCEPTABLE CHANGE

(1) The Encyclopedia of Ecotourism1 defines carrying capacity as "the amount of tourism-related activity that a site or destination can sustainably accommodate; often measured in terms of visitor numbers or visitor-nights over a given period of time, or by the number of available accommodation units; management techniques such as site hardening can be employed to raise a site's carrying capacity".

(2) Over a period of time, the carrying capacity framework has come up for criticism especially in the context of wild life, nature based or ecotourism. One of the major criticisms being that the carrying capacity model does not take into account the social implications while arriving at the number of visitors allowed entering a protected area.

(3) Over the past approximately 10 years, the concept of Limits of Acceptable Change has evolved and found to be far more relevant to ecotourism.

(4) The definition of Limits of Acceptable Change as defined by the Encyclopedia of Ecotourism is "a land management philosophy that identifies specific indicators of environmental quality and tourism impacts, and defines thresholds within which the conservation goals of a protected area are met".

(5) The Limits of Acceptable Change is a planning model and does not merely look at the level of use and impact of tourism but on identifying the desirable environmental and social conditions for visitor activity. The process entails the listing of existing conditions and identifying the optimal limits for both physical and social conditions.

(6) The model involves a 9-step process, which have been articulated differently by different policy making bodies across the world. Below is the 9-step process as propounded by the United Nations Environment Programme (UNEP)2:

(i) Identify special values, issues and concerns attributed to the area.
(ii) Identify and describe recreation opportunity classes or zones.
(iii) Select indicators of resource and social conditions.
(iv) Inventory existing social resource and conditions.
(v) Specify standard for resource and social conditions in each opportunity class.
(vi) Identify alternative opportunity class allocations.
(vii) Identify management actions for each alternative.
(viii) Evaluation and selection of a preferred alternative.
(ix) Implement actions and monitor conditions.
(x) What is important to note is that the model uses a process which is systematic, explicit, defensible and rational and involves public participation, this last element being most important if benefits of ecotourism are to accrue to communities.

(7) What is important to note is that the model uses a process which is systematic, explicit, defensible and rational and involves public participation, this last element being most important if benefits of ecotourism are to accrue to communities.

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(8) It is suggested that the Tiger Conservation Foundation in consultation with the Local Area Committee may suitably decide on the implementation of the Limits of Acceptable Change model in and around tiger reserves.

End Notes :1 David B, Weaver (Ed.) (2001), "The Encyclopedia of Ecotourism", CABI Publishing, U.K. 2 Eagles, Paul F.J., McCool, Stephan F & Haynes Cristopher D (1998) "Sustainable Tourism in Protected Areas: Guidelines for Planning and Management", UNEP.

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F. No. 15-1(7)/2015-NTCA
Government of India
Ministry of Environment, Forest and Climate Change
National Tiger Conservation Authority

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EPABX: 011-24367837-42
Fax: 011-24367836
Email: aig3-ntca @nic.in

Dated: 18.08.2015

To,

All Chief Wildlife Warden,
Tiger Range States.

Sub: Filming/Tourism in Monsoon Season in the Tiger Reserves.

Sir,

I am directed to say that the Competent Authority has approved closure of all Tiger Reserves as per recommendation of Technical Committee NTCA held on dated 28.07.2015, for a minimum period of three months, extending up to 5 months, keeping in mind the following factors:

i. Breeding period of wild animal especially Tigers
ii. Condition of forest roads and repair thereof
iii. Safety of eco tourists/visitors

The period of closure for the said duration shall be decided by respective states based on local prevailing conditions.

Sd/-
(Dr. Vaibhav C. Mathur)
Assistant Inspector General of Forests (NTCA)

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भारत सरकार
Government of India
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest & Climate Change
राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण
National Tiger Conservation Authority
****

F.No.7-16 /2010 –NTCA (Part-II) **New Delhi, the October 11, 2019**

To,

Chief Wildlife Warden(s),
All Tiger Range States.

Sub: Phasing out of tourism (Night Stay) from Core Areas of Tiger Reserves-reg.

Sir,

You are aware that tourism in Tiger Reserves is regulated and managed as per the prescriptions given in Tiger Conservation Plan approved by National Tiger Conservation Authority under section 38V of the Wildlife (Protection) Act, 1972. The basic principle behind the regulation and management of tourism in Tiger Reserves is to adopt low-impact wildlife tourism, which protects ecological integrity of forest and wildlife areas, secure wildlife values and its surrounding areas while maintaining the Core Areas as inviolate space.

In view of above, I am to bring following Guidelines, provisions of the Act and relevant directions of Hon'ble Apex Court to your kind notice in this regard;

1. The tourism in Tiger Reserves is governed by ***National Tiger Conservation Authority (Normative Standards for Tourism activities and Project Tiger) Guidelines, 2012*** notified under 38 O 1 (c) vide F. No. 15-31/2012-NTCA dated 15.10.2012, which were further re-iterated by Hon'ble Apex court in ***Shri Ajay Dubey Vs National Tiger Conservation Authority and Ors, SLP (civil) No.(s). 21339/2011, LAWS(SC)-2012-10-104, Decided on October 16, 2012.*** Para 2.2.12 of these Guidelines provides for phasing out of permanent tourist facilities from core critical areas of Tiger Reserve as below;

   "Permanent tourist facilities located inside core or critical tiger habitat, which are being used for wildlife tourism shall be phased out on a time frame decided by the LAC. Strict plans ensuring low impact adherence by these facilities shall be developed and approved by LAC for implementation. There shall be no privately run facilities such as catering, etc., inside the core or critical tiger habitat where night stay is permitted. Such existing facilities if any, are to be run by the Tiger Conservation Foundations."

2. In context of directives by Hon'ble Apex Court dated 25.11.2005 **in *I.A. No.1220 (Interim Report of CEC in I.A. No. 548) and I.A. No. 994 in W.P.C. No. 202/1995***, an Advisory was issued by this Authority vide letter No. 1-16/93-PT (Part-I) Dated the 12th August, 2010 for not using patrolling

camps / chowkis / watch towers inside a Tiger Reserve (Core as well as Buffer) for accommodating tourists or facilitating tourism.

3. Core Areas of Tiger Reserves are mainly constituted of National Parks and Wildlife Sanctuaries, where the *proviso* under Section 33 (a) of the Wildlife (Protection) Act, 1972 is applicable as below;

   "*Provided that no construction of commercial tourist lodges, hotels, zoos and safari parks shall be undertaken inside a Sanctuary except with the prior approval of the National Board."*

4. In ***I.A. No. 2354-2355 in W.P. (Civil) No. 202/1995 T.N. Godavarman Thirumulpad Vs. Union of India and Ors. decided on 05- 07-2018,*** Hon'ble Supreme Court has directed as below;

   "Forest Rest Houses / Inspection Bungalows located within the forest area including the Protected Areas shall not be transferred to private and commercial entities in the name of public–private partnership or by whatever name such an arrangement is called, for promotion of any form of tourism including Ecotourism."

   Above directions have been re-iterated by F.No 12-17/2016-NTCA dated 18.07.2018 of this Authority also.

In view of compliance of above provisions of the Wildlife (Protection) Act, 1972, Guidelines of this Authority and directions of Hon'ble Apex Court, you are requested to furnish the details of permanent tourism facilities (Night Stay) available inside the Core Areas of Tiger Reserves, extent of phasing out done so far after the aforesaid guidelines of 2012 by this Authority and timeline in which these permanent tourism facilities will be phased out completely from Tiger Reserves at earliest.

Yours Faithfully,

Sd/-

(Dr. Anup Kumar Nayak)
Member Secretary (NTCA)
Email: ms-ntca@nic.in
Tel. (EPABX): + 91 11 24367837-39
FAX: +91 11 24367836

Copy to:

1. Principal Secretary, Forest, All Tiger Range States
2. Principal Chief Conservator of Forest (HoFF), All Tiger Range States
3. Inspector General, Regional Offices, NTCA (Guwahati & Bangalore)
4. Field Director(s), All Tiger Reserves
5. AIG, Regional Office, Nagpur

Sd/-

(Dr. Anup Kumar Nayak)
Member Secretary (NTCA)

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No. 1-16/93-PT (Part-I) **Dated the 12th August, 2010**

To,

Chief Wildlife Warden(s),
All Tiger Range States.

Ref: 1. Directive of the Hon'ble Apex Court dated 25.11.2005 in I.A. No.1220 (Interim Report of CEC in LA. No. 548) and I.A. No. 994 in W.P.C. No. 202/1995.
2. Section 38V of the Wildlife (Protection) Act, 1972.
3. Forest (Conservation) Act, 1980 and the Rules / Guidelines issued therein.
4. Letter No. PS-MS (NTCA)/2009-Misc. dated 22.4.2009.
5. Guidelines of CSS-PT No. 3(1)/2001-PT dated February, 2008.
6. Guidelines for preparation of Tiger Conservation Plan, Technical Document: NTCA/01/07.

Sir,

Reference is invited to the directive of the Hon'ble Apex Court, and the statutory provisions contained in the Acts along with advisory/guidelines cited above.

In this context, the following is stated:

(i) The patrolling camps / chowkis / watch towers inside a tiger reserve (core as well as buffer) should not be used for accommodating tourists or facilitating tourism. As these structures have been constructed under Project Tiger, for the sole purpose of accommodating the frontline field staff (at places with wireless), it needs to be ensured that they are solely used for patrolling / antipoaching work.

(ii) Tourists should not be allowed to patrol the core / critical tiger habitat owing to the risk involved vis-à-vis the intensive legwork in a formidable terrain with wild animals. Further, exposing tourists to sensitive patrolling routes / paths / spatial presence of animals, besides the patrolling strategy would make the habitat vulnerable by exposing such details which may be confidential for apprehending the offenders / poachers. Besides, there can be no method by which a poacher entering a wildlife habitat under the garb of a tourist can be identified. Likewise, there is no mechanism available to ensure that sensitive information pertaining to wildlife protection is not advertently/inadvertently passed on to miscreants / poachers. The frontline staff would also be burdened with the task of acting as "caretakers" for the tourists, besides attending to their possible health related emergencies. Needless to point out, patrolling is effective and successful only if it is organized discretely. Patrolling is a technical / specialized task requiring considerable physical fitness and a knowledge of a terrain which by and large, is done at odd hours. While the tourists would not be in a position to undertake this task, there is also a risk of patrolling strategy and related details getting exposed to poachers.

(iii) Under no circumstances forest produce material should be used for making a temporary / permanent construction to facilitate tourists in the core / critical tiger habitat.

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(iv) It is reiterated that provisions under section 38V of the Wildlife (Protection) Act, 1972 should be implemented in letter and spirit for ensuring the inviolate status of the core / critical tiger habitat.

(v) The guidelines / advisories issued from the Project Tiger/NTCA may be strictly followed for organizing intelligence based patrolling in tiger reserves.

Yours Sincerely,

Sd/-

APCCF & Member Secretary (NTCA)

Copy to:

1. APS to MEF.
2. PPS to Secretary (E&F).
3. PPS to DGF & SS, MoEF.

Copy for information to:

1. PS to Chief Secretary(s) of all tiger States.
2. Additional Chief Secretary(s)/ Principal Secretary(s) of all tiger States.
3. PCCF(s) of all tiger States.
4. Field Director(s), All Tiger Reserves.

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TOURISM ADVISORY/ GUIDELINES FOR TOURISM IN TIGER RESERVES

(Issued by letter No. 1-16/93-PT (Part-I), Dated the 12th August 2010 by National Tiger Conservation Authority.)

Reference:

1. Directive of the Hon'ble Apex Court dated 25.11.2005 in I.A. No.1220 (Interim Report of CEC in I.A. No. 548) and I.A. No. 994 in W.P.C. No. 202/1995.
2. Section 38V of the Wildlife (Protection) Act, 1972.
3. Forest (Conservation) Act, 1980 and the Rules / Guidelines issued therein.
4. Letter No. PS-MS(NTCA)/2009-Misc. dated 22.4.2009.
5. Guidelines of CSS-PT No. 3(1)/2001-PT dated February 2008.
6. Guidelines for preparation of Tiger Conservation Plan, Technical Document: NTCA/01/07.

Reference is invited to the directive of the Hon'ble Apex Court, and the statutory provisions contained in the Acts along with advisory/guidelines cited above. In this context, the following is stated:

(i) The patrolling camps / *chowkis* / watch towers inside a tiger reserve (core as well as buffer) should not be used for accommodating tourists or facilitating tourism. As these structures have been constructed under Project Tiger, for the sole purpose of accommodating the frontline field staff (at places with wireless), it needs to be ensured that they are solely used for patrolling / anti-poaching work.

(ii) Tourists should not be allowed to patrol the core / critical tiger habitat owing to the risk involved vis-à-vis the in pensive legwork in a formidable terrain with wild animals. Further, exposing tourists to sensitive patrolling routes / paths/spatial presence of animals, besides the patrolling strategy would make the habitat vulnerable by exposing such details which may be confidential for apprehending the offenders / poachers. Besides, there can be no method by which a poacher entering a wildlife habitat under the garb of a tourist can be identified. Likewise, there is no mechanism available to ensure that sensitive information pertaining to wildlife protection is not advertently/inadvertently passed on to miscreants/poachers. The frontline staff would also be burdened with the task of acting as "caretakers" for the tourists, besides attending to their possible health related emergencies. Needless to point out, patrolling is effective and successful only if it is organized discretely. Patrolling is a technical/ specialized task requiring considerable physical fitness and a knowledge of a terrain which by and large, is done at odd hours. While the tourists would not be in a position to undertake this task, there is also a risk of patrolling strategy and related details getting exposed to poachers.

(iii) Under no circumstances forest produce material should be used for making a temporary / permanent construction to facilitate tourists in the core / critical tiger habitat.

(iv) It is reiterated that provisions under section 38V of the Wildlife (Protection) Act, 1972 should be implemented in letter and spirit for ensuring the inviolate status of the core / critical tiger habitat.

(v) The guidelines / advisories issued from the Project Tiger/ NTCA may be strictly followed for organizing intelligence based patrolling in tiger reserves.

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PRIORITY

IGF & Director (Project Tiger)
Ministry of Environment & Forests
Government of India

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(R) rajeshgopal@vsnl.net

No.PS-DIR(PT)/2005-MISCE. **Dated the May 9, 2005**

To,

The Field Directors
(All Tiger Reserves)

Subject: Special anti-poaching strategy for the monsoon.

Reference:

(1) This Ministry's letter No. F.1-6/2001-PT, dated 11-09-2001
(2) This Ministry's letter No.1-18/2002-PT, dated 18-06-2002.

Sir,

Reference is invited to the circulars cited above. As you are aware, during monsoon our Protected Areas and Tiger Reserves become inaccessible, which calls for a specific protection strategy considering the terrain and other site-specific problems. During this period, the Tiger Reserve/Protected Area is vulnerable to illicit grazing, felling of tees as well poaching, which necessitate surveillance at some sensitive places, viz.:

- Footpath/bridal paths linking Protected Area/Tiger Reserve to outside
- Natural salt licks
- Habitat close to electric transmission lines
- Beehive bearing trees
- Habitat close to human settlements and prone to cattle influx
- Areas close to weekly countryside markets

An appraisal of sensitive points in the habitat and evolving a protection strategy with a round the clock communication through wireless network is absolutely necessary to deal with the situation. The chowkies/patrolling camps may be designated as nodal points for dissemination of information, which should be regularly supervised by senior officers. Special care should be taken of the staff posted in such remote areas to ensure necessary medical assistance, as and when required. Since some areas are endemic to malaria (including cerebral malaria), prophylactic dose may also be required as per medical advice. In case the Tiger Reserve has trained department elephants, such squads may be

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deployed at sensitive areas to complement foot patrolling. Some staff members may specifically be deployed for gathering information relating to poaching with a mechanism for day -to- day exchange for vital information. A roster may also be prepared indicating the details of officers/staff and the area entrusted to each for protection.

The Centrally Sponsored Scheme of Project Tiger provides funding support for deployment of anti- poaching squads as well as paramilitary forces (if required). Therefore, in case the situation warrants, proposal for such a deployment may be sent to this Ministry at the earliest. The funding support required for anti-poaching measures may please be faxed to this Directorate at the earliest for the needful.

The field staff may be directed to exercise considerable care and caution, so that the local people are not subjected to undue harassment while implementing the protection strategy. To make the effort participatory, the possibility of establishing reciprocal commitments with locals for protecting the habitat should be given top priority to prevent undue park-people conflicts in the landscape.

An early response in this regard is requested from your end.

Yours Sincerely,
Sd/-
Member Secretary (NTCA)

Copy to:

1. Principal Secretary /Secretary (Forests) (All Tiger Reserve States)
2. Principal Chief Conservator of Forests (All Tiger Reserve States)
3. Chief Wildlife Wardens (All Tiger Reserve States)

Copy also to :

1. PPS to Secretary (E&F)
2. PPS to DGF & SS
3. PPS to Addl. DGF (Wildlife)

Sd/-
Member Secretary (NTCA)

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F. No. 15-22/2013-NTCA
Government of India
Ministry of Environment, Forest Climate Change
National Tiger Conservation Authority

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Email: aig3-ntca@nic.in
Tel. (EPABX): + 91 11 24364837-42
FAX: +91 11 24367836

Dated 23.04.2018

To,

The Chief Wildlife Warden(s),
Andhra Pradesh, Chhattisgarh, Rajasthan, Maharashtra, Uttar Pradesh, Arunachal Pradesh and Tamil Nadu

Sub: Submission of proposal for notifying Eco sensitive Zones of Tiger Reserves

Sir,

Reference is invited to the subject cited above. In this context, I am directed to request you to kindly furnish proposal for notifying Eco Sensitive Zones around Tiger Reserves, as per list enclosed herewith, as per advisory issued by this Authority in the matter which states;

1. The entire buffer zone should be included in the Eco Sensitive Zone
2. A radial cushion of minimum 1 km should be kept from the critical tiger habitat wherever the buffer is disjunct/absent
3. Where a Protected Area forms part of the buffer, then a minimum 1 km cushion should be demarcated around the said buffer also

An expeditious response is kindly requested.

Enclosed: As above

Yours Faithfully,
Sd/-
(Dr. Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

Copy to:

1. NTCA Regional Offices, Guwahati, Bengaluru and Nagpur
2. The Field Director(s) concerned

GUIDELINES FOR TAKING NON-FORESTRY ACTIVITIES IN WILDLIFE HABITATS

(Issued by Wildlife Division of Ministry of Environment and Forests vide F. No. 6-10/2011 WL Dated: 19 December 2012)

1. General Policy:

National Parks, Sanctuaries and Conservation Reserves are notified under the Wildlife Protection Act, 1972 as dedicated areas rich in, and representing the unique biodiversity of a place. Such protected areas are considered very important for conservation of biodiversity, and for ensuring the healthy populations of its floral and faunal components, for the present and future generations alike. However, the rising human population and its growing demands for socio-economic development put increasing stress on forests including protected areas both directly and indirectly. This calls for a balance that has to be struck between development and conservation implying that any activity involving use or diversion of any part of a notified protected area may be considered only under **most exceptional** circumstances, taking fully into account its impending impact on the biodiversity of the area, and consequently on the management of the Protected Area. A critical part of this balanced approach is to spell out the feasibility of mitigation to address the impacts without compromising the management objectives of the Protected Area. The activities to be taken up in the identified wildlife habitats also need to comply with the orders of the Hon'ble Supreme Court in addition to the statutory requirements as provided in the Wild Life (Protection) Act, 1972.

2. Scope:

Measures to protect the wildlife and biodiversity in general include *inter alia,* notification of suitable wildlife habitats as Protected Areas (National Parks, sanctuaries etc.) under the Wild Life (Protection) Act (WLPA), 1972. Recommendations of the National Board for Wildlife (NBWL) are prescribed in the Act for regulating any activity inside such areas. Hon'ble Supreme Court though a number of orders has further made it essential to seek the recommendations of this advisory body for regulating activities in the adjoining areas to the Protected Areas. Protection of other forests is ensured through the Forest (Conservation) Act 1980 wherein, recommendations of the Forest Advisory Committee are prescribed for this purpose. Protected areas cover generally the known habitats of wildlife including important flagship species. Tiger Reserves represent specifically notified areas under the WLPA focusing on conservation of the charismatic big cat under the Project Tiger in view of the specially threatened status of this national animal. With a view to ensuring conservation of elephants, the national heritage animal, 'Project Elephant' is operational. Technical and financial assistance is provided by the Central Government for conservation of elephants in the designated elephant habitats in the country. But presently such habitats are not legal entities. Though many existing elephant habitats are part of the existing Protected Areas, a proposal for enabling notification of such important habitats as elephant reserves under appropriate legal provisions is also under consideration of the government in the Ministry of Environment and Forests. It is expected that once the legal provisions for declaration of elephant reserves is in place, such areas will also be included under the regulatory regime under Wild Life (Protection) Act 1972 as proper legal entities.

These guidelines prescribe the process of obtaining recommendations of the Standing Committee of NBWL under the Wild Life (Protection) Act 1972 with respect to the areas, for which this process is mandatory under the law, and also in compliance to relevant Hon'ble Supreme Court orders.

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These guidelines replace the guidelines dated 15.03.2011 issued earlier in this regard, along with all amendments made therein.

3. Activities inside Protected Areas:

The process of consideration of any proposal for use of areas inside the protected areas, as a mandatory requirement under the present statutes, involves consideration and recommendation of the **National Board for Wildlife.** However, as the **Standing Committee of National Board for Wildlife** has been delegated the powers of the National Board for Wildlife, such cases are to be referred to the Standing Committee of National Board for Wildlife for consideration and recommendation. Details of such situations where such reference is warranted are described below:

3.1 Activities inside Wildlife Sanctuaries:

Section 29 of the \Wild Life (Protection) Act, 1972 provides for the seeking the recommendation of the **State Board for Wildlife** *(a Board chaired* by *the State Chief Minister)* for any diversion of land or produce including water, etc. from a Sanctuary.

A per the proviso under Section 33 (a), no construction of commercial tourist lodges, hotels, zoos and safari parks can be undertaken inside a sanctuary except with prior approval of the Standing Committee of NBWL.

Further, in view of the directions dated 9th May 2002 of Hon'ble Supreme Court in Writ Petition (Civil) No. 337/1995, all such proposals in respect of a Sanctuary or a National Park also require Supreme Court's approval based on the recommendation of the **Standing Committee of National Board for Wildlife** *(a Committee chaired* by *the Minister in charge of the Ministry of Environment and Forests)*

3.2 Activities inside National Parks:

Section 35 (6) of the Wild Life (Protection) .Act, 1972 provides that the recommendation of the **National Board for Wildlife** *(a Board chaired by the Prime* Minister) is essential for any use or diversion of the habitat of any wild animal, or produce including water, etc. in a National Park.

This proviso is also applicable with respect to National Parks in view of Section 35(8) of the Act.

In the circumstances, any activity proposed within the boundaries of a National Park or Wildlife Sanctuary shall require the recommendation of the Standing Committee of NBWL, and the approval of the Hon'ble Supreme Court.

Section 33 (8) of the Wild Life Protection Act, 1972 provides that no construction of commercial tourist lodges, hotels, zoos and safari parks can be undertaken inside a National Park except with prior approval of the Standing Committee of NBWL.

3.3 Activities inside a Tiger Reserve:

A Tiger Reserve notified under the provisions 38V (1) of WLPA may include an existing Protected Area or other forests (as the buffer areas). The Tiger Reserve, once notified gets conferred protection on par with a Wildlife Sanctuary under section 38V (2). Further section 38W makes it mandatory to obtain approval of Standing Committee of NBWL for any activity including alteration of boundaries of Tiger Reserves. Therefore, any proposal involving any area under the notified Tiger Reserve will also be governed by the relevant provisions applicable to the Wildlife Sanctuaries and therefore, will be referred to the Standing Committee of NBWL for consideration.

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3.4 Activities inside Conservation Reserves:

The Ministry of Law and Justice has opined that activities to be taken up inside a Conservation Reserve can also be dealt with in the Standing Committee of NBWL. Therefore, the procedure indicated under para 4 below needs to be followed for planning and executing any activity inside Conservation Reserve also.

3.5 Activities in areas other than Protected Areas:

In addition to the notified protected areas as described above, the consideration of the Standing Committee of NBWL has been prescribed in certain circumstances. which are listed below:

3.5.1 Activities within 10 Kms from boundaries of National Parks and Wildlife Sanctuaries:

In pursuance to the order of Hon'ble Supreme Court dated 4th December 2006 in Writ Petition (Civil) No. 460/2004, in case any project requiring Environmental Clearance, is located within the eco-sensitive zone around a Wildlife Sanctuary or National Park or in absence of delineation of such a zone, within a distance of 10 kms from its boundaries, the User agency/Project Proponent is required to obtain recommendations of the Standing Committee of NBWL.

3.5.2 Activities within areas connecting the Tiger Reserves, notified by NTCA for controlling the land use as per section 38 O (g):

Section 38 O (g) of the Wild Life Protection Act, 1972 entrusts the responsibility to NTCA to ensure that areas connecting Tiger habitats are not diverted for ecologically unsustainable habitats except in public interest and with the approval of NBWL. Proposals for any activities in such areas duly notified by NTCA, and recommended by it in accordance with these provisions, to be covered under such regulation will be permitted only after seeking recommendations of the Standing Committee of NBWL. Violation of this provision is required to be dealt with by the NTCA.

4. Procedure to be followed forconsideration of Proposals by the standing committee of National Board for wildlife:

4.1 The User Agency/Project Proponent is required to submit the proposal in the prescribed proforma that has been prescribed by the Ministry of Environment and Forests, and is available on the website of the Ministry (http://moef.nic.in/modules/others to be filled in) **(Annexure-I).**

4.2 The prescribed proforma has **five** parts and each part is required to be filled in by the User Agency; concerned Divisional Forest Officer/Park Manager; Concerned Chief Conservator of Forests; Concerned Chief Wildlife Warden and the Forest Secretary.

4.3 The proforma also seeks information in detail on the biodiversity of the area in question; maps. of the area, other activities already in place; possible impacts of the proposal, etc.

4.4 The User agency is required to submit Part-I and Part-II of the proforma duly filled in to the concerned Forest Officer, who in turn, forwards the same to the Chief Wildlife Warden through the Chief Conservator of Forest.

4.5 The Chief Wildlife Warden, after giving his specific comments on the proposal, shall forward 15 copies of the same to the Government of India, through the Forest Secretary **after obtaining the recommendation of the State Board for Wildlife on the proposal.**

4.6 The proposal so received from the State Chief Wildlife Warden will be placed before the Standing Committee of NBWL, chaired by Minister of State (I/C) Environment and Forests. The meeting of the Standing Committee is convened once in 2-3 months.

4.7 In cases where the area proposed for diversion is large and/or the impact of the project on wildlife is considered to be serious, site inspections may be conducted by the members of the Committee or further studies/ surveys may be conducted by experts on the instruction of the Standing Committee of NBWL.

4.8 The site inspection reports are generally considered in the next meeting of the Standing Committee to enable the Committee to make its recommendation.

4.9 After the Standing Committee of NBWL recommends the proposal the User Agency /State Government is required to approach Hon'ble Supreme Court for final clearance in view of the Court orders dated 13.11.2000.

[N**ote:** *Hon 'ble Supreme Court vide their order dated 13. 11.2000 had directed that there shall be no dereservation /denotification of National Parks and Sanctuaries without approval of the Supreme Court. Therefore, to take up any such activity, a clearance from Hon'ble Court is mandatory.]*

4.10 In case of Border Roads, proposals of the Ministry of Defense, a simplified proforma for simultaneous clearance under the Forest (Conservation) Act, 1980 and wildlife clearance is being adopted under 'A Single Window System'.

5. Proposals for survey work to be carried out inside National parks and wildlife sanctuaries;

In case any kind of survey work and/or Environment Impact Assessment (EIA) studies, that is a prelude to future diversion of land, are to be taken up in areas involving a wildlife habitat, then also the entire procedure, as prescribed in paragraph 4 above would need to be followed.

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FORMS
(All documents to be submitted in triplicate and signed in blue ink)

PART I
Proposal for Investigation and Survey in the National Park / Sanctuary
(Details to be provided by the Applicant)

1. Name of the Organization
2. Aims and Objectives of the Proposed Project
3. Location and .Map (1:50,000 scale) of the area duly authenticated by the competent authority to be investigated/ surveyed
4. Whether investigation/ survey requires clearing of vegetation
5. If yes, please specify the extent (in Ha.)
6. Opinion of the Officer In Charge of the NP/ WLS (Attach signed copy)
7. Opinion of the Chief Wildlife Warden (Attach signed copy). The following be included in the opinion:
   i) Brief history of the protected area
   ii) Current status of wildlife
   iii) Current status of pressures on protected areas.
   iv) Projected impacts of projects on wildlife, habitat management and access/ use of resource by various stakeholders.
   iv) Contiguous wildlife areas which would benefit wildlife if added to national park/sanctuary.
   v) Other areas in the State which have been recommended by State Government, Wildlife Institute of India, BNHS, SACON, IISC, IUCN or other expert body for inclusion in protected area network

Signed	Signed	Signed
Project Head Name Organization	The Officer In Charge of the NP/ WLS Office Seal	The CWLW Office Seal

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PART II
(To be filled in by the Applicant)

1. Project details:
   (i) Copy of the Investigation and Survey report. (The report should include the dates of survey and the names of the investigators, surveyors and all officials of the concerned NP/ WLS who remained present during the period.
   (ii) Self contained and factual project report for which NP/WLS area is required (Enclose copy of Project Appraisal document)
   (iii) Map (duly authenticated by the Divisional/District Head of the Department dealing with Forests and Wildlife) on a scale of 1: 50,000 showing the boundaries of the NP/WLS, delineating the area in question in red color).
   (v) Self contained and factual report of at least two alternatives considered by the project authorities along with technical and financial justification for opting national park/ sanctuary area.
   (vi) Copy of the Bio diversity Impact Assessment report in case the Proposal involves diversion of more than 50 ha. NP /WLS area.
2. Location of the project/scheme
   (i) State/Union Territory
   (ii) District
   (iii) Name of the National Park/ Sanctuary
3. Details of the area required (in Hectares only)
   (Provide break up of the land use under the project, e.g., construction of dam, submergence, housing for staff, road etc)
4. Details of displacement of people, if any, due to the project
   (i) Total number of families involved in displacement
   (ii) Number of scheduled caste/Scheduled tribe families involved in displacement
   (iii) Detailed rehabilitation plan
5. Any other information relevant to the proposal but not covered in any of the columns above.

Signed by
Project Head

Name

Organization

Date of submission to the Head of the National Park/Sanctuary

PART III

(To be completed by the Officer -in- Charge of the National Park/ Sanctuary completed and submitted to the Chief Wild Life Warden or officer authorized by him in this behalf within 30 days of the receipt of PART - II)

1. Dare of receipt of the PART II
2. Total Area (Ha.) of national park/sanctuary
3. Total area (Ha.) diverted from the NP/WLS so far for development purposes
4. List the past projects and the area (Ha.) diverted

Name of Project	Area Diverted	Year of Diversion

5. Positive impact(s) due to the diversion of area for the projects referred to in column 4 above

Name of the Project(s)	Positive Impact	Scientific Basis of Assessment

(Attach separate sheet, if required)

6. Negative impact/s due to the diversion of area for the projects referred to in column 4 above

Name of the Project(s)	Negative Impact	Scientific Basis of Assessment

(Attach separate sheet, if required)

7. Management Plan Period

   Attach copy of the Management Plan/Management Scheme/ Recommendation of Chief Wildlife Warden
8. List Management actions taken/ proposed to be taken in the whole Block/ Zone in which the proposed area is located.
9. Type of forest in which the proposed area falls.
10. Location of the proposed area w.r.t. the critical/intensive wildlife management areas/ wildlife habitats (attach Map to scale).
11. List the likely POSITIVE AND NEGATIVE impact/ s of the proposed project giving scientific and technical justification for each impact.
12. Provide COMPREHENSNE details of the impact of the proposal in terms of Sections 29 and/or section 35 (6) of the Wild Life (Protection) Act, 1972 as the case may be.
13. Whether the project authorities have ever committed violation of the Wild Life (protection) Act, 1972 or Forest Conservation Act, 1980. If yes, provide the EXHAUSTIVE details of the offence and the present status of the case.

    (Concealing or misrepresenting the facts will lead to rejection of the case in addition to any other penalty as prescribed under Law)
14. Have you examined the Project Appraisal document and the alternatives as provided in PART - II?
15. Have you examined the Bio diversity Impact Assessment Report?
16. If Yes, please give your comments on the recommendations given in the report?
17. Dates and duration of your field visits to the proposed site.

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18. Do you agree that the present proposal of diversion of NP/WLS area is the best or the only option and is viable.
19. Any other information that you would like to bring to the notice of the State Board for Wildlife, National Board for Wildlife or Standing Committee that may be relevant and assist in decision making.
20. Do you recommend the project.

    (Please provide full justification to support your recommendations)

Signed by

The Officer In Charge of the NP/ WLS Official Seal

Date of submission to the Chief Wild Life Warden or any other officer authorized by him in this regard

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PART IV
(To be completed by the Chief Wildlife Warden within 15 days of the receipt of PART - II and Part- III)

1. Date of RECEIPT of P ART- II and Part- III by the Chief Wild Life Warden or the officer authorized by him in this regard
2. Do you agree with the information and recommendations provided by the Officer in - Charge in PART III?
3. If not, please provide the reasons
4. Have you visited the site yourself and held discussions \\rith the applicant?
5. (a) Do you agree that the present proposal for permitting use of NP/WLS area is the best option or the only option, and 1S viable?
5. (b) Whether the proposal sub-judice? If yes, give details.
6. Please provide specific comments w.r.t, Section 29 of the Wild Life (Protection) Act, 1972
7. Any other information that you would like to bring to the notice of the State Board for Wildlife, National Board for Wildlife or its Standing Committee that may be relevant and assist in decision making
8. Do you recommend the project?
   (Please provide full justification to support your recommendations)
9. Conditions, if any, to be ensured in the interest of protection and conservation of wildlife for allowing use of the area?

Signed by
The Chief Wildlife Warden

Name
State
Official Seal

Date of submission to the State Government

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PART V

(To be completed by the Department in Charge of Forestry and Wild Life in consultation with the State Board for Wild Life within 30 days of the receipt of PART - II, PART- III and PART- IV)

1. Date of RECEIPT of PART- II, PART- **III** and PART - IV by the Department
2. Do you agree with the recommendation(s) of the Chief Wildlife Warden
3. If not, please provide the reasons.
4. Did you provide PART **II,** PART- **III** and PART - IV to the members of the State Board for Wild Life?
5. Attach copy of the opinion of the State Board for Wild Life
6. Give details of the recommendations of the State Government

Signed by
The Principal Secretary

Name
State
Official Seal

Date of Submission to Central Government

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Guidelines for Roads in Protected Areas

(Recommendations of the Sub-Committee of National Board for Wild Life issued by Wildlife Division, Ministry of Environment, Forests and Climate Change vide F.No. 6-62/2013 WL, dated 22nd December 2014)

In pursuance to the decision taken by the Standing Committee of the NBWL in its 28th Meeting held on 20th March 2013, a sub-committee under the chairmanship of Dr. M.K. Ranjit singh, Member, National Board for Wildlife, was constituted by the Ministry of Environment and Forests vide O.M. No. 6-62/2013-WL, dated 26th June 2013. The terms of reference of the sub-committee are as follows:

- To frame a comprehensive guideline for construction/repair or roads passing through PA in the country.
- Design best practices for such roads passing through PAs so as to have better wildlife conservation.

The 1st meeting of sub-committee was convened on 2nd July, 2013. The second meeting of the sub-committee was convened on 6th August, 2013. The list of participants who attended both the meetings are given in Annexure-1.

PREAMBLE

Background

Roads are an essential part of India's development, providing vital connectivity and transportation across the country. Yet, when they intersect natural areas (as opposed to being situated in already-modified human-dominated landscapes), roads have wide-ranging and complex impact on natural areas and wild species inhabiting these areas. Within India's Protected Areas, the extensive impact of roads remains poorly understood, except in the obvious and serious instance of wild animal mortality due to road accidents. Elsewhere, it was been well established that roads have detrimental ecological effects in both terrestrial and aquatic natural ecosystems. Roads further fragment the already highly fragmented natural habitats. They break forest contiguity, impinge on forests and well-worn migratory paths of animals, break tree cover and canopy, slice vegetation-all of which gravely impact wildlife. Roads cause soil erosion and landslides. Crucially, roads are the first step to ancillary development an increasing human footprint in the area, thus leading to accelerated developmental, tourist and hunting pressures, increase in pollution, litter, and various disturbances. Unless great vigilance and checks are provided, roads provide conduits for illegal extraction of timber and forest produce and for poaching, particularly at night, from vehicles. It is very difficult to provide the requisite surveillance and it is well established that PAs have suffered loss of vegetative cover and poaching after construction of roads. In PAs in the mountainous region, construction of roads and their widening has grave consequences, including landslides and erosion, as the debris from road cuts on hillsides is invariably tipped over the sides. A background paper on linear intrusions into natural areas, including roads, commissioned by the National Board for Wildlife in 2011, provides an exhaustive review of the current state of knowledge on this topic 1 and a companion document 2 provides detailed guidelines by which their negative impact on natural habitats and wild species, can be minimized.

BASIC PRINCIPLES

We wish to reiterate a point articulated clearly and emphatically in the National Wildlife Action Plan-2002-2016, which states that the *"Ministry of Surface Transport... to plan roads, highways, expressways in such*

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a manner that all national parks and sanctuaries are by-passed and integrity of/he PA is maintained. Wildlife corridors also need to be avoided, or mitigaative measures (such as restricting night traffic) need to be employed." This principle must serve as the cornerstone of any road plan that is being conceived in the vicinity of any wildlife or Protected Area, and envisages the Ministry of Surface Transport to work in coordination with the Ministry of Environment & Forests, and other relevant authorities and experts. Further, we believe that this principle must apply to all other roads being planned by any other agency at the national, state, or local levels. The implication of this action point articulated in the National Wildlife Action Plan (NWAP) is also that plans be made proactively by relevant agencies to realign existing roads passing through protected areas, in a way that PAs are bypassed and, subsequently, decommission roads that intersect PAs.

If there are viable alternative alignments-as observed in a number of cases--to roads that otherwise intersect PAs, those within PAs must gradually be phased out and eventually decommissioned, while the alternate roads should be improved. This must be done in active coordination with the relevant ministries, departments and authorities, as noted above.

In planning roads, within and in the vicinity (defined here as roads that are situated inside and within 1 km radial distance) of protected areas, we recommend that following fundamental principles must be followed in order of priority: Avoidance, Realignment, Restoration.

1. **Principle of Avoidance:** The foremost option would be to altogether avoid are as that are within or in the vicinity of any Protected Area and to find alternatives that are socially and ecologically more appropriate.
2. **Principle of Realignment:** This follows as a corollary of the first principle. Road projects must investigate and demonstrate that they have considered other alternative routes that avoid natural areas of high ecological value. This must be an integral feature of a project proposal and implementation documents. Realignments must also be developed in a transparent manner through consultation with local communities affected by the routing and subject to ecological and wildlife considerations.

   User agencies seeking clearances for roads must demonstrate as to how they have taken these factors into account, before their proposals can be considered for approval by the SC-NBWL.
3. **Principle of Restoration:** In natural areas, existing roads that are in disuse (e.g., old logging roads), or evaluated to be inefficient or detrimental to their objects, shall be targeted for decommissioning and subsequent ecological restoration, as the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.

The Deputy Inspector General of Forests (WL) briefed the committee regarding the existing guidelines for roads within Protected Areas, viz.:

(i) Decision of the Standing Committee of IBWL, as per decision taken during the meeting held on 14.6.2000. This held that roads that have already been tarred should continue to be maintained and repaired properly, in the current form. No roads inside the National Parks and Sanctuaries should be widened or upgraded.

(ii) During the meeting of 14th October 2011, it indicated that *"No widening of existing roads shall be permitted, and the status of finishing of the surface of the repaired road(s) shall remain same as that*

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of the original road(s), i.e.,un-tarred roads shall remain un tarred after repairs, and only originally tarred roads shall be repaired and tarred "

Recommendations

The committee recommends the following: ·

1. The status quo of the roads passing through National Parks and Core Critical Tiger Habitats (CTH) shall remain the same. The roads could be maintained and repaired in the best manner possible in their current form and present width. No widening or up gradation is to be allowed. If it is an existing tarred road, it shall be maintained as such and no widening of the tarred surface or the widening of the road itself, may be done.
2. For Wildlife Sanctuaries and Conservation Reserves, the same norms as in the case of National Parks and Core, Critical Tiger habitats, shall apply. However, in case of Sanctuaries and Conservation Reserves, culverts and metalling in sections of roads that become impassable or 'all weather roads' for approach/connectivity to villages within the Protected Areas, can be considered for approval in the Standing Committee of NBWL. If necessary in such cases, required maintenance could be taken up by the Forest Dept. on the recommendation of the Standing Committee of NBWL. It may be stressed again, that the width and status of the existing roads shall remain the same and no up gradation will be allowed. In considering such proposals, the method of such road construction/improvement such as blasting, borrow-pit digging, etc., the impact upon movement of animals from one habitat to another/ wildlife corridors, access of water, etc. would be criteria for consideration.
3. Where roads approaching/passing by National Parks/Core-Critical Tiger Reserve/Wildlife Sanctuary are within a radius of l km thereof, or within the Eco Sensitive Zone, whichever of the two is lesser, would be treated on same basis/guidelines as are applicable to the Protected Areas category that it is in proximity of.
4. Presently, as Community Reserves are outside the purview of Section 29 of Wildlife (Protection) Act, 1972, the committee decided not to delve into the matter of roads passing through such PAs.

   The committee recommended that, no change of current ownership and maintenance of roads passing through the Protected Areas should be permitted. However, in specific cases where such a transfer is required to better manage roads so as to cause minimal impacts on wildlife, as in the case of transfer of certain PWD /other toads which pass through PAs, back to the concerned Forest Dept; such transfers could be considered.
5. Roads being managed by the Forest Department for the purpose of patrolling and tourism, were of equal concern like other roads inside Protected Areas. It was noted that there was a large network of such roads in several National Parks/Tiger Reserves/Wildlife Sanctuaries. No new roads should be constructed by the concerned Forest Departments and if so required to be constructed, the approval of the National Tiger conservation Authority (in case of Tiger Reserves) and concerned State Boards for Wildlife in case of non-Tiger Reserve for other PAs must be obtained. The concerned authority should be able to demonstrate and justify the grounds for construction of the new roads within PAs, in the conservation interest of the concerned PA.

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6. The committee also agreed that the Wildlife Institute of India should formulate guidelines - for making road's by the Forest Departments, for protection purposes, in Protected Areas, Critical Wildlife Habitats and designated corridors.

Management of Roads within PAs:

Mitigation: For existing roads, repairs and maintenance of existing roads, and for repairing roads that are impassable during monsoon/all-weather roads as described in the recommendation above, it is imperative that mitigation measures are included in the project planning, design, budget, implementation, and monitoring stages. This requires measures to minimise detrimental effects of roads on ecology, wildlife, local communities and users. This shall be considered only for existing structures and for new cases, where the options given earlier have been comprehensively considered and overruled, with adequate justification. These are also subject to requisite approvals from the state authorities and boards, the Ministry of Environment and Forests and its statutory bodies, such as the National Board for Wildlife, Forest Advisory Committee, and the National Tiger Conservation Authority, as relevant to each case.

An exhaustive set of management measures have peen recommended in the NBWL's draft guideline document mentioned above (pages 8-13, and 17-21). While fully endorsing these recommended management measures, for ready reference, some of the key management considerations applicable for already existing roads, are herewith highlighted:

- Ban on night traffic (dusk to dawn) is essential to save animals from disturbance from the constant flow of traffic, and thus allow them passage. It is recommended that night traffic bans should be initiated and applied in Core Critical Tiger Habitats, National Parks and Sanctuaries. There are such existing bans in various Tiger Reserves and NPs. Night passes may be provided for villagers/communities living within the PAs.
- Strong regulations controlling timing and traffic volumes need to be built in for all roads through Protected Areas and critical habitats.
- Speed reduction is a must to reduce wild animal mortality, and can be achieved through imposed speed limits and speed breakers.
- Vehicles should not be allowed to stop within PAs.
- No use of horns within the PA, and no littering.
- Speed restrictions and other guidelines that spell out rules and avoidance of disturbance to wildlife and habitats along roads in PAs, must be prominently conveyed through well-designed signboards, at entry and exit points and all other relevant locations.
- Establishment of check posts by the forest department, at both entry and exit points.
- Wherever possible, natural animal crossings existing across roads should be retained or encouraged. For instance, overlapping tree canopy in closed canopy evergreen/semi evergreen forests is an essential attribute for the movement of arboreal species. Passage to waterholes and daily movements of animals must also be safeguarded.
- Underpasses: well-designed tunnels, culverts, pipes, and other structures can function as underpasses below roads and bridges, for a wide-range of terrestrial and aquatic species. Underpasses can also be deployed below railway lines/highways for passage of large bodied animals, viz elephants, tigers.

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- During maintenance works on existing roads, the underlying principle should be that work must be carried on in a speedy manner, with minimal disturbance to wildlife and with adherence to all rules and regulations that govern wildlife and PAs.
- No work should be allowed between 6 pm to 8 am (just before dusk to just after dawn).
- The labour force required for road maintenance must have their camps outside, the concerned PA.
- No firewood cutting or fuel collection from within the PA.
- Waste/debris should not be dumped in the PA/or adjoining rivers/nullas/water bodies.
- No taking of any material like sand, gravel etc from the PA. All materials for construction, road maintenance etc should be brought from outside.
- No vegetation/tree should be cut or damaged/ during the maintenance.

1. Raman, T. R. S. 2011. Framing ecologically sound policy on linear Intrusions affecting wildlife habitats: Background paper for the National Board for Wildlife. Available from: envfor.nlc.in/assets/Linear%20intruslons%20background%20paper.pdf.
2. NBWL. 2011. Draft guidelines for linear infrastructure intrusions in natural areas: roads and power lines. Available from: http://envfor.nic.in/assets/FlRST0raft%20guidelines%20roads%20and%20powerlines.pdf

Guidelines for Seeking Recommendations of Standing Committee of National Board for Wildlife for Activities in Protected Areas

(Issued by Wildlife Division of Ministry of Environment, Forest and Climate Change vide F.No. 6-74/2012 WL (pt) dated 11.03.2016 and 24.03.15)

1. General Policy:

National Parks and Wildlife Sanctuaries are notified as a part of the forest management as dedicated areas for harbouring the representative biodiversity of a place and for providing reproductive surplus to the forests providing harvest based sustainable utilization. Therefore such protected areas are extremely important for conservation of biodiversity, and for ensuring the survival of its floral and faunal components, not only for the present but also for future. However, the rising human population and their growing demands for socio economic development have placed tremendous stress on forests including such areas both directly and indirectly. Keeping in view the fact that a balance has to be struck between development and conservation, any activity involving use or diversion of any part of a notified Protected Area may be considered only under **most exceptional** circumstances, taking mainly into account inevitability, its impending impact on the management of the Protected Area, and feasibility of mitigation thereof without compromising the objective thereof. Additionally, such activities to be taken up in the identified wildlife habitats also need to be governed by the orders of Hon'ble Supreme Court as well as the statutory requirements as provided in the Wild Life (Protection) Act, 1972.

2. Activities inside Protected Areas:

The process of consideration of any proposal for use of areas inside the Protected Areas, as a mandatory requirement under the present statutes, involves consideration and recommendation of the **National Board of Wild Life**. However, as the **Standing Committee of National Board for Wildlife** has been delegated the powers of the National Board for Wildlife, such cases are to be referred to the Standing Committee of National Board for Wildlife for consideration and recommendation. Such provisions of law, where such reference is warranted are described below:

2.1 Wildlife Sanctuaries:

Section 29 of WLPA provides for consultation with the State Board for Wild Life before any decision is taken by the state government for permitting any activity within a WLS. Presently, in view of the directions dated 9th May 2002 of Hon'ble Supreme Court in Writ Petition (Civil) No. 337/1995, all such proposals also require recommendation of the **Standing Committee of National Board for Wildlife,** before seeking its approval for such activities.

2.2 National Parks:

Section 35 (6) provides for consultation with the National Board for any such activity within a National Park.

2.3 Other Provisions

Section 33 (a) provides for **prior approval** of the National Board for any construction of commercial tourist lodges, hotels, zoos and safari parks inside a sanctuary. This proviso is also applicable on National Parks in Section 35 (8). Section 26 A (3) provides for recommendation of

the National Board for alteration of boundary of a sanctuary. Section 35(5) provides for similar recommendation for alteration of boundary of a National Park.

2.4 Activities inside a Tiger Reserve:

The PAs constituting a Tiger Reserve attract all the provisions applicable for National Parks or Sanctuaries. Section 38-O (g) and 38W provide for approval of NBWL for activities within and in areas linking protected areas or tiger reserves, alteration of boundaries or de notification of Tiger Reserves.

2.5 Activities inside Conservation Reserves:

The Ministry of Law and Justice has opined that activities to be taken up inside a Conservation Reserve can also be dealt with in the Standing Committee of NBWL. Therefore, the procedure indicated under para 3 below needs to be followed for planning and executing any activity inside Conservation Reserve also.

3. Procedure to be followed for consideration of Proposals by the Standing Committee of National Board for Wildlife:

3.1 The User Agency/Project Proponent is required to file the application online as provided in the User Manual of Online Submission and Monitoring of Environmental, Forests and Wild Life Clearance – a Single Window Clearance System, attached herewith. (User manual has been uploaded on the website. http://www.moef.nic.in/division/orders-and-releases)

3.2 The user agency can apply for Forest, Wildlife and Environmental Clearances on the single portal. The user agency can also track the movement of the proposal through different stages of processing through the online clearance system.

3.3 The roles of various agencies involved in the process and actions required to be taken are provided in the manual. In case of difficulty, the details of concerned to be contacted have also been provided.

[**Note:** *Hon'ble Supreme Court vide their order dated 13.11.2000 had directed that there shall be no dereservation/ denotification of National Parks and Sanctuaries pending further orders. Therefore, to take up any such activity, approval from Hon'ble Court is mandatory at present.]*

4. Time lines to be followed by various agencies involved in processing the proposals:

Following time lines will be adhered by all the officials responsible for the activities indicated;

1	DFO/Wildlife Warden	i. Initial scrutiny in 5 days of receipt of the proposal ii. 30 days after receipt of complete proposal for site inspection, consultation with Conservator of Forests/ Chief Conservator of Forests/ Addl. Principal Chief Conservator of Forests and forwarding to the Chief Wildlife Warden
2	Chief Wildlife Warden	20 days from receipt of proposal for scrutiny and recommendation to the State Government for placing before the State Board for Wildlife.
3	Consultation with State Board for Wildlife and recommendation of State Government	The activity involves decision of the State Government, consultation with State Board for Wildlife and thereafter, recommendation of State Government to Ministry of Environment, Forest and Climate Change enclosing the copy of the minutes of the State Board for Wildlife. Therefore, this stage may take up to 90 days (3 months), as the State Board for Wildlife is chaired by Hon'ble Chief Minister.

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4	Ministry of Environment, Forest and Climate Change	i. Initial scrutiny in 5 days of receipt of the proposal. ii. 30 days after receipt of complete proposal for Standing Committee of National Board for Wildlife.
5	Consultation with Standing Committee of National Board for Wildlife	Meetings of Standing Committee of National Board for Wildlife are ordinarily convened once in 3 months.

5. Proposals for survey work to be carried out inside national parks and wildlife sanctuaries:

In case any kind of survey work and/or Environment Impact Assessment (EIA) studies are to be taken up in areas involving a Protected Area, and are covered under section 29 or 35(6) of WLPA, then, also the entire procedure, as prescribed in paragraph 3 above would need to be followed.

6. Activities referred by other agencies

There may be cases where chairperson of NBWL or Standing Committee of NBWL or Honourable Supreme Court of India or any other statutory agency may desire examination of any proposal by the NBWL or its Standing Committee. In such cases the agenda will be proposed in accordance with the scope of reference made to the Standing Committee, which can be submitted direct to the Member Secretary, National Board for Wild Life, Ministry of Environment, Forests and Climate Change.

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F.No.5-3/2007-FC
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
(FC DIVISION)

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi-110510

Dated the 8th September, 2009

To,

The Principal Secretary/Secretary (Forest)
All States/UT Governments.

Sub: Diversion of forests land for non-forestry purposes under Forest (Conservation) Act, 1980- guidelines for relocation/rehabilitation of villages from National Parks/ Wildlife Sanctuaries/Tiger Reserves – regarding

Sir,

The ministry of Environment and Forests, Government of India has receiving representations from different States/UT Governments stating that the clause 'legal status of forests land shall remain unchanged' precludes possibility of relocated villages, who are by and large tribals, from becoming absolute owners of the land allocated to them and by retaining the status of land as 'forests' several ongoing developmental works in the district are not implemented in the area, which deprives the relocated people from their due benefits. After careful examination of the issue, the matter was taken up with the Central Empowered Committee (CEC) which recommended to the Supreme Court for relaxation of its order dated 13.11.2000 in WP (C) No. 337/1995, to permit Ministry of Environment and Forests (MoEF), to allow change in the legal status of the forest land approved for diversion under the Forest (Conservation) Act, 1980 for the relocation of villages from the National Parks/Sanctuaries.

The Hon'ble Supreme Court of India vide its order dated 21.11.2008 in IA 1658 in WP (C) No. 202/1995, referring to the CEC's report for permission for change in the legal status of the forest land diverted under Forest (Conservation) Act, 1980 by the MoEF, for rehabilitation of villagers of three villages in Andhari Wildlife Sanctuary, Maharashtra, ordered that "… we make it clear that despite the order passed by this Court on 13.11.2000, the MoEF is permitted to change the legal status of the forest land approved under the Forest (Conservation) Act, 1980 for relocation of these villages for the purpose of extending the boundary and for rehabilitation of the tribal people residing there". It is also informed that the Hon'ble Supreme Court of India vide its order dated 09.05.2008 regarding correction of the judgment dated 28.03.2008 has already accorded full exemption from payment of

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Net Present Value (NPV) to the relocation / rehabilitation of villages from National Parks / Wildlife Sanctuaries / Tiger Reserves to alternate forest land. In this connection, this Ministry's letter of even number dated 05.02.2009 may kindly be referred to.

In view of the above, I am directed to convey the approval of the Central Government for changing the legal status of forest and, with retrospective effect covering all such cases of diversion of forest land, diverted under Forest (Conservation) Act, 1980 for relocation/rehabilitation of villages from National Parks/Wildlife Sanctuaries/Tiger Reserves from 'forest land' to revenue land'.

It is further reiterated that this stipulation is strictly restricted to relocation/rehabilitation of villages from National Parks/Wildlife Sanctuaries/Tiger Reserves.

This is issued with approval of competent authority.

Sd/-
(C.D. Singh)
Sr. Assistant Inspector General of Forests

Copy to:

1. The Principal Chief Conservator of Forests, All States/UTs.
2. The Chief Wildlife Warden, All States/UTs.
3. The Nodal Officer (FCA), O/o the PCCFs, All States/UTs.
4. All Regional Offices of MoEF located at Bhopal, Shillong, Bengalore, Bhubaneshwar, Lucknow and Chandigarh.
5. The RO (HQ), MoEF, New Delhi.
6. Monitoring Cell, FC Division, MoEF, New Delhi.
7. Guard File.

Sd/-
(C.D. Singh)
Sr. Assistant Inspector General of Forests

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REPORT OF THE CENTRAL EMPOWERED COMMITTEE IN IA NO. 3924 OF 2015 IN IA NO. 1658 IN WRIT PETITION (CIVIL) NO. 202 OF 1995
(Dated : 26th December 2018)

REPORT OF THE CEC IN IA NO. 3924 OF 2015 IN IA NO. 1658 IN WRIT PETITION (CIVIL) NO. 202 OF 1995 FILED BY THE GOVERNMENT OF INDIA, MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE (MOEF&CC) THROUGH THE NATIONAL TIGER CONSERVATION AUTHORITY SEEKING CLARIFICATION OF THE ORDER DATED 21.11.2008 OF THE HON'BLE SUPREME COURT PERMITTING CHANGE IN LEGAL STATUS OF FOREST LAND APPROVED UNDER THE FOREST (CONSERVATION) ACT, 1980 TO REVENUE LAND IN RELOCATION/REHABILITATION CASES FROM CRITICAL TIGER HABITATS AND CORE AREA OF PROTECTED AREAS (NATIONAL PARKS AND WILDLIFE SANCTURIES)

Dated : 26th December 2018

1. The Assistant Inspector General, National Tiger Conservation Authority (NTCA) has filed IA No. 3924 of 2015 in IA No. 1658 in WP (C) No. 202 of 1995 before this Hon'ble Court with the following prayer:
   (a) Clarify its order dated 21.11.2008 in IA No. 1658 in W.P. (C) No. 202 of 1995 permitting change in legal status of forest land approved under the FC Act, 1980 to revenue land in all such relocation/ rehabilitation cases from Critical tiger habitats and core areas of Protected Areas (National Park and Wildlife Sanctuaries); and
   (b) Pass such other order and further orders as this Hon'ble Court may deem fit and proper in the facts and circumstances of the case."
2. This Hon'ble Court in the above IA has vide its order dated 03.08.2018 directed the CEC to file its Report within six weeks. This Report is being filed after hearing the officials of the MoEF&CC and the Member Secretary, National Tiger Conservation Authority (NTCA) in a meeting taken by CEC on 26th September, 2018 and after going through the records made available to the CEC.
3. Earlier the CEC has filed its Report dated 28.9.2006 before this Hon'ble Court on an Application filed before it by the Member Secretary, Tiger Conservation Authority seeking permission of this Hon'ble Court for change in the legal status of the forest land approved under FC Act by MoEF&CC to revenue land for rehabilitation of villagers of three villages namely, Kosla, Botezari and Palasgaon in Andhari Wildlife Sanctuary in District Chandrapur, Maharashtra. The CEC has in its above Report recommended modification of the following order dated 13..11.2000 of this Hon'ble Court in Writ Petition

   (Civil) No. 337 of 1995. " …..*pending further orders, no de-reservation of forests / Sanctuaries / National Parks snail be affected".*
4. After considering the Report dated 28.9.2006 of the CEC this Hon'ble Court by order dated 21.11.2C08 permitted MoEF&CC to change the legal status of the forest land approved under the FC Act, 1980 for relocation of the three villages for the purpose of extending the boundary and for rehabilitation of the tribal people residing therein.

5. Pursuant to the above order dated 21.11.2008 of this Hon'ble Court MoEF&CC vide letter dated 8.9.2009 conveyed approval of the Central Government for changing legal status of the forest land to revenue land with retrospective effect covering all such cases of diversion of forest land diverted under FC Act, 1980 for relocation rehabilitation of villages

from National Parks / Wildlife Sanctuaries / Tiger Reserves (Annexure A-4 of IA No. 3924 of 2015). While the order dated 21.11.2008 of this Hon'ble Court is specific to the relocation of the three villages in Andhari Wildlife Sanctuary in District Chandrapur, Maharashtra the letter dated 8.9.2009 of MoEF&CC has conveyed the general approval for changing the legal status of forest land diverted under PC Act, 1980 for relocation of villages in respect of ail such cases from the Sanctuaries and National Parks.

6. It has been stated by NTCA that as per the records available with them pertaining to the 18 States so far 177 villages (out of the 751 identified villages) have been relocated

from core / critical tiger reserves as per provisions in Section 38 V(5) of Wildlife (Protection) Act, 1972. Further out of 177 villages as many as 122 villages have been rehabilitated on

forest land. However only in 42 cases out of 122 cases the forest land has been de-notified. The remaining 55 villages out of 177 have been rehabilitated on revenue and. A copy of the

letter dated 20.12.2018 received from NTCA is enclosed as **ANNEXURE R-1** to this Report.

7. The Applicant, NTCA, has prayed to extend the exception to the directions in the order dated 13.11.2000 granted in the order dated 21.11.2008 in IA No. 1658 in Writ Petition (Civil) No. 202 of 1995 to all such cases of voluntary village relocation / rehabilitation from core critical tiger habitats and core areas of Protected Areas (National Parks and Wildlife Sanctuaries) to the periphery of forest land being undertaken as per provisions in Section 38 of Wildlife Protection Act, 1972. The prayer has been made on the following grounds:
   (i) Section 36 V (5) Wildlife (Protection) Act, 1972 has outlined the procedure for voluntary village relocation from core/critical tiger habitat areas of tiger reserves which has been operationalised through the NTCA;
   (ii) Retention of the legal status of the relocated forest land as forest deprives of developmental benefits to the relocated families who are mainly tribals and which is working counterproductive to voluntary relocation as well as protection and conservation of the wildlife;
   (iii) A total of 751 villages have been identified in notified / core / critical tiger habitats for relocation out of which only 177 villages have so far been relocated. The change in legal status of the relocated land to revenue will encourage the villagers to come forward for voluntary relocation;
   (iv) The change in status of the relocated land from forest to revenue. Fosters several on-going developmental activities in the relocated areas which is precluded if status remains that of forest land;
   (v) relocation of the villages from the core of the protected areas and the tiger reserves helps in conservation of the natural resources and will result in significant improverment in the ecological function of National Parks Wildlife Sanctuaries:
8. The CEC after detailed deliberation with the officials of the MoEF&CC and the NTCA is of the considered view that the order dated 21.11.2008 of this Hon'ble Court in I.A. No. 1658 in WP (C) 202 of 1995 may be extended to all such cases of relocation/ rehabilitation of the villages from the core/

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critical tiger reserves and core of the protected areas (National Parks and Sanctuaries) to the periphery of Reserve Forest/ Sanctuaries / National Parks subject to the following conditions:

a) Resettlement/ relocation within the boundaries of the notified forest land be considered only if suitable non-forest land is not available within the vicinity of the protected area from where the relocation is proposed;
b) The District Collector concerned shall furnish to the NTCA a certificate of non-availability of land suitable for relocation of the villages located within the protected area and tiger reserves before any proposal of relocation within the forest is approved;
c) The land identified for relocation / rehabilitation should not result in fragmentation of the forest/ wildlife habitat;
d) The relocation activity shall be undertaken solely as a process of consolidation of the wildlife habitat;
e) The relocation shall be undertaken only along the fringes of the forest such that all facilities to the resettled families can be provided without recourse to further diversion of forest land for providing infrastructure.
f) The land / villages within the forest which have been vacated shall be brought under the protected area network through enabling notification under the Wildlife Protection Act after extinguishing all the existing rights over the vacated land:
g) The extent of land de-reserved / de-notified for resettlement shall not be more than the extent vacated by the settlers in the core area; and
h) The payment of NPV and cost of CA may be exempted in all such cases of voluntary relocation / rehabilitation of families from the protected areas undertaken within the forest land;

This Hon'ble Court may please consider the above Report and may please pass appropriate order in the matter.

Sd/-
(Amarnatha Shetty)
Member Secretary

Dated: 26th December, 2018

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F. No. 8-34/2017-FC
Government of India
Ministry of Environment, Forest & Climate Change
(FC Division)

Indira Paryavaran Bhavan
Jor Bagh Road, Aliganj
New Delhi – 110003

Dated 20 the May, 2019

To,

The Principal Secretary (Forests),
All States/Union Territory Governments,

Sub: Order of the Hon'ble Supreme Court dated 28.01.2019 on I.A. No 3924/2015 in WP (Civil) 202/1995 regarding changing status of forest land to revenue land in case of voluntary relocation of villages-reg.

Sir,

I am directed to refer to Hon'ble Supreme Court order dated 28th January, 2019 wherein the Hon'ble Supreme Court, based on recommendation made in the CEC report dated 28.09.2018, in which it has extended the scope of its order dt. 21.11.2008 to all such cases of relocation/rehabilitation of the villages from the core/critical Tiger Reserves and core of the Protected Areas (National Park and WL Sanctuaries) to the periphery of Reserved forests/Sanctuaries/ National Park subject to following conditions:

a) Resettlement/relocation within the boundaries of the notified forest land be considered only if suitable non-forest land is not available within the vicinity of the protected area from where the relocation is proposed;
b) The District Collector concerned shall furnish to the NTCA a certificate of non-availability of land suitable for relocation of the villages located within the Protected Area and Tiger Reserves before any proposal of relocation within the forest is approved;
c) The land identified for relocation/rehabilitation should not result in fragmentation of the forest/ wildlife habitat;
d) The relocation activity shall be undertaken solely as a process of consolidation of the wildlife habitat;
e) The relocation shall be undertaken only along the fringes of the forest such that all facilities to the resettled families can be provided without recourse to further diversion of forest land for providing infrastructure;

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f) The land/ villages within the forest which have been vacated shall be brought under the protected area network through enabling notification under the Wildlife Protection Act after extinguishing all the existing rights over the vacated lad;

g) The extent of land de-reserved / de-notified for resettlement shall not be more than the extent vacated by the settlers in the core area; and

h) The payment of NPV and cost of CA may be exempted in all such cases of voluntary relocation/ rehabilitation of families from the protected area undertaken within the forest land.

In this regard, it is informed that in compliance of the above order of the Hon'ble Supreme Court dt. 28.01.2019, the approval of the competent authority of the MoEF&CC is hereby conveyed for change in the legal status of forest land to revenue land in respect of all the 122 villages in 18 states (as mentioned in letter vide 12-12/2015-NTCA dated 20.12.2018 of NTCA to Member Secretary, CEC), which have been relocated to forest areas from the National Parks/Wildlife Sanctuaries/Tiger Reserves. Copies of letter of NTCA to CEC dt. 20.12.2018, Hon'ble Supreme Court orders dt. 21.11.2008 & 28.01.2019, Report of CEC dt. 26.12.2018 are enclosed.

It is also to inform that in future, all relocation/rehabilitation cases involving forest land shall be considered for change in legal status of the forest land on case to case basis as per the provisions under Forest (Conservation), Act, 1980, subject to condition at para-1 above.

The issues with approval of the Hon'ble Minister, EF&CC.

Yours Faithfully,

Sd/-
Shrawan Kumar Verma
Deputy Inspector General of Forests

Copy to:

1. Principal Chief Conservator of Forest, all States/UTs Governments.
2. Nodal Officer, the Forest (Conservation) Act, 1980, all States/UTs Governments
3. All Regional Offices, MoEF&CC
4. PPS to Member Secretary, CEC
5. PPS to the Secretary, EF&CC/PPS to the DG of Forests & Spl. Secretary, MoEF&CC
6. PPS to all ADGFs (Incl. NTCA)/IGFs, MoEF&CC
7. Monitoring cell (FC Division)
8. Guard file

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Government of India
Ministry of Environment, Forest and Climate Change
National Tiger Conservation Authority
****

F. No. 12-12/2015-NTCA **New Delhi, the February 11, 2019**

To,

The Chief Wildlife Warden(s)
All Tiger Range States

Sub.: Order of the Hon'ble Supreme Court dated 28.01.2019 in I.A. No. 3924/2015 in WP (Civil) 202/1995 regarding changing status of forest land in context of voluntary village relocation.

Madam/Sir,

Reference is invited to the subject & order cited above. In this context, I am directed to inform that the Hon'ble Apex Court in I.A. 1658 in WP (C) 202/1995 permitted the Ministry of Environment, Forest and Climate Change to change the legal status of forest land to revenue under the Forest (Conservation) Act, 1980 for relocation of Kolsa, Botezari and Palasgaon (Single) villages from the Tadoba Andhari Tiger Reserve vide their order dated 21.11.2008.

2. Consequently, the MoEF & CC vide their letter no. 5-3/2007-FC dated 8.9.2009 conveyed approval of the Central Government for changing the legal status of forest land with retrospective effect covering all such cases of diversion of forest land, diverted under Forest (Conservation) Act, 1980, for relocation/rehabilitation of villages from National Parks/Wildlife Sanctuaries/Tiger Reserves from "forest land" to "revenue land".

3. However, the FC Division of the MoEF&CC had referred the matter to this Authority as the aforesaid order named only 3 villages of the Tadoba-Andhari Tiger Reserve, which rendered it unsuitable for blanket implementation, and deemed their aforesaid letter void.

4. This Authority sought comments of the Ministry of Law and Justice which advised to file a Clarificatory Application before the Apex Court in the matter, which this Authority duly did vide letter of even no. dated 8.10.2015, which was registered as I.A. 3924 of 2015 in WP(C) 202/1995. This Authority had prayed the Hon'ble Apex Court to clarify its order dated 21.11.2008 in IA No. 1658 in W.P. (C) No. 202 of 1995 permitting **change in legal status of forest land approved under the FC Act, 1980 to revenue land in all such relocation/rehabilitation cases from critical tiger habitats and core areas of Protected Areas (National Parks and Wildlife Sanctuaries).**

5. The Hon'ble Apex Court referred the matter to the Central Empowered Committee (CEC) who filed their report no. 50/2018 dated 26.12.2018 (enclosed) based on which the Hon'ble Court passed order dated 28.01.2019 in I.A. 3924 of 2015 (enclosed) which is reproduced verbatim as below :

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"Report No. 50 of 2018 of the CEC dated 26.12.2018 is accepted since it is not objected by the National Tiger Conservation Authority (NTCA). The Application is disposed of".

6. Hence, in all cases of voluntary village rehabilitation carried out from core/critical tiger habitats of Tiger Reserves, National Parks and Wildlife Sanctuaries, on notified forest land, it may be ensured that a proposal for change in legal status should also be furnished concomitantly so that rehabilitated people may avail benefit of welfare schemes/amenities unhindered.

Yours faithfully,

End. As above

Sd/-
(Dr. Valbhav C. Mathur)
Assistant Inspector General (NTCA)

F.No. 12-12/2015-NTCA

Copy to:

1. All Field Director(s).
2. PPS to Secretary, EF &CC
3. PPS to DGF & SS
4. PPS to ADG (FC)
5. PPS to ADG (Wildlife)
6. All Regional Offices of the NTCA
7. All Regional Offices of the MoEF&CC

Sd/-
(Dr. Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

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भारत सरकार
Government of India
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest & Climate Change
राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण
National Tiger Conservation Authority
****

F. No. 15-37/2012-NTCA (Vol-I) **New Delhi, the December 12, 2019**

To,

The Chief Wildlife Warden(s),
All Tiger Range States.

Sub: Advisory for Retirement of Captive Elephants in Tiger Reserves-reg.

Sir,

You are aware that state forest departments throughout the country manage captive elephants in Elephant Camps. Some of these elephant camps are established in Tiger Reserves, where the elephants are used for various activities including tourism & patrolling.

Director, Project Elephant vide his letter No. 9-5/2003-PE dated 08.01.2008 has issued **Guidelines for care & management of captive elephants**, with respect to housing of elephant, care of elephant, feeding of elephant work load of elephant, records to be kept and acts which are tantamount to cruelty to elephants. Further, these guidelines also prescribe for retirements of captive elephants as below;

1. An elephants shall normally be allowed to retire from its work on attaining an age of 65 years.
2. Healthy elephants above 65 years of age shall be allowed to be put to light work under proper health certificate from the veterinary doctor.

In this regard, I am directed to request you to take necessary action for retirement of elephants attaining an age of 65 years so that the related guidelines are strictly adhered to. All such captive elephants qualifying for retirement as per above guidelines shall not be used for the purpose of tourism and any other kind of rides etc. A copy of these guidelines is enclosed with a request to provide information regarding number of elephants in captivity in various camps in Tiger Reserves with their age and retirement status to this Authority at the earliest.

End: As above.

Yours Faithfully,
Sd/-
(Surender Mehra)
Deputy Inspector General of Forest (NTCA)
E-mail: dig1-ntca@nic.in
Tel. No. +91 11 2436 7837-39
Fax: +91 11 2436 7836

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F. No. 15-37/2012-NTCA (Vol-I)

Copy to:

1. ADG (WL), Ministry of Environment, Forest & Climate Change.
2. The Director, Project Elephant, Ministry of Environment, Forest & Climate Change.
3. Field Director(s), All Tiger Range States.
4. PS to ADG (PT) & MS (NTCA), New Delhi.

Sd/-
(Surender Mehra)
Deputy Inspector General of Forest (NTCA)

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Enclosure

Guidelines for Care and Management of Captive Elephants

(Issued by Director, Project Elephant vide letter No. 9-5/2003-PE dated 8-1-08)

Ownership Certificate:

1. All States/UTs would carry out a fresh survey of the captive elephants in their territory within a period of six months and report the number to the ministry. All the captive elephants shall be microchipped for which chips have been provided in adequate numbers to the states/ UTs. Fresh ownership certificate should be issued in the form annexed for a period of five years and should be renewed every five years in case there is no violation of the norms to be followed.
2. Illegal elephants i.e. those which have not been declared under the declaration of the Wild Life Stock Rules 2003 or are found without valid documents will be confiscated.
3. It would be mandatory for the owners to declare in writing in advance to the nearest Divisional Forest Officer or to the authorised officer by the state government of the pregnancy of the female elephants in order to get fresh ownership certificate of the calf. The certificate would be issued to the calves of the legal cows only physically ascertaining that they are genuine offspring or after getting the DNA test done.

Transportation of Elephants:

1. For transportation of elephants, necessary permission from CWLW (Chief wildlife Warden) or any officer authorised by the government in this behalf shall be obtained as per Section 48 A of the Wiled Life (Protection) Act 1972.
2. A valid health certificate from a veterinary doctor to the effect that the elephant is fit to travel by road or rail, as the case may be, and is not showing any sign of infectious or contagious disease shall be obtained.
3. In the absence of such certificate, CWLW shall not give permission for transport.
4. Permission, if any, should be given for transport to a particular destination and for a fixed period. It would be incumbent for the owner to bring back the elephant to the place of residence within this period.
5. Before the issue of transport permit, CWLW or the authority issuing the permit would obtain no objection from the CWLW of the state where it is to be transported about the availability of the adequate housing facility at the place where it is to be kept.
6. It will be mandatory for the owner to inform the CWLW of the state within 30 days where it has been transported.
7. Except for the return journey, no permission for the further onward transport of the elephant to other states will be given by the CWLW of the state where it is in transit.
8. In case any captive elephant is found in any state without valid transport certificate, it is liable for confiscation.
9. CWLWs may consider banning of captive elephants entry in municipal limits under Section 40 (2).

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Norms and Standards for Transportation:

(a) The elephant shall be properly fed and given water before loading.

(b) Necessary arrangements shall be made for feeding and watering the elephant en route.

(c) No elephant shall be made to walk for more than three hours at a stretch.

(d) While transporting elephants by walk during nights, two prominent reflectors shall be placed at the front and hind portion of the elephant.

(e) No elephant shall be made to walk more than 30 kms a day and any transportation for more than 50 kms shall be carried out in a vehicle.

(f) Trucks with length less than 12 feet shall not be used for carrying elephants except calves (height below of and 1.59 m).

(g) One truck shall not be used to carry more than two weaned calves (height below 1.50 m) or one elephant with one unweaned calf or one adult/sub-adult elephant (height below of and 1.51 m).

(h) At least a 12 hour rest should be allowed to elephants for every 12 hours of journey by trucks.

(i) Cow elephants in advanced stage of pregnancy shall not be transported by trucks.

(j) While transporting elephants by rail, an ordinary goods wagon should not carry more than three adult elephants or six calves on broad guage, or not more than two elephants or three calves on meter gauge, or not more than one adult elephant or two calves on narrow gauge.

(k) While transporting elephants by truck or train, care shall be taken to maintain constant speed avoiding jerks and sudden stops and reducing affects of shocks and jolts to the minimum.

(l) Each truck or wagon carrying elephant should have at least two attendant mahouts.

(m) Sedatives, if necessary, shall be used to control nervous or temperamental elephants only as prescribed by the veterinary doctor.

(n) Vehicle breakdown is one of the most common problems contributing to unsuccessful translocation. Therefore, it should be ensured that the vehicle is in order and a trained mechanic with tools must accompany the vehicle. The vehicle must have drainage facility to keep it dry and must have a water storage facility.

Housing of Elephants:

(a) The owner shall provide a stable (tethering place) in a clean and healthy environment with sufficient shade to keep elephants during its rest period;

(b) Each elephant must be ensured a minimum floor area as specified below:-

(i) Weaned calf (height below 1.50 m) - 5m × 2.5 m

(ii) Sub-adult elephant (height 1.50 m to 2.25 m) - 7m × 3.5 m

(iii) Adult elephant (height above 2.25 m) and cow elephant with unweaned calf -9m × 6m

(c) In the case of covered sheds, the height of the structure shall not be less than 5.5m.

(d) Corrugated iron sheets or asbestos when used for roofing of elephant stables shall be covered with cooling materials like gunny bags, grass, cadjan leaves etc.

Care of Elephant:

(a) The mahout shall ensure that the elephant gets a thorough bath every day.

(b) If the elephant is found sick, injured, unduly stressed or pregnant the mahout shall report the condition to the owner, who in turn shall consult a veterinary doctor for providing treatment expeditiously.

(c) Routine examination including parasitic checks shall be carried out regularly and preventive medicines including vaccination be administered at such intervals as may be prescribed by the veterinary doctor.

(d) The owner shall arrange for a medical check-up of the mahout responsible for the upkeep of the elephant at least once in two years to ensure that they do not have any diseases, which may infect the elephant.

(e) The organisers of festivals where elephants are used shall submit in writing the programmes with details to the station house officer and the Range Officer having jurisdiction over the area, who in turn shall ensure the implementation of the provisions in these rules.

(f) The owner shall inform within 24 hours, to the Chief Wildlife Warden or the nearest forest officer, the cases of attack of anthrax, rinderpest, hemorrhagic scepticemia, surra or any other contagious diseases and shall follow the instructions issued by the authorities regarding the treatment of the animal or disposal of the carcass. The Chief Wildlife Warden or an officer authorised by him shall ensure proper veterinary assistance and advice.

(g) The owner shall obtain prior permission of the Chief Wildlife Warden or the officer authorised by him before undertaking distortions, sterilisation, vasectomy, tubectomy or any other population control measures for the elephant and shall ensure the assistance of a competent veterinary doctor for these measures.

(h) The elephant showing symptoms of 'musth' shall be examined by a Veterinary Doctor;

(i) No drugs or intoxicants shall be used to suppress 'musth' except on a written prescription by a veterinary doctor.

(j) The owner of the elephant shall ensure that in case of 'musth', the elephant is secured properly and does not become a hazard to the public at large;

(k) An elephant in 'musth' shall not be put to any work.

(l) No owner shall put to work, any elephants pregnant of 12 months or above, or any cow elephant having a sucking calf of age below 6 months, or any elephant of height below 5 feet.

(m) No owner shall permit the use of nylon ropes or chains/hobbles with spikes or sharp edges for tying the elephants.

(n) Weight of the chains and hobbles shall be commensurate with the age and health of the elephant.

(o) No owner shall permit any type of harness which may expose the back or other sensitive organs of the elephant to pain and injury.

(p) No owner shall permit his elephant to be trained by a trainer who is not approved by the Chief Wildlife Warden or the officer authorised by him for the purpose.

(q) The owner shall report within 24 hours, to the Chief Wildlife Warden or to the officer authorised by him, the death of an elephant and the tusks, if any, shall be declared within one week to the Chief Wildlife warden for obtaining ownership certificate.

(r) The owner shall get the post-mortem examination of the elephant done by a veterinary doctor and shall submit the report to the Chief Wildlife Warden or the officer authorised by him within 15 days of the death.

Feeding of Elephants:

(a) The owner or the person who is managing the elephant on contract or the person who has taken the elephant for his own purpose shall ensure timely supply of wholesome feed with variety in required quantity to each elephant. Green fodder shall be supplemented by ration as prescribed by the veterinary doctor;

(b) The minimum feed supply for elephant shall be as follow:

Height of Elephant	**Green Fodder**
Below 1.50 m (weaned alf)	Not less than 100 kg
1.50m to 1.80m	Not less than 150 kg
1.81m to 2.25m	Not less than 200 kg
Above 2.25 m	Not less than 250 kg (or 5% of its body weight)

(c) Supply of sufficient quantity of succulent food to the elephant shall be ensured during hot climate;

(d) The owner or contactor or hirer of the elephant shall provide sufficient potable drinking water to the elephant, preferably from a river or any other source of running water.

Work Load of Elephant:

(a) The scale of load including gears, riders and materials for the elephant shall be as follow:

Height of Elephant	**Load**
Below 1.50 m	Not to be used for carrying load
1.50m to 1.80m	Not exceeding 150 kg (to carry only fodder and trainer)
1.81m to 2.25m	Not exceeding 200 kg
2.26m to 2.55m	Not exceeding 300 kg
Above 2.55m	Not exceeding 400 kg

(b) The load scale shall be reduced by 50% in hilly or other difficult terrain.

(c) The elephants of height below 2.10 m shall not be deployed for logging operations.

(d) The elephants of height from 2.10 m to 2.25 m shall not be used for dragging timber logs exceeding 750 kg in weight.

(e) The elephants of height above 2.25 m shall not be engaged for dragging logs exceeding 1000 kg in weight;

(f) Ill-designed logging harness such as exposing elephants back bone and chest to extreme strain and injuries, using tusks and jaws regularly for dragging timber logs, timber hauling over steep areas or rocky areas etc. shall not be done.

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Retirement of Elephants:

(a) An elephant shall normally be allowed to retire from its work on attaining an age of 65 years;
(b) Healthy elephants above 65 years of age shall be allowed to be put to light work under proper health certificate from the veterinary doctor.

Records to be kept:

(a) Every owner shall maintain the following records and registers in respect of the elephant in the form given in Appendix-II and such records and registers shall be produced before the officers authorised by the government in this behalf for inspection at such time as may be called for.
  (i) Vaccination record
  (ii) Disease and treatment record
  (iii) Movement register
  (iv) Feeding register
  (v) Work register

Cutting Tusks:

(a) The owner of the tusker shall apply for permission of the Chief Wildlife Warden or the officer authorised by him in this behalf, for cutting or shaping the tusk through a letter sent be registered post, including the location where it will be done and the name of the competent person who would perform the operation at least one month in advance.
(b) The Chief Wildlife Warden shall issue the permission within three weeks to carry out the operation in the presence of an officer not below the rank of Forest Range Officer or Forest Veterinary Officer or Assistant Forest Veterinary Officer as instructed by the Chief Wildlife Warden.
(c) The authorised officer shall report to the Chief Wildlife Warden, the details of the cut portion such as, length and weight of the tusk;
(d) In case permission is not granted, the owner shall be intimated of the reason for rejecting the request in writing;
(e) The Chief Wildlife Warden, based on a written request with the details shall issue permit to the owner for keeping the cut tusks in accordance with the provisions of the Act.

Acts which are tantamount to cruelty to elephants:

The following acts shall be considered as acts of cruelty to elephants and are prohibited:
(a) beating, kicking, over-driving, over-loading, torturing or treating any elephant so as to subject it to unnecessary pain or suffering or being an owner permitting, any elephant to be so treated.
(b) employing in any work or labour or for any purpose, any elephant which by reason of its age or disease, informity, wound, sore or other cause it unfit to be so employed or being owner permitting any such elephant to be employed.
(c) willfully and unreasonably administering any injurious drug or injurious substance to an elephant or intoxicants to control elephants particularly to suppress 'musth' without proper veterinary advice.

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(d) conveying or carrying whether in or upon any vehicle or not, an elephant, in such a manner or position as to subject it to unnecessary pain or suffering or cause accident.

(e) Keeping or confining an elephant, in any cage or receptacle, which does not measure the specification given in rule 4.

(f) keeping for unreasonable time, an elephant chained or tethered upon an unreasonably short or unreasonably heavy chain or cord;

(g) using an elephant for drawing any vehicle or carrying any load, more than nine hours a day or for more than five hours continuously without a break or rest for the elephant or exposes the elephant to hot climatic conditions without ensuring enough succulent food and electrolytes;

(h) failing to provide an elephant, with sufficient food, drinking water or shelter;

(i) abandoning an elephant in circumstances, which will render it to suffer pain by reason of starvation or thirst;

(j) offering for sale any elephant, which is suffering from pain by reason of mutilation, starvation, thirst, over-crowding or other ill treatment;

(k) not providing adequate veterinary care to a sick, injured or pregnant elephant;

(l) cutting the tusks of a bull elephant too short so as to expose horn cord/pulp;

(m) forcibly weaning away an elephant calf below 2 years of age from its mother;

(n) using heavy chains and hobbles with spikes or sharp edges or barbed wires for tying elephants;

(o) using "peti" (belly band) on cow elephants in advanced stage of pregnancy;

(p) using pad and Nundah of improper size on working elephant exposing its spinal cord to injuries;

(q) marching a sick, injured or pregnant elephant or a young calf over very long distances or for a long duration at a stretch;

(r) marching an elephant over tarred roads or otherwise, during the hottest period of the day and for a long duration at a stretch without rest for religious or any other purpose;

(s) transporting elephants on trucks of inadequate size or trucks with uneven floor, or tying them in an improper manner subjecting them to severe jerks during journey by truck;

(t) transporting elephants in trucks for over 12 hours at a stretch;

(u) transporting elephants through any conveyance without making arrangement for adequate fodder and drinking water during the journey;

(v) carrying load on an elephant without proper pad;

(w) making an elephant carry load unevenly balanced on its back;

(x) making the elephant stand in scorching sun for long duration, or put the ceremonial gears or decoration for unreasonably long duration, or burst crackers from or near the elephants for ceremonial purpose;

(y) using an elephant in such a manner so as to cause any injury, over- stress or strain to the elephant for tourism purposes;

(z) using an elephant for sports and games such as tug-of-war, foot ball etc. in such a manner so as to cause over stress or strain to the elephant.

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REGISTRATION CERTIFICATE OF OWNERSHIP OF AN ELEPHANT

NAME OF OWNER:_____

ADDRESS:_____

Description of the Elephant

1. Name of the elephant : _____
2. Age : _____
3. Sex : _____
4. Colour : _____
5. Colour of eyes : _____
6. Height : _____
7. Length : _____
8. Neck girth : _____
9. Chest girth : _____
10. Weight of the animal : _____kg
11. No. of nail : Front Rt _____Front Lft _____
    Hind Rt _____ Hind Lft _____
12. Length of Tusk/tusks along the curvature : Rt _____ cm Lft _____ cm
13. Any other identification marks : _____
    _____
    _____
    _____
14. No. of the Insurance Certificate : _____
    dated _____ of_____
    _____
15. No. of Veterinary Certificate : _____
    dated _____ of_____
    _____
16. Present market value : Rs. _____
17. Source of purchase : _____
    _____
18. Registration valid up to : _____

Place_____

Date _____

Signature of the issuing authority with date

Office Seal

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FORM FOR CERTIFICATE OF FITNESS TO TRAVEL ELEPHANTS

(This certificate should be completed and signed by a veterinary doctor)

Date and Time of Examination:
Number of Elephants:
Name of Elephants:
Age/Sex:
Number of Cages:

1. That, at the request of (consignor) _____. I examined the above mentioned elephants in their travelling cages not more than 12 hours before their departure.
2. That each elephant appeared to be in a fit condition to travel from the_____ area to _____ by road/rail and is not showing any signs of infections or contagious diseases.
3. That no cow elephant appeared to be under advanced stage of pregnancy.
4. That the elephants were adequately fed and watered for the purpose of the journey.
5. That the elephants have been vaccinated.
   (a) Type of vaccine/s
   (b) Date of vaccination/s

Signed

Address

Qualifications

Place:_____
Date: _____

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FORM OF RECORDS AND REGISTERS TO BE KEPT

1. Vaccination Record
   (a) Name of the Elephant:
   (b) Sex:
   (c) Age:

Date of Vaccination	*Name of Disease*	*Due date for next Vaccination*	*Signature of the Veterinary Surgeon*

2. Disease and Treatment Record
   (a) Name of the Elephant:
   (b) Sex:
   (c) Age:

Date of Treatment	*History*	*Description by Veterinary Surgoeon*	*Diagnosis*	*Treatment*	*Prevention Measure*	*Signature of Veterinary Surgeon*

3. Movement Register
   (a) Name of the Elephant:
   (b) Sex:
   (c) Age:

Date	*Place to Move*		*Time*		*Signature of the Mahour*
	Starting	*Finding*	*Starting*	*Finding*	

4. Feeding Register
   (a) Name of the Elephant:
   (b) Sex:
   (c) Age:
   (d) Ration prescribed by the Veterinary Surgeon:

Date	*Type of Food*	*Quantiry give Date*	*Signature of Mahour*

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5. Work Register

(a) Name of the Elephant:

(b) Sex:

(c) Age:

(d) Admissible quantum of work:

Date and Weather	*Type of Work From*	*Duration*	*Signature of Mahour*

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NATIONAL TIGER CONSERVATION AUTHORITY

(Statutory Body under the Ministry of Environment and Forest, Govt. of India)

Member Secretary

Bikaner House, Annexe-V
Shahjahan Road, New Delhi-110011
Telefax: 23384428
E-mail: dirpt-rfonic.in

Dated.: 19.02.2006

F. No. 6(4)/2005-PT (part III)

To,

The Chief Wildlife Wardens
(All Tiger Reserve States)

Sub: Clarification on concerns vis-à-vis Wildlife (Protection) Amendment Act, 2006.

Sir,

Some concerns have been raised on the recent amendment to the Wildlife (Protection) Act. It is pertinent to add that the Chapter IV (b) on the 'National Tiger Conservation Authority' has neither repeated nor overridden other parts of the principal Wildlife (Protection) Act, 1972 relating to national parks, sanctuaries, conservation or community reserves. The amendment has the effect of:

(a) Enabling designation of tiger reserves.

(b) Ensuring tiger conservation plan for each such area.

(c) Creating a Tiger Conservation Authority to ensure implementation amongst other provisions.

The recent amendment is compatible with and is in addition to and not in derogation of the principal wildlife (Protection) Act, 1972.

Based on the decision taken during the first meeting of the National Tiger Conservation Authority held on 28.11.2006 under the Chairmanship of the Minister of Environment and Forests, the following clarification are issued, in pursuance of sub-section (2) of Section 380, of Chapter IV (b) of the "Wildlife (Protection) Amendment Act, 2006:

(a) The tiger reserves notified by the State Government prior to coming into force of the Wildlife (Protection) Amendment Act, 2006 shall be eligible for receiving financial assistance. The Field Directors are required to prepare and submit the Tiger Conservation Plan before the expiry of the

present management plan after working out the compliance of sub-section (4) of Section 38 V for delineating core and buffer areas.

(b) The areas of national parks, and sanctuaries included in a tiger reserve, where the process of final declaration is yet to be completed, shall be completed under Chapter IV read new Chapter IV B of the Act.

(c) Provisions of sub-section (2) of Section 38 V of Chapter IV (b) shall be applicable only to the buffer or peripheral areas of a tiger reserve and not to areas notified as national park or sanctuary or those which are in the process of being so and form part of a tiger reserve.

(d) The process of settlement of rights in areas included in a tiger reserve, where final notification for constituting national park or sanctuaries is yet to be issued, the proceeding would be conducted as per the provisions provided in Chapter IV read with Chapter TV B of the Act.

(e) As per the procedure followed in the past, which required the States to send proposals for constituting tiger reserves to the Project Tiger, the States may continue to send such proposals to the National Tiger Conservation Authority, so as to enable the Authority to ensure the desired requisites vis-à-vis the normative guidelines for declaration of such areas, apart from making provisions for their funding support.

Yours Sincerely
Sd/-
Member Secretary (NTCA)
National Tiger Conservation Authority

Copy to: The Field Director (All Tiger Reserves States)

Sd/-
Member Secretary (NTCA)
National Tiger Conservation Authority

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NATIONAL TIGER CONSERVATION AUTHORITY

(Statutory Body under the Ministry of Environment and Forest, Govt. of India)

Member Secretary (NTCA)

Annexe No. 05 Bikaner House,
Shahjahan Road, New Delhi-110011
Telefax: 23384428
E-mail: dirpt-r@nic.in

No. PS-MS (NTCA)/2008-Miscle. **Dated the 6th November, 2008**

To,

The Chief Wildlife Warden
Govt of Tamil Nadu, 6 D, Panagal Building, No. 1, Jeenis Road, Chennai.

Sub: Applicability of section 28, 29 and 33 (a) in Project Tiger areas.
Ref: Your letter No. WL5/59746/2008 dated 31.10.2008.

Sir,

Please refer to the correspondence cited above. The desired clarification is as below:

(Applicability of section 28, 29 and 33(a) in Project Tiger areas)

A Tiger Reserve has been legally defined for the first time in the Wildlife (Protection) Amendment Act, 2006, comprising of two units, viz. core and the buffer. The core or critical tiger habitat has been explained under section 38V, which are inviolate areas of National Parks and Sanctuaries included in the tiger reserve. The buffer or peripheral areas require lesser degree of habitat protection but their aim is to promote coexistence between wildlife and human activity

Under sub-section 2 of section 38V, provisions of sub-section 2 of section 18, sub- section (2), (3) and (4) of section 27, sections 30, 32 and clauses (b) and (c) of section 33 of the Wildlife (Protection) Act have been made applicable to safeguard the interest of wildlife in areas which do not have the status of a National Park or a Sanctuary, but form part of a tiger reserve (i.e. the buffer or peripheral area). Since there is no overriding of any earlier provisions of the Act relating to chapter IV of the Wildlife (Protection) Act, 1972, section 28 is applicable to those areas of a tiger reserve which have the status of a National Park or Sanctuary.

Since the core or critical tiger habitat under section 38V of the Wildlife (Protection) Act, 1972, as amended in 2006, has to he kept inviolate for tiger conservation, no film shooting can be permitted in such areas.

Yours Sincerely,
Sd/-
Member Secretary

DETAILED GUIDELINES OF PROJECT TIGER

(Issued under National Tiger Conservation Authority (Normative Standards for Tourism activities and Project Tiger) by this Authority F. No. 15-31/2012 – NTCA dated 15th October, 2012)

13. Introduction.

13.1. 'Project Tiger' is an ongoing Centrally Sponsored Scheme of the Ministry of Environment and Forests. The revised guidelines incorporate the additional activities for implementing the urgent recommendations of the Tiger Task Force, constituted by the National Board for Wildlife, chaired by the Hon'ble Prime Minister. These, inter alia, include support for implementing the provisions of the Wild Life (Protection) Act, 1972 as amended by the Wild Life (Protection) Amendment Act, 2006, which came into force with effect from the 4th September, 2012. The activities are as follows:

(i) antipoaching initiatives;
(ii) strengthening infrastructure within tiger reserves;
(iii) habitat improvement and water development;
(iv) addressing man-animal conflicts;
(v) co-existence agenda in buffer and fringe areas with landscape approach;
(vi) deciding inviolate space and relocation of villages from critical tiger habitats within a timeframe by providing a better relocation package, apart from supporting States for settlement of rights of such people;
(vii) rehabilitation of traditional hunting tribes living in and around tiger reserves;
(viii) providing support to States for research and field equipments;
(ix) supporting States for staff development and capacity building in tiger reserves;
(x) mainstreaming wildlife concerns in tiger bearing forests outside tiger reserves, and fostering corridor conservation in such areas through restorative strategy involving local people to arrest fragmentation of habitats;
(xi) providing safeguards and retrofitting measures in and around tiger reserves and tiger bearing forests for wildlife conservation;
(xii) strengthening the infrastructure of National Tiger Conservation Authority at the Centre;
(xiii) carrying out independent monitoring and the evaluation of tiger reserves;
(xiv) establishment and development of eight new tiger reserves;
(xv) provision of project allowance to all categories of staff working in tiger reserves;
(xvi) providing residential amenities to facilitate basic education to children of frontline field staff posted in tiger reserves;
(xvii) providing assistance to States for fostering ecotourism to benefit local people.

13.2. 'Project Tiger' was launched in April, 1973 with the objective "to ensure maintenance of a viable population of Tigers in India for scientific, economic, aesthetic, cultural and ecological values, and to preserve for all times, areas of biological importance as a national heritage for the benefit, education and enjoyment of the people".

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13.3. The 'Project Tiger' has been successfully implemented, and at present, there are **41 Tiger Reserves** in **17 States**, covering an area of **63874.68 sq. km.** Apart from the above, 5 have been given in-principle approval, and for another 6, the State Governments have been advised, besides according approval for one tiger reserve in Karnataka. The selection of reserves has been guided by the need to conserve unique ecosystem and habitat types across the geographic distribution of tigers in the country.

13.4. Conservation of endangered species and their habitat, strengthening and enhancing the Protected Area Network, control of poaching, monitoring, research and ensuring people's participation in Wildlife Conservation have been accorded high priority in the National Wildlife Action Plan and the Wildlife Conservation Strategy, 2002.

14. Past funding pattern and major activities supported under the Scheme.

During present plan period, 100% Central Assistance is being made available to States for expenditure on all non-recurring items; for recurring items, the Central Assistance is restricted to 50% of the expenditure, while the matching grant is provided by the Project States. The activities and field inputs under 'Project Tiger', inter alia, include : (**Non recurring**) strengthening of protection, deployment of armed squads in tiger reserves, creating basic infrastructure for management, roads, wireless, civil works, habitat development, augmenting water resources, compensatory ameliorative measures for habitat restoration, eco-development, village relocation, use of Information Technology in crime detection, establishment of a digitized database in tiger reserves having collaborative linkage with Project Tiger Directorate in the Geographical Information System (GIS) domain, monitoring and evaluation of tiger reserves, monitoring of habitat status, carrying out All India Estimation of Tigers, co-predators and prey animals in the Geographical Information System (GIS) domain with the state of art technology, continuous monitoring of tiger populations in various tiger range States (tiger reserves and other forest areas outside tiger reserves), fostering wildlife viewing for tourists in tiger reserves, providing compensation to villagers for human deaths and livestock depredation by carnivores in tiger reserves, staff welfare measures, providing 'Project Allowance' to all categories of staff working in tiger reserves, establishment of veterinary facility, and fostering research and research projects relating to tiger conservation, replacement and purchase of new vehicles for existing and new tiger reserves to ensure staff mobility. (**Recurring**) creation and deployment of local work force for patrolling and barriers, habitat improvement, providing salt licks, water facility, fire protection measures, maintenance of various items, publicity and extension and leg al assistance.

15. Constitution of the National Tiger Conservation Authority (NTCA).

15.1. The Central Government had launched 'Project Tiger' to promote conservation of the tiger, since the significance of its conservation has ramifications beyond State boundaries. Management of forests and wildlife is primarily the responsibility of concerned States. The field implementation of the project, protection and management in the designated reserves is done by the 30 project States, who also provide the matching grant to recurring items of expenditure, deploy field staff and officers, and give their salaries. The Project Tiger Directorate of the Ministry of Environment and Forests was mandated with the task of providing technical guidance and funding support.

15.2. The implementation of 'Project Tiger' over the years has highlighted the need for a statutory authority with legal backing to ensure tiger conservation. On the basis of the recommendations

of National Board for Wild Life under the Chairmanship of the Hon'ble Prime Minister, a Task Force was set up to look into the problems of tiger conservation in the country. The recommendations of the said Task Force, inter alia include strengthening of 'Project Tiger' by giving it statutory and administrative powers, apart from creating the Wildlife Crime Control Bureau. It has also recommended that an annual report should be submitted to the Central Government for laying in Parliament, so that commitment to 'Project Tiger' is reviewed from time to time, in addition to addressing the concerns of local people. Broadly, the urgent recommendations of the said Task Force are as below:

(i) Reinvigorating the constitution of governance.

(ii) Strengthening efforts towards protection of tiger, checking poaching, convicting wildlife criminals and breaking the international trade network in wildlife body parts and derivatives.

(iii) Expanding the undisturbed areas for tiger by reducing human pressure.

(iv) Repair the relationship with local people who share the tigers habitat by fielding strategies for coexistence.

(v) Regenerate the forest habitats in the fringes of the tigers protective enclaves by investing in forest, water and grassland economies of the people.

15.3 The tiger reserves are faced with ecological disturbances and various other problems. Fragmentation of habitats occurs owing to overuse of forest habitats, apart from conflicting land uses leading to loss of habitat. There are also in some cases, significant village population with large number of cattle, which graze in the forests, leading to ecological degradation, apart from major sources of regular or intermittent disturbance, such as temples and commercial entities, such as, tea estates. This also leads to man-animal conflicts, resulting in tiger and prey mortality.

15.4. Several constraints affect field implementation of the project, such as, delayed release of Central Assistance given to the States for Field Units, staff vacancies, ageing of field staff, lack of capacity building initiatives, weak enforcement and monitoring of protection work, etc. The events in the recent past have highlighted the fact that there is a need in the States for greater commitment and vigilance. The field administration managing the tiger reserves require capacity building and supervision.

15.5. There is also an urgent need to strengthen the system at the Central Government level (Project Tiger Directorate), which has the mandate to oversee and guide tiger conservation in the country. Involvement of States and strengthening the field administration, supervision of the project and building a participatory base by including interests of local people living in and around tiger reserves are extremely important.

15.6 Considering the urgency of the situation, 'Project Tiger' has been converted into a statutory authority National Tiger Conservation Authority (NTCA) by providing enabling provisions in the Wild Life (Protection) Act, 1972 through an amendment, namely, the Wild Life (Protection) Amendment Act, 2006. This forms one of the urgent recommendations of the Tiger Task Force appointed by the Prime Minister. The NTCA would address the ecological as well as administrative concerns for conserving tigers, by providing a statutory basis for protection of

tiger reserves, apart from providing strengthened institutional mechanisms for the protection of ecologically sensitive areas and endangered species. The Authority would also ensure enforcing of guidelines for tiger conservation and monitoring compliance of the same, apart from placement of motivated and trained officers having good track record as Field Directors of tiger reserves. It would also facilitate capacity building of officers and staff posted in tiger reserves, apart from a time bound staff development plan.

15.7. Despite three decades of 'Project Tiger' and the efforts of the Centre and State Governments, tiger continues to remain one of the most endangered large predators in the world. The causative factors are many, and to name a few, we may mention the important ones like loss of habitat due to agriculture expansion and development, revenge killings by people due to man-animal conflicts and above all, the demand for the body parts and derivatives of tiger in the illegal international market. These factors contribute to the decimation of our in-situ population in the wild. Therefore, continuance of a focused, species-specific, multifaceted, ecosystem project like 'Project Tiger' becomes important and crucial at this juncture to address the threats faced by the tiger and its habitat.

15.8. The three key imperatives in tiger conservation which necessitate a 'project mode' are, namely, a focused approach to prioritize actions, in the interest of tiger conservation (within and outside the tiger reserves), eliciting the support of local stakeholder communities and ensuring the necessary infrastructure for protection and management. Considering the fact that conservation of tiger has ecological and national significance transcending State boundaries, the Central Government provides funding support and technical guidance to States through the ongoing Centrally Sponsored Scheme of Project Tiger and other schemes for wildlife conservation. Tigers are present in the forests of seventeen States in our country at present, which also include their protected areas and tiger reserves.

15.9 The distribution of tigers and their density vary in States due to several ecological and human reasons, such as, the forest cover, terrain, natural prey availability, presence of undisturbed habitat and the quality of managerial efforts taken towards protection. Since tigers are at the top of the ecological "food -chain", their conservation results in the overall conservation of all other species of plants and animals occupying the ecosystem. We can say that tigers are indicators of the well being of the ecosystem. A healthy tiger population indicates that the other ecological components in its habitat are equally robust, since tigers need large amount of prey and good habitat. The investments made in a project of this kind are more than justified.

16. Ongoing activities and additionalities to be supported under the revised Centrally Sponsored Scheme of Project Tiger.

16.1. Anti-poaching activities (ongoing) (non recurring for antipoaching squad and Tiger Protection Force deployment, and recurring for wages towards patrolling camp labourers and watchers).

The antipoaching operations in tiger reserves are site specific. However, the following activities, inter alia, would form part of the protection strategy in tiger reserves, namely:

(i) Providing 100% support to tiger reserves for raising, arming and deploying Special Tiger Protection Force (STPF).

(ii) Deployment of antipoaching squads.

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(iii) Establishing and maintenance of existing patrolling camps/chowkis and deployment of camp labourers for patrolling.

(iv) Organising vehicular patrolling by constituting squads (Tiger Protection Force), comprising of field staff, labourers and police or SAF or ex-army personnel or homeguards with wireless handset and paraphernalia for apprehending offenders, apart from prescribing a patrolling calendar for the squad.

(v) Establishing and maintenance of wireless network.

(vi) Organising surprise raids jointly with the local police in railway stations, local trains, bus-stops, buses, catchers and cafeteria.

(vii) Ensuring special site-specific protection measures during monsoon as 'Operation Monsoon' – considering the terrain and accessibility of Protected Areas.

(viii) Deployment of ex-army personnel and home guards.

(ix) Deployment of local work force for patrolling, surveillance of water holes, manning barriers.

(x) Procurement of arms and ammunition.

(xi) Procurement/maintenance of elephant squads.

(xii) Rewards to informers.

(xiii) Legal support for defending court cases.

(xiv) Procurement of vehicles, boats.

(xv) Procurement field gear, night vision device.

16.2. Strengthening of infrastructure within Tiger Reserves (ongoing) (non recurring for new civil works and recurring for maintenance).

The following activities, inter alia, would form part of reinforcing the infrastructure of tiger reserves (including support to new tiger reserves):

(i) Civil Works (staff quarters, family hostels, office improvement, patrolling camp, house keeping buildings, museum, culverts).

(ii) Maintenance, creation and upgradation of road network.

(iii) Maintenance and creation of wireless tower.

(iv) Maintenance and creation of fire watch tower.

(v) Maintenance and creation of bridges, dams, anicuts.

(vi) Maintenance, creation of firelines and firebreaks.

(vii) Maintenance and creation of earthen ponds.

(viii) Procurement and maintenance of vehicles (Gypsy, Jeep, Truck, Tractor etc.).

(ix) Habitat improvement works.

(x) Procurement of hardware, software / Geographical Information System (GIS).

(xi) Procurement of compass, range finder, Global Positioning System (GPS), camera traps

(xii) Procurement of satellite imageries for management planning.

(xiii) Map digitization facility for management planning.

(xiv) Monitoring system for Tigers' Intensive Protection and Ecological Status (M-STrIPES) monitoring.

(xv) E-surveillance.

16.3. Habitat improvement and water development (ongoing) (recurring).

These, inter alia, may include: weed eradication, removal of gregarious plant growth from grasslands, grass improvement, water retention structures and the like. These initiatives would increase the forage and browse values of the habitat for wild animals.

16.4. Addressing man-animal conflict (ensuring uniform, timely compensation for human deaths due to wild animals, livestock depredation by carnivores, crop depredation* by wild ungulates) (compensation for crop loss is a new component) (non recurring).

16.4.1. This would involve:

(i) Payment of compensation for cattle lifting, death of human beings and crop depredation* due to wild animals.

(ii) Creation of crop protection structures.

(iii) Procurement and deployment traps, cages to catch problematic animals.

(iv) Procurement of tranquilizing equipments, rescue vehicles and drugs.

16.4.2. The above initiatives are extremely important to avoid as well as redress the "park-people" interface conflicts.

(*would be supported as per prevailing norms of the State, in the delineated buffer area as explained in Section 38V of the Wild Life (Protection) Act, 1972, as amended in 2006.)

16.5. Co-existence agenda in buffer and fringe areas (landscape approach, sectoral integration, ecologically sustainable development programme, livelihood options and eco-tourism) (new activity in case of tiger reserves where buffer has not been notified so far) (non recurring).

The fringe areas around tiger reserve have corridor value, and their ecological sustainability is important to prevent the area from becoming ecological sinks on account of over use of resources and unwise land use. This calls for delineation of buffer zone around a tiger reserve to incorporate such fringe areas so that it can fulfill the following objectives, namely:

(i) Providing ecologically viable livelihood options to local stakeholders for reducing their dependency on forests.

(ii) Conserving the forest area through restorative inputs involving local people for providing habitat supplement to wild animals moving out of core areas.

A comparative assessment of the forest cover status of outer fringe areas of tiger reserves up to a radial distance of 10 kms. has been done in collaboration with the Forest Survey of India. The States are required to delineate the fringe or buffer area around the core zones of tiger reserves, and submit a Tiger Conservation Plan as required under section 38 V of the Wild Life (Protection) Act, 1972, to ensure wildlife conservation while addressing the livelihood issues relating to local people.

16.6 Rehabilitation package for traditional hunting tribes living around tiger reserves (new activity) (non recurring).

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There is an urgent need to launch a rehabilitation and development programme for the denotified tribes and tribes involved in traditional hunting, living around tiger reserves and tiger corridors. The following denotified tribes and communities are involved in traditional hunting of wild animals: Behelias, Ambalgars, Badaks, Mongias, Bavariyas, Monglias, Pardhi, Boyas, Kaikads, Karwal Nat, Nirshikaris, Picharis, Valayaras, Yenadis, Chakma, Mizo, Bru, Solung and Nyishi. While this list is not exhaustive, around 5,000 such families are required to be taken up under a welfare programme (forming part of NTCA initiatives) during the Plan period. The rehabilitation and welfare package should be evolved in a site specific, consultative manner with livelihood options, to include: wages for such people towards their deployment in foot patrolling for protecting wildlife, providing agricultural land with irrigation, basic health care, housing and related community welfare inputs and basic education facilities. The experience gained in the past for settling denotified tribes by the salvation army is required to be considered dispassionately while structuring the programme.

16.7. Research and field equipments (ongoing) (non recurring).

The All India tiger estimation using the new methodology approved by the Tiger Task Force has resulted in a permanent monitoring protocol for the field units. The format and protocol used for the Phase-I data collection in the new estimation process should be adopted for day-to-day field monitoring. Further, assistance would be provided for fostering field oriented research and to equip the staff with facilities like Global Positioning System (GPS), camera traps, night vision, range finder and related accessories including hardware and software. As decided in the 1st meeting of the National Tiger Conservation Authority, the tiger reserves are required to carry out the day to day monitoring of wild animals using the refined process in the GIS domain, which would enable "forecasting" vis-à-vis wildlife protection.

16.8. Staff development and capacity building (ongoing) (non recurring).

This would involve:

(i) Capacity building and training.
(ii) Providing project allowance and special incentives.
(iii) Specialized training in the use of Global Information System (GIS), antipoaching operations.
(iv) Specialized training in jurisprudence and wildlife forensics.
(v) Study tours for appraisal of good practices in other reserves.
(vi) Dissemination workshops.
(vii) Specialized training in park interpretation.
(viii) Specialized training in management planning.

The above inputs are extremely important for enhancing the skill of field staff. Several instances of poaching occur for want of specialized training in crime detection and related skills.

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16.9. Deciding inviolate spaces for wildlife and relocation of villagers from core or critical tiger habitats in tiger reserves within a timeframe and settlement of rights (settlement of rights is a new activity) (non recurring).

16.9.1. The Wild Life (Protection) Act, 1972, as well as the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, require that rights of people (Scheduled Tribes and other traditional forest dwellers) recognized in forest areas within core and critical tiger and wildlife habitats of tiger reserves and protected areas may be modified and resettled for providing inviolate spaces to tiger and wild animals. This requires payment of compensation (rights settlement in addition to the relocation package offered under the Centrally Sponsored Scheme at present). Chapter IV of the Wild Life (Protection) Act, 1972 (section 24) provides for acquisition of rights in or over the land declared by the State Government under section 18 (for constituting a Sanctuary) or section 35 (for constituting a National Park). Subsection (2) of section 24 of the said Act, authorizes the Collector to acquire such land or rights. Therefore, payment of compensation for the immovable property of people forms part of modifying or settling their rights which is a statutory requirement.

16.9.2. The ongoing study and the analysis of the available research data on tiger ecology indicate that the minimum population of tigresses in breeding age, which are needed to maintain a viable population of 80-100 tigers (in and around core) require an inviolate space of 800-1000 sq km. Tiger being an "umbrella species", this will also ensure viable populations of other wild animals (co-predators, prey) and forest, thereby ensuring the ecological viability of the entire area or habitat. Thus, it becomes an ecological imperative to keep the core areas of tiger reserves inviolate for the survival of source populations of tiger and other wild animals.

16.9.3. Based on the recommendations of the professional agency, a new package for village relocation and rehabilitation has been proposed, with the following options and norms, which adequately covers the "National Rehabilitation and Resettlement Policy, 2007", while taking into consideration the difficulties and imperatives involved in relocating people living in forest areas.

16.9.4. The proposed package has two options, namely:

Option I – Payment of the entire package amount (Rs. 10 lakhs per family) to the family in case the family opts so, without involving any rehabilitation and relocation process by the Forest Department.

Option II –Carrying out relocation and rehabilitation of village from protected area and tiger reserve by the Forest Department.

(i) In case of option I, a monitoring process involving the District Magistrate of concerned District would be ensured so that the villagers rehabilitate themselves with the package money provided to them. In this regard, a mechanism involving handholding, preferably by external agencies should also be ensured, while depositing a considerable portion of the amount in the name of the beneficiary in a nationalized bank for obtaining income through interest generated.

(ii) In case of option II, the following package (per family) is proposed, at the rate of Rs. 10 lakhs per family, namely:

(a)	Agriculture land procurement (2 hectare) and development	:	35% of the total package
(b)	Settlement of rights	:	30% of the total package
(c)	Homestead land and house construction	:	20% of the total package
(d)	Incentive	:	5% of the total package
(e)	Community facilities commuted by the family (access road, irrigation, drinking water, sanitation, electricity, tele-communication, community center, religious places of worship, burial and cremation ground)	:	10% of the total package

(iii) The relocation process would be monitored and implemented by the following two Committees, namely:

State level Monitoring Committee consisting of:

(a) Chief Secretary of the State - Chairman
(b) Secretaries of related departments - Members
(c) State Principal Chief Conservator of Forests - Member
(d) Non-official members of respective Tiger Conservation Foundation - Members
(e) Chief Wildlife Warden - Member- Secretary.

District level Implementing Committee for ensuring convergence of other sectors, consisting of:

(a) District Collector - Chairman
(b) Chief Executive Officer (CEO) - Member
(c) Representative officials from Public Works Department (PWD), Social Welfare, Tribal Department, Health Department, Agriculture Department, Education Department, Power and Irrigation Departments - Members
(d) Deputy Director of the tiger reserve or protected area - Member Secretary

(iv) **The above cost norms are indicative in nature to facilitate flexibility for State and site specific situation, and may be modified to allow inter component as well as inter family adjustments by respective State Governments as per site specific requirements.**

(v) **The relocated village would be taken up on a priority basis for eco development as well as local development through convergence of District level schemes.**

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(vi) **The labour oriented works involved in the relocation process would be preferably implemented through the villagers who are being relocated, so that they derive benefits out of the same apart from ensuring the field implementation to their satisfaction.**

(vii) **In case resettlement has been done on a forest land, the new settlement will be eligible for access to forest resources for their bonafide use through the Village Level Committee and Gram Sabhas.**

(viii) **The District Administration would facilitate fair price shop, education, health centre close to the relocated site.**

(ix) **"Handholding" after relocation would be ensured through the forest department with ongoing ecodevelopmental inputs through Central assistance and district administration involving convergence of schemes. In this effort help of competent independent agencies may be sought wherever available.**

(x) **The relocated villagers would be given priority for livelihood options emanating from the protected area.**

(xi) **In case the cost of relocation including settlement of rights per family exceeds Rs. 10 lakhs, the State Government has to meet the extra cost.**

(xii) **The relocation process would be an open ended one, since the progress of relocation process would depend on performance by States.**

16.10 Main streaming wildlife concerns in tiger bearing forests and fostering corridor conservation through restorative strategy involving locals to arrest fragmentation of habitats (new activity) (non-recurring).

16.10.1. The forests connecting tiger reserves or protected areas have tigers and other wild animals in most of the States. At present, there is no Scheme for addressing wildlife concerns in such areas, where restorative as well as protective inputs are required. The Wild Life (Protection) Act, 1972, provides for addressing such corridor areas. This, inter alia, would involve the following, namely:

(i) Redressing man-animal conflict.

(ii) Capturing problematic and aberrant wild animals.

(iii) Monitoring of wild animals.

(iv) Antipoaching operations.

(v) Habitat improvement measures.

16.10.2. The communities living in fringe areas of National Parks, Sanctuaries and tiger reserves suffer from frequent depredation of their crops on account of damage caused by wild herbivores like blue bull, black buck, wild pig and elephants. The situation becomes acute in certain pockets, since people depend on a single annual rain fed crop with low productivity. This is one of the major reasons for man-animal conflicts around our Tiger Reserves and Protected Areas, and is a serious bottleneck in enlisting the much needed local support for wildlife conservation.

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16.10.3 Under Section 11 of t h e Wild Life (Protection) Act, 1972, the State Chief Wildlife Wardens and officers authorized on his behalf can permit killing of wild animals causing destruction to life and property, including standing crops. However, rural communities do not favour such killings due to religious sentiments attached to these animals. Trapping and translocation of such wild animals which gain a pest value is neither feasible nor cost effective. Therefore, the situation calls for adequately compensating the stakeholder communities around tiger reserves from this recurring loss. This would be supported as per prevailing norms of the State, in the delineated buffer area as explained in Section 38V of the Wild Life (Protection) Act, 1972, as amended in 2006.

16.11 Safeguards and Retrofitting measures in the interest of wildlife conservation (new activity) (non recurring).

Several tiger reserves are affected on account of heavily used infrastructure like roads, railway tracks and others. The high tension electric lines passing through many reserves cause mortality of wild animals due to electrocution by poachers. In the interest of wild animals several safeguards as well as retrofitting measures may be required, which would be supported on a site-specific basis.

16.12 Providing basic infrastructure/Project Tiger Headquarter expenditure for consultancy, field visits by expert teams, all India tiger estimation/ continuous monitoring of tigers (Phase-IV), support for monitoring tigers outside tiger reserves through NTCA grant, developing a National Repository of Camera Trap Photo Database of tiger, strengthening of NTCA at the Centre and Regional Offices, besides establishing a monitoring lab (non recurring).

16.13 Independent monitoring and evaluation of tiger reserves (ongoing) (non recurring).

The independent monitoring of tiger reserves was carried out using as many as 45 parameters by a panel of experts, based on International Union for Conservation of Nature format. The monitoring reports were peer reviewed by the International Union for Conservation of Nature and placed before the Parliament. An independent Management Effectiveness Evaluation was again carried out in 2010-2011, which would be repeated again in subsequent years.

16.14 Establishment and development of new tiger reserves (new activity) (recurring and non recurring as indicated for various activities).

16.14.1 'Project Tiger' has a holistic ecosystem approach. Though the focus is on the flagship species 'tiger', the project strives to maintain the stability of ecosystem by fostering other trophic levels in the food chain. This is essential to ensure an ecologically viable population of tiger, which is at the 'apex' of the ecological food chain. The community pressures on forests are ever on the increase in developing countries, and India is no exception. As a sequel, the tiger habitat has become fragile and weak at several places, warranting a focused conservation approach. Our protected areas and tiger reserves are analogous to "islands" in an ocean of the other- use patterns. Empirical evidences from 'island biogeography' indicate that "isolated" reserves lose their species rapidly owing to 'ecological insularization'. Further, apart from fragmentation, the situation is aggravated by degraded forest cover owing to biotic pressure, dislocated prey – predator ratio, absence of effective measures to ensure the desired level of protection

and lack of eco developmental initiatives for the fringe dwelling stake holders to reduce their dependency on forest resources. Since 'Project Tiger' would go a long way in redressing the above situation, the Steering Committee of Project Tiger in its meeting held on 23rd January, 2003 recommended inclusion of new tiger reserve areas so as to increase the total area of ' Project Tiger' from existing 37761 sq. kms. To 50,000 sq. kms. during the X Plan period.

16.14.2 In-principle approval has been accorded for declaring the following tiger reserves:

Sl. No.	*Name of Tiger Reserve*	*State*
1.	Ratapani	Madhya Pradesh
2.	Sunabeda	Odisha
3.	Pilibhit	Uttar Pradesh
4.	Mukundara Hills (including Darrah, Jawahar Sagar and Chambal Wildlife Sanctuaries)	Rajasthan
5.	Sathyamangalam	Tamil Nadu

16.14.3 Further, the following areas have been suggested, by the National Tiger Conservation Authority to States, for creation as tiger reserves are given below:

Sl. No.	*Name*	*State*
1.	Nagzira-Navegaon	Maharashtra
2.	Bor	Maharashtra
3.	Suhelwa	Uttar Pradesh
4.	Guru Ghasidas	Chhattisgarh
5.	Mahdei	Goa
6.	Srivilliputhur Grizzled Giant Squirrel / Megamalai Wildlife Sanctuaries / Varushanadu Valley	Tamil Nadu

16.14.4 Final approval has been accorded for the Kudremukh Tiger Reserve (Karnataka).

16.15 Provision of Project Allowance to staff (all categories) of Project Tiger (providing project allowance to Ministerial staff is a new component) (non recurring).

16.15.1 The officers and staff of tiger reserves receive Project Allowance as approved by the Expenditure Finance Committee and Cabinet Committee on Economic Affairs during IX plan period as detailed below:

(a) Field Director - @ Rs. 1000 per month
(b) Deputy Director - @ Rs. 750 per month
(c) Assistant Director/ Research Officer/Veterinary Officer (equivalent rank) - @ Rs. 650 per month
(d) Forest Ranger and equivalent rank - @ Rs. 500 per month

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(e) Forester and equivalent rank - @ Rs. 450 per month

(f) Forest Guard and equivalent rank - @Rs. 350 per month

16.15.2 The offices of tiger reserves are located in remote places. More often than not, the ministerial staff prefer postings elsewhere in regular Forest Division offices, as a result of which the routine official working in the Project Tiger Office are adversely affected. Further, several ongoing complimentary schemes from the Collector Sector are also dovetailed in tiger reserves as a part of the eco development strategy to benefit the stake holders. Such ongoing schemes, enhance the office work and therefore, able ministerial support becomes extremely crucial. However, to attract the best talent, it is proposed to extend the project allowance to ministerial staff working in tiger reserves as indicated below:-

Class II - Rs 500 (per employee per month)

Class III - Rs 350 (per employee per month)

Class IV - Rs 200 (per employee per month)

16.15.3 The above rates were doubled for the existing categories of eligible employees with the approval of the Ministry of Finance with effect from the 1st September, 2008.

16.16 Staff welfare activities (non recurring).

The field staff of tiger reserves serve in remote and difficult areas, often subjected to endemic diseases like malaria, dengue, water-borne infections, apart from facing the risk of chance encounters with wild animals. Further, such postings are normally 'non- family postings', and the frontline personnel has to bear the cost of maintaining his family in a nearby village or town having the basic schooling and medical facilities. It is relevant to add, accommodation in such rural areas are seldom readily available. In addition, the field staff of a tiger reserve, unlike his counterpart in Territorial Forest Divisions, has also to bear the brunt of local community dwelling in fringe areas, owing to restrictions on the latter for free access to forest resources. Thus, the role of a frontline field personnel in a protected area or tiger reserve is different from his counterpart in regular Forest Divisions. The physical assault on the staff of tiger reserves and protected areas by people nurturing a grudge against the management is more common, often resulting in casualties. Therefore it becomes essential to provide amenities for staff welfare, to attract the best talent in the working age group. During the Plan period, staff welfare inputs like residential accommodation for the children of frontline staff in nearby towns or villages, supply of kerosene, medicine, field kit, mosquito net, torch and the like would be supported.

16.17 Fostering Tourism/Ecotourism in tiger reserves (new activity) (non recurring).

'Tourism' in the context of tiger reserves is contemplated as "ecotourism", which needs to be ecologically sustainable nature-tourism. This is emerging as an important component of tourism industry. It is distinct from 'mass tourism', having sustainable, equitable, community based effort for improving the living standards of local, host communities living on the fringes of tiger reserves. Ecotourism is proposed to be fostered under 'Project Tiger' to benefit the host community in accordance with tiger reserve specific Tourism Plan forming part of the Tiger Conservation Plan, subject to regulation as per carrying capacity, with a focus on buffer areas. Since, tourism has been happening in areas of national parks and wildlife sanctuaries which

are now designated as core and critical tiger habitat, regulated low impact tourism (visitation) would be allowed in such areas subject to site specific carrying capacity. However, no new tourism infrastructure should be permitted in such core and critical tiger habitats. Further, the buffer forest areas should also be developed as wildlife habitats with the active involvement of local people living in such areas. This would provide extended habitat to tiger population for its life cycle dynamics, besides benefitting local people from ecotourism activities in such areas while reducing the resource dependency of people on core and critical tiger habitats and human-tiger interface conflicts. The opportunities for stakeholders would include management of low cost accommodation for tourists, providing guide services, providing sale outlets, managing excursions, organizing ethnic dances and the like.

16.18 **Change in the funding pattern in respect of North Eastern States by increasing the central share from the existing 50% to 90% for Recurring Expenditure, with the States' share becoming 10%. The ongoing support for Non-Recurring Expenditure would continue to be 100%.**

There is considerable delay in the release of central assistance to the field formations (tiger reserve) by the North Eastern States under the Project Tiger Scheme, owing to non availability of matching State share for recurring activities, despite allocation from the Centre. There has been a demand for increasing the central share in the recurring component of funding support. Accordingly, the central share has been increased from 50% to 90% for recurring items of expenditure.

16.19 **Raising compensation for man-animal conflict to Rs. 2 lakhs in case of loss of human life, 30 per cent of the same for grievous injury and cost of treatment for minor injury (Non-Recurring).**

The human-wildlife interface is extremely sensitive due to spill over of wild animals from core areas of tiger reserves. The loss on account of such depredation needs to be compensated adequately in a time bound manner to avoid 'revenge killings'. The compensation on man-wildlife conflict has been doubled from Rs. 1 lakh to Rs. 2 lakh in the case of loss of human life, while the compensation for serious injury has been retained at 30% of the amount of compensation on death, besides meeting the cost of treatment of minor injuries to people due to wildlife.

16.20 **Acquisition of private land for making the core and critical tiger habitat inviolate (Non-Recurring).—**

In several tiger reserves, there are private land holdings/estates within the core and critical tiger habitats of tiger reserves. The above component has been included under the Project Tiger Scheme for providing 100% central assistance to States to acquire such areas, if necessary, for making the core/critical tiger habitat inviolate.

16.21 **Establishment of Tiger Safari, interpretation and awareness centres under the existing component of 'co-existence agenda in buffer and fringe areas', and management of such centres through the respective Panchayati Raj Institutions (creation – Non-Recurring; maintenance – Recurring).**

The Tiger Safaris may be established in the buffer areas of tiger reserves which experience immense tourist influx in the core/critical tiger habitat for viewing tiger. The interpretation and awareness centres would also be supported in such buffer areas to foster awareness for eliciting public support. The management of such centres would be through the respective Panchayati Raj (PR) institutions.

16.22 **Re-introduction of Cheetah in the States of Madhya Pradesh and Rajasthan under the Scheme at a cost of Rs. 50 crore after ensuring the historical co-existence of Cheetah with other carnivores, especially the tiger.**

Reintroduction of large carnivores has increasingly been recognised as a strategy to conserve threatened species and restore ecosystem functions. The Cheetah is the only large carnivore that has been extirpated, mainly by over-hunting in India in historical times. Based on the recommendations of an expert group involving the Wildlife Institute of India, the Ministry of Environment and Forests has decided to take up reintroduction of cheetah in the States of Rajasthan (Shahgarh area) and Madhya Pradesh (Kuno-Palpur and Noradehi Wildlife Sanctuaries). The said States would receive 100% support towards village relocation, habitat management and restoration, holding facility, veterinary facility, training professionals, monitoring, procurement of cheetah, eco-development in the fringes and maintenance.

17. **State to enter into Memorandum of Understanding.**

The Tiger Reserve States would be required to enter into a Tripartite Memorandum of Understanding with the Ministry of Environment and Forests, as provided in the format at **Appendix-C.**

18. The Tiger Reserves would receive funding support under the ongoing Centrally sponsored Scheme of 'Project Tiger' on the basis of a reserve specific Tiger Conservation Plan as required under Section 38V of the Wildlife (Protection) Act, 1972, as amended in 2006. This should be prepared in accordance with the guidelines issued by the National Tiger Conservation Authority. Till the preparation and approval of the Tiger Conservation Plan vis-à-vis the provisions of the Wild Life (Protection) Act, 1972, the tiger States would be required to send an interim Indicative Tiger Conservation Plan which should form the basis of the Annual Plan of Operations to obtain funding support under 'Project Tiger'.

19. The centrality of Panchayati Raj Institution should be ensured through consultation for deployment of local workforce, issues relating to man – animal conflicts, livelihood options, village relocation and eco-tourism.

F. No. 7-9/2010-NTCA (Part)
Government of India
Ministry of Environment, Forest and Climate Change
National Tiger Conservation Authority
****

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Fax: +011-2436 7836

Dated : 28.11.2018

To,

The Chief Wildlife Warden(s),
All Tiger Range States.

Sub: Compliance of the statutory provisions in context of infrastructure Development Projects-reg.

Sir,

Reference is invited to the subject cited above. In respect of infrastructure development projects, especially in context of linear development, the statutory role of this Authority is clearly outlined in the Wildlife (Protection) Act, 1972 which is **re-iterated** as follows;

1. **Section 38 (O) (1) (b) of the Wildlife (Protection), Act, 1972;**
   The Tiger Conservation Authority shall have the following powers and perform the following functions, namely: -
   "Evaluate and assess various aspects of sustainable ecology and disallow any ecologically unsustainable land use such as, mining, industry and other projects within tiger reserves,"
2. **Section 38 (O) (1) (g) of the Wildlife (Protection) Act, 1972:**
   The Tiger Conservation Authority shall have the following powers and perform the following functions, namely: -
   "ensure that the tiger reserves and areas linking one protected area or tiger reserve with another protected area or tiger reserve are not diverted for ecologically unsustainable uses, except in public interest and with the approval of the National Board for Wildlife and on the advice of the Tiger Conservation Authority,"

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Accordingly, the "flow" of obtaining clearance in respect of the aforesaid sections is re-iterated as under.

1. Project proposal involving area falling within a Tiger Reserve:

   In respect of projects falling within a notified tiger reserve, be it core or buffer, irrespective of area involved, the project proposal need wildlife clearance. Therefore, the project proponent shall have to submit proposal to the Chief Wildlife Warden of the concerned State and (*) the proposal shall be placed before the State Board for Wildlife (SBWL). The proposal (**) shall be forwarded for consideration of the Standing Committee (SC) of the National Board for Wildlife (NBWL). The Standing Committee of NBWL shall refer it to the National Tiger Conservation Authority for its advise as per provisions of section 38 (O) (1) (b) of the Wildlife (Protection) Act, 1972. The NTCA shall after due scrutiny advice the SC of NBWL for allowing or disallowing the project. There may be areas within the buffer where legal status of the land can be other than forest. Herein too, section 38 (O) (1) (b) shall be invoked and the Chief Wildlife Warden can refer the matter directly to the NTCA.

2. Project proposal involving corridor/linking area, irrespective of legal status of land:

   In such projects, the project proponent may have to seek wildlife or forest clearance or both. The latter clearance shall be necessitated in case legal status of the land is forest.

   In respect of wildlife clearance, the project proponent shall have to submit proposal to the Chief Wildlife Warden of the concerned State and (*) the proposal shall be placed before the State Board for Wildlife (SBWL). The proposal (**) shall be forwarded for consideration of the Standing Committee (SC) of the National Board for Wildlife (NBWL). The Standing Committee of NBWL shall refer it to the National Tiger Conservation Authority for its advise as per provisions of section 38 (O) (1) (g) of the Wildlife (Protection) Act, 1972. The NTCA shall after due scrutiny advice the SC of NBWL for allowing or disallowing the project.

   I am directed to request you to follow the above statutory provisions in letter and spirit particularly in respect of all projects falling within the notified tiger reserves and its corridors for wildlife clearance irrespective of area involved and requirements of obtaining forest clearance or not.

   This issues under section 38 (O) (2) of the Wildlife (Protection) Act, 1972 and approval of the Competent Authority.

Yours Faithfully,

Sd/-
(Nishant Verma)
Deputy Inspector General of Forests (NTCA)

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Copy to:

1. The Field Director(s), All Tiger Reserves.
2. The Inspector General of Forest (WL), MoEF&CC, New Delhi.
3. The IGF/AIGF, NTCA Regional Offices, Guwahati, Nagpur & Bengaluru.
4. PS to ADG (PT) & MS (NTCA).

Note: The words *'if found sustainable'* (*) and '*if agreed upon'* (**) deleted vide F.No. **7-9/2010-NTCA (Part) dated 30.12.2019**

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भारत सरकार
Government of India
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest & Climate Change
राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण
National Tiger Conservation Authority

F.No.1-7/2009–NTCA (Part-II) **New Delhi, the December 27, 2019**

To,

Chief Wildlife Warden(s),
All Tiger Range States

Sub: Order issued under section 11 (1) (a) and 12 (a) (b) of the Wildlife (Protection) Act, 1972.
Ref: This Authority's letter of even number dated 12.09.2019.

Sir,

Reference is invited to this office even letter dated 12.09.2019. It is clarified that speaking order of hunting of wild animal issued by the Chief Wildlife Warden under section 11(1) (a) of the Wildlife (Protection) Act, 1972 need to be invariably sent to this Authority for information in case of Tiger. No prior permission needs to be taken in this regard.

However, following needful action shall be taken in such situations;

1. All efforts shall be made to ***capture or tranquilize*** the identified Tiger (which has become dangerous to human life or disabled or diseased beyond recovery) while issuing speaking orders to that effect by the Chief Wildlife Warden.
2. The Tiger captured, tranquilized shall be rehabilitated back to wild, while ensuring ***minimum trauma*** to the animal.
3. Chief Wildlife Warden has to take the final decision on whether a tiger has to be ***released back in the wild or transferred to a zoo*** while issuing a speaking order.
4. Failing all such efforts, in case of ***permission for killing such animal***, a speaking order in writing and stating reasons therefore, to be issued by Chief Wildlife Warden.
5. Copies of such orders with respect to Tigers shall always be sent to this Authority.
6. Standard Operating Procedure for ***Dealing with the emergency arising due to straying of Tigers in human dominated landscape*** and other related SOPs/Advisories/Guidelines issued by this Authority should also be adhered to while dealing with such situation.

Further, in view of section 38 O (f) & (k) of the Wildlife (Protection) Act, 1972 and various Advisories/SOPs issued by this Authority, cases of capture and collaring of Tigers for the purpose of education, scientific research and monitoring shall require prior permission of this Authority as well as Central Government (Ministry of Environment, Forest & Climate Change) under section 12 (a) & (b) of the Act.

Yours Sincerely,

Sd/-
(Dr. Anup Kumar Nayak)
Member Secretary (NTCA)
Email: ms-ntca@nic.in
Tel. (EPABX): + 91 11 24367837-39
FAX: +91 11 24367836

F.No.1-7/2009–NTCA (Part-II)

Copy to:

1. The Additional Director General of Forest (Wildlife), Ministry of Environment, Forest & Climate Change
2. The Add. Chief Secretary/ Principal Secretary/ Secretary, Forest, Govt. of Tiger Range States
3. The Field Director(s), All Tiger Range States
4. All Regional Offices, NTCA (Bengaluru, Nagpur & Guwahati)

Sd/-
(Dr. Anup Kumar Nayak)
Member Secretary (NTCA)

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F.No.7-25/2012-FC
Government of India
Ministry of Environment, Forest and Climate Change
(Forest Conservation Division)

Indira Paryavaran,
Bhawan Aliganj, Jorbagh Road,
New Delhi -110003

Dated: 24th October, 2016

To,

The Principal Secretary (Forests),
All States/ Union Territories.

Sub.: Guidelines for diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980- Guidelines for laying transmission lines through forest areas -*reg.*

Sir,

In continuation of this Ministry's letter of even number dated 5th May 2016 on the above-mentioned subject where under this Ministry sent a copy of revised guidelines for laying transmission lines through forest are as,I am directed to say as below:

(i) The norms/ standard for laying underground insulated cables through forest areas shall be as below:

Line Voltage	*Trench Width*	*Trench Depth*
33 KV	600 mm	1200 mm
11 KV	300 mm	900 mm

(ii) For laying double circuit (D/C) underground cables through forest areas trench width shall be twice the afore-mentioned width stipulated for the single circuit cable.

(iii) The following shall be ensured while laying and maintenance of 11 KV and 33 KV transmission and distribution lines in areas critical from wildlife point of view:

(a) Laying/maintenance of lines shall conform to IS 5613, Rural Electrification Corporation Limited (REC) Construction Standards and applicable guidelines of Central Board of Irrigation and Power;

(b) Suitable guard spikes may be provided on 400 Volts, 11 KV and 33 KV poles at height of 4 ft. and 7 ft. toward off animals coming close to poles and likely to damage it by rubbing against them;

(c) Tower accessories as stipulated in Indian Electricity Rules, 1956 shall be provided on all the towers;

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(d) Concerned Electricity Department should undertake rigorous exercise to inspect the lines so as to ensure that mandatory ground clearances are not violated as stipulated in the Indian Electricity Rules, 1956. Lines should be inspected periodically, say, at least once in a year by electricity Department officials and corrective actions shall be taken in this regard. Maintenance of the minimum ground clearance and periodical inspection should be certified by an officer not below the rank of an Executive Engineer;

(e) Joint inspection of every transmission/distribution line by officials of Electricity Department and Forest Department may be undertaken twice in a year, say, once before onset of monsoon and once after monsoon so as to identify any need for lopping of trees and ensuring necessary action in this regard;

(f) Every tripping of an Electric line should be investigated by the owners of such line and they should take suitable measures to avoid recurrence of the same;

(g) Forest Department shall inform the concerned power supplier/line owner of the area about every electrical accident occurring in and around forest area involving human/animals which in turn shall submitan accident report in Performa as given at Annexure-XI II of Indian Electricity Rules, 1956 duly completed in all respects to Electrical Inspector of the State. All electrical accidents should be investigated by Electrical Inspector and suitable measures should be taken as proposed in the investigation report.

(iv) In case of the demand for **reduction in the width of right of way (Ro W) of transmission lines in forest areas in the cases where ABC cables are used in place of overhead lines,** it is clarified that as per definitions in Measures relating to Safety and Electric Supply, Regulations, 2010, conductor is defined as bare or insulated and as such the vertical & horizontal clearance specified in Regulation 61 have to be maintained for both bare and insulated conductors like ABC *etc.*

(v) To prevent death of animals like elephant *etc.* in the forest areas due to electrocution by the distribution lines, in the forest area the distribution companies shall preferably use ABC or underground cable. In case of the overhead lines, the clearance above ground of the lower conductor of 1 l KV and 33 KV overhead lines should be as per the CEA regulation 58(3) and 58(4) or above maximum trunk height of the elephant, which ever higher.

Yours faithfully,

Sd/-
(Nisheeth Saxena)
Sr. Assistant Inspector General of Forests

Copy to:-

1. Prime Minister's Office ***(Kind attn.:*** Shri Ajeet Kumar, Deputy Secretary), South Block, New Delhi.
2. Secretary, Ministry of Power, Government of India, Shram Shakti Bhawan, New Delhi.
3. Principal Chief Conservator of Forests, all States/Union territories.

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4. Nodal Officer, the Forest (Conservation) Act, 1980, all States/Union territories.
5. All Regional Offices, Ministry of Environment. Forest and Climate Change (MoEFCC), Government of India (GoJ).
6. Joint Secretary in-charge, Impact Assessment Division, MoEF&CC,GoI.
7. All Assistant Inspector General of Forests/Director in the Forest Conservation Division, MoEF&CC,Gol.
8. Deputy Secretary (ROHQ) Division, MoE F&CC,Gol.
9. Sr. Director (Technical), NIC, MoEF&CC, GoI with a request to place a copy of the letter on website of thisMinistry.
10. Sr. PPS to the Secretary, Ministry of Environment, Forest and Climate Change, Gol.
11. PPS to the Director General of Forests & Special Secretary, MoEF&CC,Gol.
12. PPS to the Addl. Director General of Forests (Forest Conservation), MoEF&CC, Gol. 1 3. PPS to the Inspector General of Forests (Forest Conservation), MoEF&C C, Gol. 1 4. Guard Fi1e.

Sd/-

(Nisheeth Saxena)

Sr. Assistant Inspector General of Forests

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F. No.15-5/2008-NTCA (Part-III)
Government of India
Ministry of Environment, Forest
National Tiger Conservation Authority
***

Annexe No. 05 Bikaner House,
Shahjahan Road, New Delhi-110011
E-mail: jdntca@gmail.com
Telefax: 2338 4428

Dated the 9th January, 2013

To,

The Chief Wildlife Warden(s),
Uttar Pradesh, Uttarakhand, Rajasthan, Madhya Pradesh, Arunachal Pradesh, Karnataka, Maharashtra, Tamil Nadu, Assam, Odisha.

Sub: Guidelines for constituting the Special Tiger Protection Force (STPF) – Option-II (comprising of forest personnel)-reg.

Ref: This Authority's letter No. 15-5/2008-NTCA (Part-I) dated-11th August, 2009.

Sir,

In supersession of guidelines issued reference, I am directed to forward herewith "Guidelines for constituting the Special Tiger Protection Force (STPF) – Option-II (comprising of forest personnel)" for necessary action and implementation.

Yours Faithfully,

Encl: As above.

Sd/-
(S. P. Yadav)
Deputy Inspector General (NTCA)

Copy to:

1. PS to MEF.
2. PPS To Secretary (E&F).
3. PPS to DGF & SS, MoEF.
4. Regional Offices of NTCA- Guwahati/Bengaluru/ Nagpur.

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GUIDELINES FOR CONSTITUTING THE SPECIAL TIGER PROTECTION FORCE (STPF)
OPTION-II (Comprising of Forest Personnel)

1. **Preamble**

The policy initiative announced by the Finance Minister in his Budget speech of 29.02.2008, interalia, contained action points relating to tiger protection (para 114, Sl. No. 73). A one time grant of Rs. 50.00 crore was proposed to the National Tiger Conservation Authority (NTCA) for raising and deploying the Special Tiger Protection Force. The instant guidelines are issued for providing a second option (comprising of forest personnel) for the same.

2. Central Assistance (100%) would be provided to States under the ongoing Centrally Sponsored Scheme of Project Tiger for raising, arming and deploying the STPF.

3. **Description of the STPF:**

(A) Name of the Force:

Special Tiger Protection Force (STPF), to be raised, armed and deployed by the tiger States in tiger reserves as a specialized force for tiger protection, on the lines of 'India Reserve Battalion', with 100% central assistance under the ongoing Centrally Sponsored Scheme of Project Tiger.

(B) **Composition of the Force:**

(i) The STPF will not be "Armed Force of the Union", but a modest, dedicated force comprising of forest personnel as suited to tiger reserves, not conforming to the large scale of Central Forces.

(ii) The STPF would be comprised of 13 companies, and would be a specialized Force with its own structure and composition as required for tiger reserves.

(iii) Each company (of 112 personnel) of the STPF would be headed by the Tiger Force Assistant Conservator of Forests and three Tiger Force Range Officers.

(iv) The STPF personnel would serve in the force till the age of 40 years, and should be later absorbed by the Forest Department on posts outside the Tiger Reserve, while ensuring new, suitable substitutes. In States having more than one tiger reserve, the STPF personnel would normally be posted in a reserve for a minimum tenure of three years.

(v) In all, there would be 90 Special Tiger Guards in a company, who would be equivalent to the rank of a regular Forest Guard in the State Forest Department. To deploy local forest dwelling people like Van Gujjars, Gonds etc., 30% of this strength should be drawn from such local people. However, since such locals may not possess the academic qualifications prescribed by the States for appointment as Forest Guards, they may be appointed by creating a lower cadre of 'Forest Watchers' through appropriate relaxation of academic requirements, without comprising the physical standards. The appointment of all personnel would be done by the respective State Governments as per their rules and procedures. The STPF should be recognized as a separate cadre with due identity having professional competence through specialized training.

(C) **Structure of a company:**

(i) Each company would comprise of three platoons, with each platoon under a Tiger Force Range Officer, assisted by 36 Special Tiger Guards.

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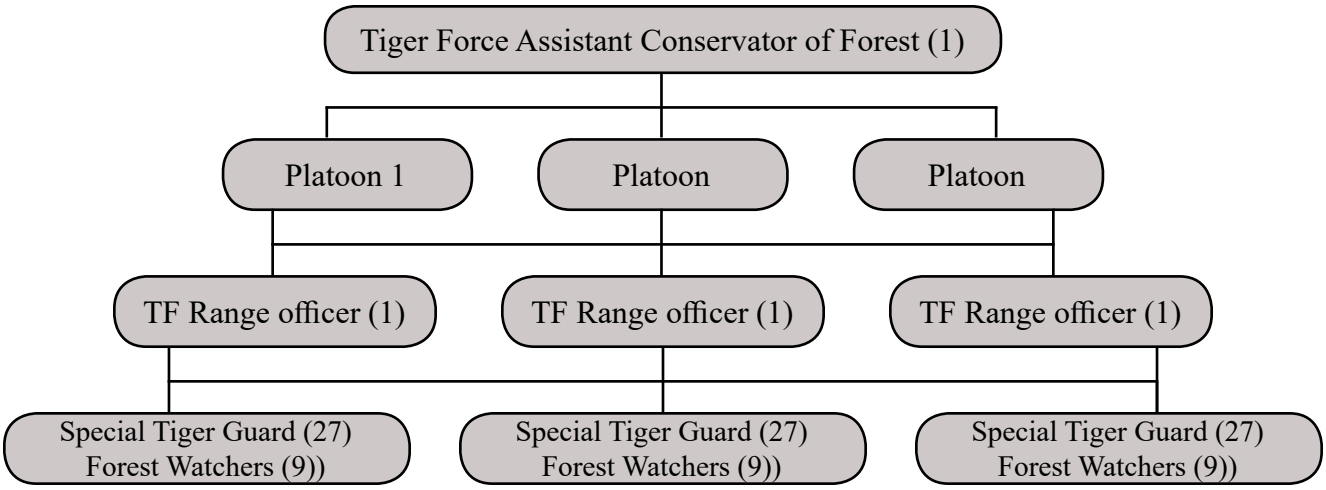

The cost details relating to salary, procurement of vehicles, arms and ammunition, infrastructure are provided in Annexures-I to V.

(D) **Overall command and control:**

(i) The Tiger Force Assistant Conservator of Forests in-charge of the STPF and other personnel would work under the overall control and supervision of the Field Director of a Tiger Reserve. The administrative, operational command would be under the control of the Field Director of the tiger reserve. The NTCA, through the Centrally Sponsored Scheme of Project Tiger would be required to pay the deployment charges to the State Government or reimburse such costs relating to STPF, on the lines of India Reserve Battalion. The reimbursement / payment would be 100% central assistance from the ongoing Centrally Sponsored Scheme of Project Tiger. The deployment charges in this regard would be borne under Project Tiger.\

(ii) Only during an emergency situation, the Ministry of Environment and Forests, GoI would have the authority to ask the State for deployment of the STPF companies from one reserve / area to another within the same State using the first right of call. Otherwise, the STPF would be under the overall administrative control of the State Authorities, recruited and deployed with 100% central assistance on the lines of India Reserve Battalion. The Government of India will also have full authority to ask the State Government to make the companies available for deployment elsewhere in other tiger reserves within the State, or in sensitive interstate borders for tiger protection. It will also have the right to decide the number of companies to be posted in each tiger reserve.

(E) Recruitmen:

(i) The recruiting authority for the STPF would be the local Forest Department of the State, subject to the educational qualifications and physical standards prescribed by them. However, to ensure uniformity across States and to provide special identity to the STPF, it is important to include representatives from the State Police Department and the Paramilitary Forces alongwith State officials in a specially constituted Selection Committee for final selection.

(ii) Recruitment to the posts of Special Tiger Guards / Forest Watchers of the STPF companies would be done by locally from the State where the Tiger Reserve is situated, while the Tiger

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Force Assistant Conservator of Forests and the Tiger Force Range Officers would be appointed to the force on deputation from the State Forest Department.

(iii) The Assistant Conservator of Forests and the Range Officers would be selected on deputation from the State Cadre to the STPF through a Selection Committee comprising of State Government officials and representatives from the Police and Paramilitary Forces to ensure required physical standards, aptitude and age below 40 years.

(iv) On attainment of the age of 40 years, STPF personnel would be transferred out of the Tiger Reserve to other units of the State Forest Department. The State Governments must concur to absorb the STPF personnel in the regular establishment of their Forest Department after such personnel attain the age of 40 years for posting in any area within the said Department, other than tiger protection.

(v) In all, there would be 90 Special Tiger Guards in a company, who would be equivalent to the rank of a regular Forest Guard in the State Forest Department. To deploy local forest dwelling people like Van Gujjars, Gonds etc., 30% of this strength should be drawn from such local people. However, since such locals may not possess the academic qualifications prescribed by the States for appointment as Forest Guards, they may be appointed by creating a lower cadre of 'Forest Watchers' through appropriate relaxation of academic requirements, without comprising the physical standards. The appointment of all personnel would be done by the respective State Governments as per their rules and procedures. The STPF should be recognized as a separate cadre with due identity having professional competence through specialized training.

(F) Legal immunity to STPF for discharging the official mandate:

(i) The STPF personnel, being forest officers, will have policing powers as conferred to them by law.

(ii) The State Government would be required to confer powers to the STPF personnel under sub-section (3) of Section 197 of the Code of Criminal Procedure, 1973 (2 of 1974), and all powers enabling it in that behalf, the power to use fire arms to combat tiger poaching and related offence within the tiger habitat, through a notification. In this context, sub-section (2) of Section 197 of the Code of Criminal Procedure, 1973 (2 of 1974) should be made applicable to all personnel of the STPF.

(iii) Whenever, firing is resorted to by the STPF personnel, each such incident shall be enquired into by the Executive Magistrate; any proceeding, including instituting a criminal case or arrest can be initiated only if it is held, as a result of the Magisterial Enquiry, that the use of fire arms has been unnecessary, unwarranted and excessive, only after such report has been accepted by the Government after due examination.

(G) Other features:

(i) The STPF, not being an "Armed Force of the Union", would be used only for tiger protection, and under no circumstances would be requisitioned in aid of Civil Authority, for any other district work. A draft MOU to be formalized between the Government of India through the NTCA and the State of deployment is appended as Annexure-VI.

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(ii) The initial funding support for raising, arming and deploying the STPF would be provided from the one time grant given to the Project Tiger / National Tiger Conservation Authority (NTCA), and would be supported subsequently in an ongoing manner through 100% central assistance from the ongoing Centrally Sponsored Scheme of Project Tiger.

(iii) The Field Director of the Tiger Reserve would be required to provide monthly reports on the deployment / initiatives done by the STPF to the NTCA / Project Tiger.

(H) Financial implications:

(i) The total Recurring Cost (per annum/per company) works out to Rs. 3.625 crores.

(ii) The total Non-recurring Cost (per company — one time grant) works out to Rs. 1.579 crore.

(I) Training:

(i) The STPF companies would receive special training from the State Police Department as well as the Paramilitary Forces, based on a special syllabus for skill development, combating poaching, and enabling intelligence based enforcement in a forest terrain.

(ii) The training of the STPF would be on the pattern of a special syllabus of basic training which would include wildlife crime control and wildlife management, as prescribed by the Ministry of Environment and Forests through the National Tiger Conservation Authority, in consultation with the Ministry of Home Affairs.

(iii) A Special Capsule Course at the Wildlife Institute of India and the State Police Academy should be organized for the Assistant Conservator of Forests and the Range Officers to impart the necessary skills relating to the STPF.

(iv) A specialized commando training (including physical fitness) should be designed with the help of State Police and National Security Guard for the STPF personnel.

(v) Arrangements will be made for regular physical training of STPF in collaboration with the available resources.

(vi) Specialised trainings would be provided in enforcement procedures by noted agencies including international visits if the need arises.

(vii) The STPF would be given a special identity through the State by prescribing a special uniform to enable recognition.

(viii) The training cost incurred by the State in the context of STPF would be supported under the Training component of the ongoing Centrally Sponsored Scheme of Project Tiger (need based).

(J) Deployment of STPF:

During the initial phase, the STPF would be deployed in 7 sensitive tiger reserves of the country (out of the 13 identified), having considerable source populations of tiger, based on the outcome of the all India tiger estimation using the refined methodology.

(K) For core / critical tiger habitats having high relative abundance of tigers, the States should preferably explore the 'Police option' of STPF, and may resort to the `Forest option' only if the same is not found feasible. The STPF should be developed as a 'commando-force' to be effective.

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ANNEXURE-I

FINANCIAL IMPLICATIONS OF STPF PER ANNUM (Salary etc.)
(13 companies, 39 platoons)
(in ₹.)

Sl. No.	*Designation*	*Strength*	*Pay Scale*	*Mean Pay*	*Grade Pay*	*DA*	*Ration Money Allowance*	*Kit maintenance Allowance/ washing Allowance*	*Total per person per month*	*Total per person per year (X12)*	*For total strength per year*
1.	Assistant Conservation of Forests	13	(S-17) PB-3 Rs. 15600-39100	27350	5400	21288	0	300	54338	652056	8476728
2.	Range Officer	39	(S-10) PB-2 Rs. 9300-34800	22050	4200	17063	860	60	44233	530796	20701044
3.	Forest Guard	1053	(S-6) PB-1 Rs. 5200-20200	12700	1900	9490	860	60	25010	300120	316026360
4.	Forest Watchers	351	(S-6) PB-1 Rs. 5200-20200	12700	1800	9425	860	60	24845	298140	104647140
	Total	1456		74800	13300	57266	2580	480	148426	178112	449851272

FINANCIAL IMPLICATION FOR ARMS AMMUNITION

(per company)

(Amount in Rs.)

Sl.No.	*Name of weapon/ammunition*	*Rate*	*Number*	*Cost*
1.	Rifil 5.56 mm INISAS	25775	112	2886800
2.	Carbine 9 mm IAIDP	10934	3	32802
3.	Pistol 9 mm Auto IAI Action Skeleton	11600	3	34800
4.	Day Vision Binoculars	40000	5	200000
5.	Night Vision Binoculars	100000	5	500000
6.	Carts SA Ball 9 mm	13	20000	260000
7.	Carts SA Ball 9 mm for Pistol	13	25200	327600
	Total	188335	46328	4242002

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ANNEXURE-IV

FINANCIAL IMPLICATION FOR INFRASTRUCTURE

(per company)

(Amount in Rs.)

Sl.No.	*Building*	*Number*	*Total Cost*
1.	ACF Quarter	1	500000
2.	RO Quarter	3	1500000
3.	30 Men Barrack	2	1800000
4.	Mess	1	900000
5.	Office Building	1	400000
6.	Parade Ground/Play Ground	1	1500000
7.	Total	26	6600000

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FINANCIAL IMPLICATION FOR RAISING NEW ESTABLISHMENT

(Recurring Cost - per company, per annum)

(Rs. In crore)

(Salary etc.)	*Recurring cost for uniform maintenance*	*Recurring cost for vehicle maintenance*	*Procurement of ammunition*	*Total Recurring cost*
3.46	0.005	0.10	0.06	3.625

(Non-Recurring - per company)

(Rs. In crore)

Cost Infra-structure	*Tentage*	*Procurement of Arms ammunition/ equipment*	*Procurement of Vehicles*	*Total Non-recurring cost*
0.66	0.005	0.424	0.49	1.579

(Cost for 13 companies in 5 years)

(Rs. In crore)

Item	*Amount*	*Years*	*Total*
Non-recurring	1.579	1	1.579
Recurring	47.125	5	235.625
Total			237.204

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MEMORANDUM OF UNDERSTANDING
BETWEEN
THE MINISTRY OF ENVIRONMENT AND FORESTS
(NATIONAL TIGER CONSERVATION AUTHORITY)
BIKANER HOUSE, SHAHJAHAN ROAD
NEW DELHI
AND GOVERNMENT Of .....

This Memorandum of Understanding made this day of between the Ministry of Environment and Forests, acting through the National Tiger Conservation Authority, Annexe No. 5, Bikaner House, Shahjahan Road, New Delhi-110011 (hereinafter referred to as the `NTCA') of the First Part and the State Government of_____, acting through (designation and office address) (hereinafter referred to as the State Government), of the Second Part.

Whereas the NTCA is providing funding support for raising, arming and deploying the Special Tiger Protection Force (herein referred to as the 'STPF') for protection of tiger in tiger reserve, hereinafter referred to as the "_____".

And whereas the Ministry of Environment and Forests through the NTCA is ready and willing to extend financial support for the raising, arming and deploying of STPF, on the terms and conditions given below for the year…….

NOW, THEREFORE, IT IS HEREBY AGREED between the Parties as follows:

ARTICLE I.

The State Government has agreed and affirmed that: -

(a) The STPF must be raised as per the prescribed standard pattern and scale for transport,
(b) communication, arms and ammunition etc.
(c) The non-recurring as well as annual recurring expenditure for raising, arming and deploying
(d) the STPF would be borne by the NTCA.
(e) The Government of India (NTCA) would exercise the right of first call on the STPF and shall
(f) have the full authority to ask the State to make the battalion available for deployment anywhere within the State for tiger protection, as and when required.
(g) The State Forest Department shall recruit the STPF personnel and would make them available to the Forest Department for deployment in the ……. tiger reserve, on deputation for a period of three years, whose age shall be less than 40 years.
(h) The administrative as well as operational command of the said force would remain with the
(i) Field Director of the tiger reserve, who will be the appointing / disciplinary authority also.
(j) The STPF companies would be recruited locally from the District(s) within which the tiger
(k) reserve is located.
(l) The STPF personnel, being forest officers, will exercise policing powers as per law.

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(m) The State Government would be required to conform powers to the STPF personnel under sub-section (3) of Section 197 of the Code of Criminal Procedure, 1973 (2 of 1974), and all powers enabling it in that behalf, the power to use fire arms to combat tiger poaching and related offence within the tiger habitat, through a notification. In this context, sub-section (2) of Section 197 of the Code of Criminal Procedure, 1973 (2 of 1974) should be made applicable to all personnel of the STPF.

(i) Whenever, firing is resorted to by the STPF personnel, each such incident shall be enquired into by the Executive Magistrate; any proceeding, including instituting a criminal case or arrest can be initiated only if it is held, as a result of the Magisterial Enquiry, that the use of fire arms has been unnecessary, unwarranted and excessive, and such report has been accepted by the Government after-examination.

(j) The STPF, not being an "Armed Force of the Union", would be used only for tiger protection, and under no circumstances would be requisitioned in aid of Civil Authority, for any other district work.

(k) The Field Director of the Tiger Reserve would he required to provide monthly reports on the deployment / initiatives done by the STPF to the NTCA.

(l) The STPF companies would receive special training from the State Police Department as well as the Central Paramilitary Forces, based on a special syllabus for skill development, combating poaching, and enabling intelligence based enforcement in a forest terrain.

(m) The training of the STPF would be on the pattern of a syllabus of basic training which would be prescribed by the Ministry of Environment and Forests, on the basis of the ongoing syllabus prescribed by the Ministry of Home Affairs for the India Reserve Battalion.

(n) Every month, one week will be spared on rotation for each platoon, during which the STPF personnel would be sent to the local Police Department for training to ensure their fitness, apart from maintenance of fire arms.

(o) Recruitment of the personnel for STPF would be made by constitution of a Selection Board by the State, comprising of members (one each) from the Central Police Forces and the NTCA respectively.

(p) The recruitment process shall be completed within two years of the date of sanction as per the following schedule:

  (i) Recruitment: Within 6 months from the date of sanction.

  (ii) Induction training: Within one year after recruitment ($1^1/_2$ years from the date of sanction).

  (iii) Initial provisioning, procurement of uniform, equipment etc.: Concurrently with recruitment / training, i.e. within 18 months from the date of sanction but not exceeding two years.

  (iv) Deployment: After $1^1/_2$ years from the date of sanction.

(q) The Headquarter as well as deployment of the STPF platoons would be decided by the Field Director of the tiger reserve.

(r) Disbursement of the grants-in-aid by the NTCA would be done in phases as below:

  (i) 25% as initial advance after the State Government has issued recruitment notification under intimation to Government of India.

  (ii) 25% on completion of recruitment and submission of Utilization Certificate.

  (iii) 25% on completion of training for recruits.

  (iv) 25% on completion of all items relating to the raising, arming and deploying of the STPF.

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ARTICLE II.

(Site-specific action)

(a) Till the raising, arming and deploying of STPF personnel is completed, as a stop gap arrangement to address tiger poaching, the State may deploy local work force / ex-army / homeguards through outsourcing for protecting tigers in the tiger reserve, after due orientation and training.

(b) In areas affected by extremist engineered disturbances, the State may decide the mandate of STPF as a "Strike Force" or as a "Foot Patrol", considering the local conditions.

(c) Any other action as suited to the special condition prevailing in the site/State.

IN WITNESS WHEREOF, the representatives of the Parties to this Memorandum of Understanding being duly authorized have signed this Memorandum of Understanding as of the day, month and year first above written.

Signed for and on behalf of National Tiger Conservation Authority	Signed for and on behalf of Government of	Field Director _____ Tiger Reserve
Name & Designation (With Stamp) Dated:	Name & Designation (With Stamp) Dated:	Name & Designation (With Stamp) Dated:

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Proposal to be Considered in NBWL only After Obtaining the Opinion of SBWL

(3rd meeting of NBWL dt. 25.08.2004)

Members were of the view that all cases concerning diversion/de-notification, destruction, exploitation, removal etc. as mentioned in section 29 of the Wild Life (Protection), 1972 should be placed before the standing Committee along with the opinion of the State Government and the State Board for Wildlife. Accordingly, it was decided that all such cases as referred to above would be considered by the Standing Committee only after obtaining the opinion of the State Govt. and the State Board for Wild Life.

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Policy and Procedures for Wildlife Research

(6th meeting of NBWL dt. 20.01.2006)

Dr. K. Shankar of WII made a presentation on the policy and procedure for wildlife research. Through the presentation, he apprised the Members of the existing wildlife research policy and recently prepared framework for carrying out wildlife research in the country. Members appreciated the policy and suggested that there should be provision for providing interim findings by Researchers to the State Wildlife Department on regular intervals as publishing of final report takes long time. These findings may also be displayed on the web site of the Ministry. An urgent need for capacity building of veterinarians to cater the needs of wildlife was also emphasized by Shri Ravi Singh.

Guidelines for Scientific Research in the Wildlife Protected Areas

1. Introduction

Scientific Research in the Wildlife Protected Areas is vital for a better understanding of ecosystems, their functions, ecology and status of various species and their habitats. Information generated by scientific research in Protected Areas would be useful to the managers for taking appropriate conservation and management actions. Since Protected Areas (PA) also serve as 'control sites' for comparing a large number of environmental parameters and ecological processes with those of human influenced ecosystems, organizations and individuals from India as well as abroad would like to undertake basic as well as applied research within Protected Areas.

As per the guidelines of the National Wildlife Action Plan (2002-2016), research projects having the objectives of measuring biological diversity; monitoring the status of indicator / flagship / threatened species of flora and fauna, and their breeding biology, will be given priority in granting permission. In addition, applied research is also needed to help overcome specific management problems in PAs. Multi-disciplinary integrated research encompassing scientific and socio-economic aspects related to PA management also need to be encouraged.

Recognizing the significance of well conceived and problem oriented research in the PAs, adequate provisions for research work have been made in the Wildlife (Protection) Act, 1972. Section 28 (grant of permit) of the Act gives authority to the Chief Wildlife Warden (CWLW) to grant permission for research.

2. Wildlife Research

Wildlife Research is defined here as research conducted by qualified scientists, including social scientists, or by assistants/ students working under their supervision or Park Managers. Wildlife research may also be conducted by properly qualified wildlife enthusiasts and conservationists.

3. Duration of research

Based on the anticipated period of study specified in the proposals, wildlife research may be categorized as follows:

i. Short-term research: Surveys or short studies involving field work up to one year in duration.
ii. Medium term research: Studies requiring two to four years for completion.
iii. Longer-term research: Studies exceeding four years for completion.

After taking into consideration the recommendation of the Committee constituted vide Ministry of Environment & Forests (MoEF) notification No. 6-3/2003 WL I dated 24.10.2005 and also the recommendations of the Tiger Task Force, the following guidelines are hereby formulated to facilitate processing and grant of permission for carrying out research in PAs.

4. Processing of Research Proposals and Grant of Permission

4.1 Under existing laws the Chief Wildlife Wardens are authorized to permit research in Protected Areas. In case of research that involves capture, handling and collection of biological samples from any species listed in Schedule-I of the Wildlife (Protection) Act, the award of permission would lie with the Director (Wildlife Preservation), Government of India (Additional Director General (Wildlife) and Director, Wildlife & Preservation, MoEF). In all cases the proposal should be submitted to the Chief Wildlife Warden of the State with a copy of the same to the Additional Director General

(Wildlife), MoEF, Govt. of India. In case of foreign nationals desirous of conducting research in Indian Protected Areas, permission from Ministry of External Affairs / Ministry of Home Affairs, and National Biodiversity Authority if required in Law should be obtained.

4.2 The proposal should contain synopsis, objectives, methodology, literature review, work plan, budget, source of funding, duration, expected outputs and terms of reference. The proposal will be evaluated by a `Technical Committee' consisting of atleast *three* members constituted under the chairmanship of the Chief Wildlife Warden of the State. Other members could be representative of the State Biodiversity Board (if constituted), experts in relevant disciplines of wildlife management, ecology, social science etc. If the state has not constituted the State Biodiversity Board, suitable nomination from university / research institute or any other such organization involved in ecological / wildlife research may be made. The Technical Committee should meet at least once in a quarter on fixed dates and consider proposals received at least 15 days prior to the date of meeting. The committee would also suggest the areas of research relevant to management decisions with respect to Protected Areas of the state. The technical committee may have additional `Subject Specialists' as a `Special Invitee'.

However, a research project which has been approved by *Deptt. of Science and Technology, Ministry of Environment & Forests, Department of Biotechnology, and other scientific Deptt. of the State/Central Government would not be required to be reviewed by the committee. Chief Wildlife Warden/Director, Wildlife Preservation may pass necessary orders in such cases to grant access.*

4.3 The research questions and methodologies used shall be decided by the researchers according to their own priorities/reliable interests, in the case of independently funded wildlife research projects. In case of manipulative or interventional studies, the methods used must be in accordance with standard practice. Research questions in case of Wildlife Research projects sponsored by the State Department of Wildlife shall be arrived at in consultation with the respective Park Managers. Conclusions and recommendations should be discussed with the Park Managers to ensure the field applicability of the studies.

5. Time Frame for Grant of Permission

5.1 Proposal for short-term research (<6 months) shall be processed and the decision communicated by the Chief Wildlife Warden within a period of two months *if it involves one PA*.

5.2 If the short-term research involves several PAs and/or administrative forest divisions, the Chief Wildlife Warden *shall process and communicate decisions* within a period of three months.

5.3 Proposals for medium and long-term research (>6 months) shall be *processed and communicated* by the Chief Wildlife Warden within a period of three months. In case of proposals whose coverage is beyond a single Protected Area site, a maximum of four months may be taken to process and communicate the decision.

5.4 In case a research proposal is rejected or any modifications suggested, either by the Chief Wildlife Warden or the Director of Wildlife Preservation, Government of India and Additional Director General (WL) and Director, Wildlife Preservation, MoEF, the reasons for such rejection/suggestions must be clearly communicated to the researcher as per (5.1) – (5.3) above from the date of receipt of proposals.

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6. General Provisions

6.1 It is well recognized that the product of any research in terms of its scientific results and publications must be authorized by the researcher/organization. None other than the individuals responsible for framing research proposals and actually conducting research should have the authorship of scientific papers from the findings. However, the final report and other scientific publications of the project (hard and soft copy) should be submitted within three months (for short-term research) or six months (for long-term projects) to the concerned Chief Wildlife Warden. For long-term projects, half yearly progress reports should be submitted to the park authorities by the researcher. The Chief Wildlife Warden shall take appropriate action on the researcher/organization for non-submission of final reports on time as per Terms and Conditions stipulated in the letter granting permission for the project.

6.2 Wildlife Institute of India would act as the national nodal agency on wildlife research. It would be obligatory on the part of researcher / research organization to provide a soft and hard copy of his data / report / findings / thesis etc. to Wildlife Institute of India who in turn would make it available on their website for easy access.

6.3 A researcher will not be required to pay entry fee in the park. If researcher needs to use a vehicle for his research activities inside the park no entry fee for the vehicle will be charged. Other facilities when availed will be charged at the rate applicable to Government officials on duty.

6.4 Movements of the researcher and or his assistants in the PA shall be recorded in a log book to be maintained by him which will be submitted to the park management every month.

6.5 Movement at night shall be allowed *only if it is part of the approved research project.* A schedule for such movements shall be developed in consultation with the local authorities and shall be permitted accordingly by park authorities. In case of any violation of the conditions of permission, Chief Wildlife Warden shall have the authority to revoke the permission.

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Central Funding to be Restricted to Protected Areas Directly Under the Wildlife Wing and Managed by Trained Officers

(24th Meeting of NBWL Dated 13/12/2011)

Dr Ranjitsinh pointed out that there was a serious dearth of trained and specialized officer in the wildlife wing / department of the States. He mentioned that the then Prime Minister, late Smt. Indira Gandhi, had suggested and reiterated the need for trained wildlife personnel for managing wildlife areas, and that he had copy of the letter with him, wherein she had strongly recommended the need for trained and specialized officers specifically trained in wildlife techniques and issues. He also pointed out that the WII was set up as a special institute for imparting wildlife training to the officers from States and others. However, the institute was not having adequate funds for the purpose.

He informed about the nine-month training course for 20 trainees in WII and that the training imparted to the officials was free of cost. However, the State Governments were usually sending only 2 officials in contrast with 18 officials being deputed by the SAARC countries in this programme. This showed the apathy of the State Governments towards this important issue. He also suggested that Central funding should not be extended to the States who were not serious about the training of their officials in wildlife science. He suggested that it should be communicated to the State that if 50 percent of their wildlife Protect Areas (PAS) did not come to be manned by trained personnel within next 3 years, no funding support would be given to them after three years.

In response to this, the Member Secretary informed that the restrictions suggested by Dr Ranjitsinh could lead to surrender of funds by the MoEF as the States were not expected to improve their performance drastically with respect to positioning of wildlife trained staff in the PAs. He stated that the suggestion would prove to be counterproductive if it was implemented. He added that it was true that wildlife wings and protected areas were run by officials with non-wildlife background also, but if we stop funding because personnel with wildlife specialization were not posted, we may not be able to spend the amount sanctioned to the MoEF (Wildlife Division) by the Planing Commission. The Planning Commission may then downsize the funds allocated to the wildlife sector from the present Rs. 70 crores to say Rs. 40 crores, which would create more problems, and ultimately grossly underfunded Sanctuaries would suffer further.

Some members pointed out that already there was a proposal by the Planning Commission to merge the three centrally funded schemes, viz, Project Tiger, Project Elephant and Integrated Development of Wildlife Habitats, and that any withholding of funds at this stage, would not be advisable.

Speaking in this context, Ms. Prena Bindra informed that members of the NBWL had, sent a letter apposing such a move since it would be a very retrograde step and would adversely impact efforts to conserve wildlife and nature, and the national animal in particular. Secretary (E&F) informed that the proposal had since been shelved.

The Chief Wildlife Warden of Maharashtra, said that sanctuaries which were the last priority of the State would suffer, if the already meagre funding available to them from MoEF was further reduced.

Shri Kishore Rithe suggested that MoEF should prescribe a timeframe for the States to train the requisite staff in the wildlife management, failing which the funding support from the Ministry for wildlife management should be discontinued.

Dr Ranjitsing further suggested that we may strongly communicate to every State that at least 50% of their wildlife staff should be trained or have specialization in the wildlife background within the next 3 years.

Dr. A.J.T. Johnsingh mentioned that the funding to the WII had gone down drastically, and there was a need to enhance the funding to WII to cater to the need for training of officials on wildlife issues.

Shri Biswajit Mohanty suggested for amending the CSS itself by making training of wildlife staff as one of the conditions for the States being eligible to seek central funds for wildlife managements from MoEF.

The DGF&SS mentioned that gross generalizations should be avoided since there were several States that make serious efforts to train their wildlife staff but many times the problem actually was shortage of money. He also opined that we should look at the performance, inclination and interest of individuals rather than insist only on posting of wildlife trained personnel in wildlife areas. In many cases, non-trained personnel perform better than wildlife trained personnel. However, we could encourage that trained officers should be posted in wildlife areas.

The Members Secretary accepted that fund shortage for WII was an issue, but also informed that MoEF had agreed to give an additional amount of Rs. 2 crores in the current year (2011-12) to WII.

Thereafter, the Chairperson while agreeing to the suggestions of the official and non-official members added that she would start by making serious communications to the State Chief Ministers to enhance the staff strength of wildlife wing/department, and to train them in wildlife management and conservation within next 3 years. She suggested that there can be a mechanism by which it could be monitored also. A time limit of 2 to 3 years could be given to the State Governments for compliance.

The Standing Committee unanimously agreed to the suggestion of the Chairperson.

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Guidelines for Sanctioning Proposals on Laying of Underground Drinking water Pipelines and Optical Fire Cables Inside PA

(46th Meeting of NBWL dated 08/12/2017)

The IGF(WL) mentioned that in view of decision taken in the 45th meeting as mentioned above, there is a need to issue guidelines in this regard. The guidelines should be in consonance with the guidelines issued by the Ministry under Forest (Conservation) Act, 1980. Accordingly, following guidelines for sanctioning proposals on laying of underground drinking water pipelines and optical fiber calbes inside Protected Areas are proposed:

(1) The size of the trench will not exceed more than 2.0 m depth and 1.0 m width;
(2) The user agency agrees to make good the land after use/ maintenance;
(3) The user agency agrees to make good any looss to forest / environment;
(4) The user agency seeks permission from the State Forest Department for carrying out any maintenance;
(5) The diameter of drinking water pipeline will not exceed 4 inches in diameter. The operational length of trench (for laying optical fiber cables or drinking water pipeline) will not exceed 500 m at any time;
(6) No civil structures will be built with the laying of optical fiber cables / drinking water pipeline;
(7) The user agency will have to submit NOC from the agency which holds the right to use the Right of Way;
(8) The State Government / Union Territories should ensure that the trench dug for underground laying of drinking water pipeline and optical fiber cables are duly filled up and compacted so that these do not become source of the constant soil erosion;
(9) This approval shall be valid for five years till 31.12.2022;
(10) The State Government / Union Territories will submit a monthly progress report on the extent of the forestland diverted for such purpose to the Ministry as well as the concerned Regional Offices.

After discussions the Standing Committee decided to accept the guidelines for delegating powers to the State Board for Wildlife for sanctioning proposals on laying of underground drinking water pipelines and optical fiber cables (OFC) along the roads inside National Parks,

Wildlife Sanctuaries and Tiger Reserves. Furthers, it requested the Ministry to issue an advisory on this.

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47.3A4. Wildlife Passage Plan with Proposal of Linear Projects (Roads, Canal and Railways)

(47th meeting of NBWL dt 25.01.2018)

Dr. H S Singh, Member, NBWL while briefing the Standing Committee about this agenda mentioned that high speed and multiple lane roads, wide canals and railways lines not only cause deaths of animals however they also block wildlife movement completely thereby fragmenting the habitat. The nature of the linear projects is changing fast, leaving no scope of movement of wildlife from one side to other. In some cases, it is impossible for wild animals and reptiles to cross high speed multiple lane roads or wide canals. Practically, such linear projects fragment habitats totally, blocking genetic flow of the fauna in the nature. Over a period, such projects cause loss or extinction of the wildlife. Any linear proposal for approval by the Standing Committee of NBWL should invariably contain a master plan for passage of the wildlife. Although WII, Dehradun has prepared the guidelines on mitigation measures for linear infrastructure passing through Protected Areas and some of the proposals mention passage plan however these are not adequate or perfect. The project proponent always tries to avoid such components in the plan to minimize expenditure, although the cost of the passage plan is small fraction of the total cost of the project. The size of wildlife passage should be adequate so that wild animal cross the site without fear and hesitation. The society still does not accord importance to wildlife which is against the principle of sustainable development.

In the background of this fact, every such proposal should contain one page passage plan with location of wildlife passages on map, duly examined on the ground and approved by the State Chief Wildlife Warden. The Director, Wildlife Institute of India intimated that the guidelines named *"Eco-friendly Measures to Mitigate Impacts on Linear Infrastructures on Wildlife"* provides required modifications in the infrastructure designs to mitigate the impact of the infrastructure on the wildlife.

After discussions, the Standing Committee recommended that in future when user agencies involved in linear infrastructure development should take in to consideration the advisory made in the guidelines of the Wildlife Institute of India while designing the linear infrastructures inside the Protected Areas, notified ESZ area around PAs. Hence linear infrastructure proposals would be accompanied by an animal passage plan, if required, by the project proponent on the basis of these Wildlife Institute of India guidelines and in consultation with the State Chief Wildlife Warden.

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भारत सरकार
Government of India
पर्यावरण एवं वन मंत्रालय
Ministry of Environment and Forests
वन्यजीव अपराधनियंत्रण ब्यूरो
Wildlife Crime Control Bureau

No. 10-27/WCCB/2012/3874 **Dated: 9th August 2012**

ADVISORY – 01 OF 2012

1. It has been observed that whenever wildlife or wildlife articles are seized, the enforcement agencies tend to assign monetary value to such articles. Trade in wildlife articles is prohibited and there is no basis for such monetary valuation.
2. India wildlife is under stress from illegal trade. Illegal trade in wildlife and wildlife articles is demand driven and primarily for profits. Some of the habitual wildlife criminals during their interrogations revealed that they switched over to illegal wildlife trade from other criminalities such as narcotics, due to lower risk and perceived profits. Some first time wildlife criminals had resorted to such offences after reading about high values of wildlife articles in the newspapers.
3. Quotation of international market prices for wildlife articles, in no way adds value to the enforcement efforts. On the contrary, the practice may actually promote poaching and illegal wildlife trade.
4. The matter may therefore be brought to the notice of the field formations and appropriate instructions may be issued to stop this practice. If there is a system of rewards, citations etc., based on value of seized contraband, the same may be amended for wildlife articles. Conspicuous contribution towards prevention/ apprehension/ investigation/ prosecution work related to wildlife crime; and busting of organized wildlife criminal networks could be the basis for such rewards. Press briefings on wildlife crime may highlight endangered status of the species involved, its role in ecology and adverse impact of its loss on environment.

Sd/-
(Shyam Bhagat Negi)
Additional Director/GP
Ph: 26182484

Copy forwarded for information and necessary action to:

1. Directors General of Police of all States.
2. Chief Wildlife Wardens of all States.
3. Director General, Assam Rifles/BSF/CISF/ITBP/SSB, Ministry of Home Affairs, New Delhi.
4. Director General, Railway Protection Force, Ministry of Railways, Government of India, New Delhi.
5. Chairman, Central Board of Customs & Excise, Ministry of Finance, New Delhi.
6. DG, Department of Revenue Intelligence (DRI), Ministry of Finance, New Delhi.
7. RDDs WCCB – NR, WR, CR, SR and ER.

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F. No. 1-14/2011-NTCA (Part I)
Government of India
Ministry of Environment, Forest and Climate Change
National Tiger Conservation Authority
****

B-1 Wing, 7th Floor,
Pt. Deendayal 'Antyodaya Bhawan',
CGO Complex, Lodhi Road,
New Delhi-110003
E-mail: aig3-ntca@nic.in
EPABX No. +91 11 2436 7837-42
Fax: +91 11 2436 7836

Dated the 7th September, 2015

To,

The Chief Wildlife Warden(s),
All Tiger Range States.

Sub: Calculation of tourism carrying capacity-clarification thereof.

Ref: 1. This Authority letter no. PS(DIR)-PT 2003 dated 09.04.2003
2. NTCA Technical document no. NTCA/01/07
3. The Gazette of India, Extraordinary, Part III, Section 4 dated 15th October 2012

Sir,

Reference is invited to thee documents cited above. In this context, I am directed to say that the carrying capacity model circulated by the National Tiger Conservation Authority vide documents referred above is based on a six seater Maruti Gypsy.

However, it has come to the notice of this Authority, that carrying capacity calculated vide the above model is being applied to other vehicles of higher seating capacity also (e.g. Canter). It is but understood, that a larger vehicle with more seating shall cause greater impact on the core/CTH in terms of erosion, air and noise pollution, along with higher space requirements vis-à-vis distance between vehicles.

It is therefore, advised to restrict the number of vehicles based on their seating capacity vis-à-vis a Maruti Gypsy as per the following working example;

1. Vehicle X seating capacity=18. This shall be equivalent to 3 Gypsy's
2. Vehicle Y seating capacity=12. This shall be equivalent to 2 Gypsy's

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For e.g., if the carrying capacity of a tiger reserve is calculated as 36 vehicles, then 36 Gypsy's 12 Vehicles X's and 18 Vehicles Y's are permitted.

You are requested to ensure compliance of the above to ensure minimal disturbance to the core/ CTH of tiger reserves within your jurisdiction.

Yours faithfully,

Sd/-
(Vaibhav C. Mathur)
Assistant Inspector General (NTCA)

Copy to:

1. The principal Chief Conservator of Forests and Head of Forest Force, All Tiger Range States
2. The Principal Secretary, Forests, All Tiger Range States
3. IGs (NTCA), Regional Office, Bengaluru, Guwahati and Nagpur.

F. No. 13-57/2013-PC
Government of India
Ministry of Environment, Forest & Climate Change
(Plan Coordination Division)
****

Vayu-604, Indira Paryavaran Bhawan,
Jor Bagh Road, New Delhi-110003

4th November, 2015

OFFICE MEMORANDUM

Subject: Funding Pattern of Centrally Sponsored Schemes-regarding

The undersigned is directed to forward a copy of D.O. Letter No. 32/PSO/FS/2015 dated 28th October, 2015 received from Finance Secretary, M/o Finance addressed to Secretary (EF&CC) on the above mentioned subject for information and necessary compliance.

Encl: As above

(Shoyabahmed Kalal)
Assistant Director
Email: s.kalal@nic.in
Tele-fax: 24695420

To:

1. **All Divisional Heads (Plan Scheme)**

Funding Pattern of Centrally Sponsored Scheme
(As per D.O. Letter No. 32/PSO/FS/2015 dated 28th October 2015 received from Finance Secretary, M/o Finance)

Para 2.

The funding of the following *core schemes;* which form part of the National Development Agenda, will be shared 60:40 between the Centre and the States (90:10 for the 8 North-Eastern and 3 Himalayan States):

(xiv) Forestry and Wildlife (including Green India Mission, Project Tiger and Integrated Development of Wildlife Habitats)

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Further, Department of Expenditure Plan Finance-II Division, Ministry of Finance, Government of India vide its Office Memorandum No. 66(01)/PF-II/2015 (Pt.I) dated 3.12.2015 has further clarified the sharing pattern as below;

(ii) For the flagship programme 'Project Tiger, the current funding pattern i.e. 50:50 will continue for recurring items and for non-recurring items where the sharing pattern is 100%, the revised funding pattern 60:40 will applicable.

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No. 1501/11/2007-PT (Part)
Government of India
Ministry of Environment & Forests
National Tiger Conservation Authority
****

Annexe — V, Bikaner House,
Shahjahan Road, New Delhi — 110011
Tel. No. 23387691
Telefax: 23074272
E-mail: hsnegi@rediffmail.com

Dated the 15th February, 2012

To,

The Chief Wildlife Warden(s)
All Tiger Range States

Sub: Management of buffer zones under unified control — reg.

Ref: 1. Letter No. 1501/11/2007-PT (Part) dated 16/11/2007.
2. Letter No. 9-5/2006-NTCA dated 08/09/2008.

Sir,

Your kind attention is invited to the references cited above. As you are aware, Section 38V (1) and (4) (ii) of the Wildlife (Protection) Act, 1972 explains and provides for the notification and establishment of buffer / peripheral areas of Tiger Reserves. As per provisions contained in the above act buffer / peripheral area is where *a lesser degree of habitat protection is required to ensure the integrity of the critical tiger habitat with adequate dispersal for tiger species, and which aim at promoting co-existing between wildlife and human activity with due recognition of the livelihood, developmental, social and cultural rights of the local people.*

Since, the buffer / peripheral area of a Tiger Reserve has inclusive agenda of man and wildlife, therefore, the management of buffer/ peripheral area needs to complement the management inputs provided in the core area. This can only be achieved when the management of the buffer area is kept under the unified control of the Tiger Reserve Management. In this context, I am directed to request you for taking initiative to place the notified buffer areas under the unified control of the Field Director concerned. It is pertinent to point out here that unless the buffer/peripheral area is not brought under the unified control of the Field Director, funding support under the Centrally Sponsored Scheme of Project Tiger (CSS-PT) for management of the said area would not be possible from this end.

Once the notified buffer / peripheral areas are handed over to the Tiger Reserve Management, a composite Tiger Conservation Plan has to be prepared as per the guidelines and technical document

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- -NTCA/01/07 issued by the National Tiger Conservation Authority (NTCA). The funding support from Project Tiger for the eco-development of local people living in the buffer / peripheral areas would be possible, if the same is reflected in the APO on the basis of micro plans of village level institutions (eco-development committees). The TCPs should also ensure reciprocal commitment from such village level committees so that inputs provided in the buffer / peripheral villages would become helpful in achieving the objectives of managing these areas for the welfare of local people and tiger conservation.

In view of the above, you are once again requested to pursue the matter with the concerned authorities in your State so that the notified buffer/peripheral areas are brought under the unified control of the concerned Field Director.

Yours faithfully,
(H.S. Negi)
Deputy Inspector General (NTCA)

Copy to:

1. The Principal Chief Conservator of Forests, all Tiger Range States for information and necessary action.
2. Additional Chief Secretary / Principal Secretary (Forests), all Tiger Range States for information and necessary action.

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F. No.15-6/2014-PT Vol. III)
Government of India
Ministry of Environment, Forest and Climate Change
(Project Tiger Division)

B-1 Wing, 7th Floor,
Pt. Deendayal "Antyodaya" Bhavan,
CGO Complex, Lodhi Road,
New Delhi-110003,
Tel.(EPABX)+91 11 24367837-42
Fax No. +91 11 24367836
E-mail: dig2-ntca@nic.in

Dated the 26 December 2018

To,

The Chief Wildlife Warden (s)
(All Tiger Range States)

Sub: Check List for Annual Plan of Operations under Centrally Sponsored Scheme of Project Tiger.

Sir,

I am directed to forward herewith a copy of the Check List for Annual Plan of Operation under Centrally Sponsored Scheme of Project Tiger. It is requested that this Check List may please be circulated amongst all Tiger Reserves under your jurisdiction. Concerned Field Directors of the Tiger Reserves under your jurisdiction may please be advised to strictly adhere to the time schedule for each Activity mentioned in the Check List for submission of APOs and Revalidation cases to this Authority's office.

Instructions contained in the Check List for each activity may please scrupulously be followed by all Tiger Reserve of your jurisdiction. Requisite papers/documents/ information called for may please be sent alongwith submission of the APOs.

Data of tigers/cubs as per phase IV estimation and number of wildlife crime offences & the action taken in this regard is also needed to be forwarded along with APOs.

Yours Faithfully,
Sd/-
(Nishant Verma)
Deputy Inspector General (Project Tiger)

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Enclosures: As above

Copy to:

1. Field Director(s) of all Tiger Reserves.
2. IG, RO, NTCA, Guwahati/AIG (s), RO, NTCA Bengaluru & Nagpur.
3. PS to ADG (PT) & MS (NTCA)

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FORM GFR 12-C
(See Rule 239 of GFR-2017)
FORM OF UTILIZATION CERTIFICATES

S.No.	Letter No. and date	Amount (Rs.)	
			Certified that out of Rs. _____ of grants sanctioned during the year _____ in favour of _____ under this Ministry/Department Letter No. given in the margin and Rs. _____ on account of unspent blance of the previous year, a sum of Rs. _____ has been utilized for the purpose of _____ for which it was sanctioned and that the balance of Rs. _____ remaining unutilized at the end of the year of the year has been surrendered to Government (Vide No. _____ dated _____) will be adjusted towards the grants payable during the next year _____.

2. Certified that I have satisfied myself that the conditions on which the grants-in-aid was sanctioned have been duly fulfilled/are being fulfilled and that I have exercised the following checks to see that the money was actually utilized for the purpose for which it was sanctioned.

Kinds of Checks exercised

1.
2.
3.

Signature _____
Designation _____
Date_____

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FORMAT OF ANNUAL PLAN OF OPERATION
FOR SEEKING CENTRAL ASSISTANCE UNDER CENTRALLY SPONSORED SCHEME-PROJECT TIGER

(Rs. in lakhs)

S.No.	*Item*	*Para No. of CSS-PT Guidelines/ Papa of TCP*	*Previous Year Details*					*Current year Proposal*			*Justification/ Remarks*
			Location/ GPS coordi-nates	*Physical*		*Financial*		*Location/ GPS coor-dinates*	*Physical Target*	*Financial Target*	
				Target	*Achieve-ment*	*Target*	*Achieve-ment*				
NON-RECURRING (NR)											
						CORE					
		TOTAL									
						BUFFER					
		TOTAL									
RECURRING (R)											
						CORE					
		TOTAL									
						BUFFER					
		TOTAL									
		G. TOTAL (NR + R)									

Certificate: It is certified that

(i) No deviation has been done except as approved by the NTCA.

(ii) Items proposed are as per the CSS-PT guidlines.

Counter Signed

Signature of the Field Director
Name of the Tiger Reserve
Chief Wildlife Warden

Check list for Annual Plan of Operation under Centrally Sponsored Scheme of Project Tiger

S.No.	*Activity*	*Remarks*
(1)	*(2)*	*(3)*
1.	Submission of APO in the prescribed format	Format enclosed. To be submitted in the on-line APO Application. The cut-off date for submission of APOs is 28th February.
2.	Non-Recurring (NR) & Recurring ® Items to be specified seprately.	
3.	Non-Recurring (NR) Core Areas Items to be specified first with sub-total thereafter of Buffer Areas with sub-total and finally total of both Core & Buffer is to be give.	
4.	Recurring ® Activities, Core Areas first thereafter of Buffer Areas with sub-total of each and finally total of both Core & Buffer is to be given.	
5.	Figures of all activities should be in Lakhs of Rupees and in the last after decimal rounded upto only two digits.	
6.	Para No. of TCP is to be shown separately.	
7.	Para No. of CSS (PT) guidelines is also to be down separately.	
8.	Previous Year details need to be given as under: (i) Location/GPS Coordinates/KML/KMZ files (ii) Physical Target (iii) Physical Achievement (iv) Financial Target (v) Financial Achievement	
9.	Current Year Proposal details are to be given as under: (i) Location/GPS Coordinates/KML/KMZ files (ii) Physical Target (iii) Financial Target	
10.	Justification details for each activity.	
11.	For Project Allowance, information as under is needed to be sent: (i) Sanctioned Strength of eligible officials with admissible rates in each category. (ii) Officials in position (iii) No. of vacancies.	
12.	For RAtion Allowance, same information as required in Sl. No. 11 is needed to be furnished.	
13.	For requirement of vehicles, Condemnation certificate is to be enclosed.	
14.	Revalidation case of the previous financial year (if any) is to be submitted.	To be submitted by 15th April.
15.	The amount revalidated of the previous financial year should be utilized.	To be utilized by 31st of May.

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16.	Utilization certificate along with physical/financial progress report and KML/KMZ files of the works done along with geo tagged photos during previous financial year (in separate files of ≤ 10 MB. Figures mentioned in the UC should tally with the figures mentioned in the sanctioned APO and figures of Physical/Financial Progress Reports should tally with the figures of UC. State and Central Share is to be shown separately in the physical & Financial Progress Reports.	UC & Physical/financial progress report proforma enclosed. UC should be signed by the concerned Filed Director and countersigned by the CWLW. These are to be submitted by 30th April, 2019.
17.	Compliance Status of Tripartite MoU.	Should be submitted along with APO as it is its integral part.

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भारत सरकार
Government of India
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest and Climate Change
राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण
National Tiger Conservation Authority

F. No. 7-8/2008-NTCA (Part-II) **New Delhi, the November 19, 2019**

OFFICE MEMORANDUM

Sub: Constitution of a National Committee of High Altitude Tigers in India – reg.

1. With the approval of the competent authority, a National Committee of High Altitude Tigers in India hereby constituted as under:
   1. Additional Director General of Forests (Project Tiger) & member Secretary (NTCA) - Chairman
   2. Inspector General of Forests (NTCA), New Delhi - Member
   3. Chief Wildlife Warden (s), Arunachal Pradesh, Sikkim, Uttarakhand & West Bengal - Member
   4. Director, Wildlife Institute of India, Dehradun - Member
   5. Secretary General, Global Tiger Forum, New Delhi - Member
   6. Deputy Inspector General of Forests (NTCA), New Delhi - Member Convenor
2. The mandate / function of the National Committee would be:
   a) Approval of the High Altitude Tiger Master Plan / Management Plan at the landscape level.
   b) Approval of the Annual Plan of Operations for funding and providing technical support for High Altitude Tiger Range States.
   c) Facilitation / supervision of the implementation of Master Plan / Management Plan, field surveys, monitoring etc. for strengthening tiger conservation in high altitudes.

   This issues with the approval of the competent Authority.

Sd/-
(Nishant Verma)
Deputy Inspector General of Forests (NTCA)
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Tel. (EPABX): + 91 11 24367837-39
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F. No. 7-8/2008-NTCA (Part-II)

Distribution:

1. PS to MEF&CC, Ministry of Environment, Forest and Climate Change
2. PS to Secretary, EF&CC
3. PS to DGF&SS, MoEF&CC
4. All members of the committee
5. All officers of NTCA.

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F. No. 11-2/2013-NTCA
Government of India
Ministry of Environment, Forests & Climate Change
National Tiger Conservation Authority

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Shahjahan Road, New Delhi-110011.
Telefax: 011-2338 9883
E-mail: jdntca@gmail.com

Dated the 19th September, 2014

OFFICE MEMORANDUM

Sub: Implementation of Conservation Assured Tiger Standards (CA/TS).

CA/TS can be used as an over arching tool providing a standardized framework for assessing and measuring the overall impact of the work being carried out in the existing tiger range across different landscapes. It will also provide an opportunity for the landscapes/Protected Areas, by enabling them with a common mechanism, to evaluate their management effectiveness through a scientific comprehensive reference point and also fix minimum standards for tiger conservation that these areas will need to aspire in order to fulfill their national and international commitments.

The implementation of CA/TS may be considered in areas other than designated Tiger Reserves, as a voluntary process by the tiger range States.

A National Committee for CA/TS implementation is constituted as under:

i. ADG (Project Tiger) & Member Secretary, NTCA: Chairman
ii. Director, Wildlife Institute of India, Dehradun: Member
iii. IGF (NTCA): Member
iv. IGF (Wildlife): Member
v. CEO WWF India: Member
vi. Country Head, IUCN: Member
vii. Chief Wildlife Warden of respective State: Member
viii. DIG (NTCA): Member Convener

4. The terms & references of the Committee are proposed as under:
   i. To function as the 'Focal Agency' for engaging with any organization for implementation of CA/TS.
   ii. Ratification of all applications from areas that register with CA/TS.
   iii. Approval of the areas that have registered and meet the CA/TS requirements.

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iv. To provide technical input/ facilitate for assessment and accreditation
v. Liaison with the CA/TS Executive Committee to ensure continuity of CA/TS globally and alignment with the IUCN Green List.
vi. Liaison with the CA/TS technical support groups and tiger conservation area managers to ensure that the self assessment process is comprehensive and complete.
vii. Award provisional approval (to be confirmed by the Executive Committee)
viii. Organize independent review if the CA/TS process.
ix. The quorum will be the presence of at least 4 members in a meeting.

Sd/-
(S.P. Yadav)
Deputy Inspector General (NTCA)

Copy to:

1. PS to MEF&CC
2. PPS to Secretary, E,F&CC
3. PPS to DGF&SS
4. All Members of the Committee
5. All CWLWs, Tiger Range States
6. NTCA Regional Office, Guwahati/Nagpur/Bengaluru
7. Mr. Mike Baltzer, WWF Asia, Malaysia

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PART B:

IMPORTANT COURT ORDERS RELATED TO TIGER CONSERVATION

NATIONAL TIGER CONSERVATION AUTHORITY
Ministry of Environment, Forest and Climate, Change Government of India

IMPORTANT COURT ORDERS RELATED TO TIGER CONSERVATION

1. Guidelines issued by NTCA should be followed in its letter and spirit:

The learned Special Government Pleader has brought on record the standard operating procedure to deal with the emergency arising due to straying of Tigers in human dominated landscapes prepared by the Ministry of Environment and Forests, Government of India, National Tiger Conservation Authority. In paragraph 8 suggested field actions to deal with strayed wild carnivores (tiger/leopard) had been given. Paragraph 9 contains preventive measures to be followed. It is useful to refer to paragraph 8 where the suggested field actions have been given.

The National Tiger Conservation Authority which having issued details as quoted above, we are of the view that the Principal Chief Conservator of Forests has to ensure that its officials follow such guidelines in its letter and spirit

(Green Cross World Environment Protection Action Group Vs. Union of India and others, in Kerala High Court, WP (C) No. 29880 of 2012 (S) decided on 12.06.2015)

2. Various options which may become available in different contingencies are therefore only indicated in SOP:

In view of these arguments, it will be appropriate to consider the stipulations in SOP. At page no. 73 of PIL at Annexure-II, guidelines for declaring big cats as 'man eaters' are produced. Suggested steps on loss of human life due to tiger/leopard form part of this Annexure II. It requires constitution of team for technical guidance and monitoring on day to day basis. The team is to consist of a nominee of the Chief Wildlife Warden, a nominee of the National Tiger Conservation Authority, a veterinarian, local NGO representative, a representative of the local Panchayat and Field Director/Protected Area Manager/ DFO Incharge as Chairman.

The material looked into is not in dispute. Applicant/petitioners have made no effort to refute it. Proceedings of committee which has appreciated that material are also not questioned. Bonafides of the Chief Wildlife Warden are also not challenged. Only the contention is other steps/measures stipulated in SOP ought to have been considered.

SOP to which our attention has been invited only suggests field actions and measures to be adopted. Counsel for respondents have rightly pointed out to us that in suggested steps to be adopted after loss of human life, various possibilities have been only enumerated and the words "besides" and "or" have been used. Various options which may become available in different contingencies are therefore only indicated in SOP. It is an "inclusive" nature of code and cannot be seen as "exhaustive" one. These measures, therefore, show how in the presence of a problem tiger at the sight can be ascertained.

We are satisfied that all such material or evidence may not always be available at a single spot. It is, therefore, the honest and *bona fide* application of mind and subjective satisfaction of the Chief Wildlife Warden which needs to be appreciated.

(Dr. Jerryl Avinash Banait Vs. State of Maharashtra through its Principal Secretary, Department of Forest and ors. Civil Application (CAO) No. 1624 of 2018 in Public Interest Litigation No. 69 of 2017 in High Court Judicature at Bombay, Nagpur Bench, decided on 6.09.2018)

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3. All kind of mining and related activities along the aforesaid Kaziranga National Park area 7 and in the entire catchment area of rivers/streams and rivulets originating in Karbi Anglong Hill ranges and flowing into Kaziranga National Park, including Tiger Reserve are restrained;

Considered the Report No.6/2019 with respect to illegal mining in Kaziranga National Park, Assam (for short ' KNP'). We have asked for the response of the State of Assam. Learned counsel appearing for the State of Assam has prayed for three weeks' time to respond to the Report. Response be filed on or before 03.05.2019.

In the meanwhile, as certain matters are urgent as apparent from the Report, following aspects are mentioned in the Report No.6/2019:-

"iv. ban forthwith all types of mining and related activities along the southern boundary of the KNP and in the entire catchment area of the rivers/streams and rivulets originating in Karbi Anglong Hill ranges and flowing into Kaziranga National Park;

vi. not permit any new construction including on private lands which form part of the 9 identified animal corridors;

B. Director General of Police, Assam may be directed to

(a) ensure that no mining activity takes place in the Catchment area of the stream/rivers originating in Karbi Anglong Hill ranges and flowing to Kaziranga National Park;

(b) make the Superintendent of Police of Karbi Anglong Hills District, Nagaon District and Golaghat District responsible to ensure that no transportation of illegally mined material from Karbi Anglong Hills takes place;"

In view of the aforesaid, we order that all kind of mining and related activities along the aforesaid Kaziranga National Park area and in the entire catchment area of rivers/streams and rivulets originating in Karbi Anglong Hill ranges and flowing into Kaziranga National Park, including Tiger Reserve are restrained. No new construction shall be permitted on private lands which form part of the nine identified animal corridors. The Director General of Police, Assam and the concerned Superintendent of Police shall also ensure that no illegal mining takes place in the aforesaid area and no transportation of illegally mined material take place from Karbi Anglong Hills. Issue notice to Karbi Anglong Autonomous Council, Department of Environment & Forests, KAAC: Secretariat, Diphu-782460, Through its Chief Executive Officer.

Necessary steps be taken by the Registry within three days.

(T.N. GODAVARMAN THIRUMULPAD Vs. UNION OF INDIA AND ORS. & ORS., INTERLOCUTORY APPLICATION NO. 42944/2019 In Writ Petition(s)(Civil) No(s). 202/1995)

4. Tourism activities will be strictly in accordance with the Guidelines for Tourism in and around Tiger Reserves notified in Part B of the aforesaid Notification dated 15th October 2012:

Heard learned Counsel for the parties. On 24th July 2012, this Court passed an order that till the final directions are issued by this Court with reference to the Guidelines submitted by the National Tiger Conservation Authority of India, core zone or the core areas in the Tiger Reserved Areas will not be used for tourism.

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The National Tiger Conservation Authority [for short 'the Authority'] has by Notification dated 15th October, 2012 notified the Comprehensive Guidelines for Tiger Conservation and Tourism. Part B of these Guidelines are tilled: **"Guidelines for Tourism in and around Tiger Reserves".** The Guidelines for Tourism in and around the Tiger Reserves have been framed by virtue of the powers of the Authority under Section 38(O)(1)(c) of the Wild Life Protection Act, 1972 [for short 'the Act'] which empowers the Authority to lay down normative standards for tourism activities in buffer and core area of Tiger Reserves.

Now that the Guidelines for Tourism in and around the Tiger Reserves have been notified by the Authority, we modify the aforesaid interim order dated 24th July, 2012 and direct that henceforth tourism activities will be strictly in accordance with the Guidelines for Tourism in and around Tiger Reserves notified in Part B of the aforesaid Notification dated 15th October, 2012. All the concerned authorities will ensure that the requirements in the aforesaid Guidelines for Tourism in and around the Tiger Reserves are complied with before tourism activities recommence.

We make it clear that we have not declared the notification dated 15th October 2012 either intra vires or ultra vires and if any party is aggrieved by the Notification dated 15th October 2012 of the Authority it will be open to the aggrieved party to challenge the same before appropriate forum.

It has been brought to our notice by the learned Additional Solicitor General that under sub section (3) of 38(V) of the Act, the State government is required to prepare a Tiger Conservation Plan. We direct that the respective State Governments will prepare within six month from today and submit the same the National Tiger Authority for approval in accordance with section 38(O)(1)(a) of the Act.

While passing this order modifying the earlier interim order, we have taken note of the submission of the learned Additional Solicitor General that tourism activities may recommence strictly in accordance with Guidelines for the Tourism in Part B as indicated above. All the applications for vacating the modification of interim order dated 24th July, 2012 stand disposed of.

(Ajay Dubey Vs. National Tiger Conservation Auth. And Ors, SLP (Civil) No(s). 21339/2011, LAWS(SC)-2012-10-104, Decided on October 16,2012.)

5. No road development activities without statutory approvals under section 38 of the Wildlife (Protection) Act, 1972;

The State of Uttarakhand is directed to withdraw the orders dated 07.12.2018 and 28.12.2018 forthwith and the orders shall not be acted upon. Similarly, it is also ordered that the State Government shall obtain the statutory approvals, required under Section 38 of the Wild Life (Protection) Act, 1972 before undertaking road development activities within Rajaji Tiger Reserves. No road activity shall be undertaken without obtaining statutory approvals under Section 38 of the Wild Life (Protection) Act, 1972. It is open to the State of Uttarakhand to approach the Ministry of Environment and Forest in accordance with law. I.A. No.90182/2019 in W.P.(C) No.202/1995 is, accordingly, disposed of. Thus, no further orders are required in Report Nos.16/2019 and 21/2019, which are also disposed of.

(In I.A. No.90182/2019 in W.P.(C) No.202/1995 decided by Hon'ble Supreme Court on 29.07.2019)

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6. Tiger Conservation Plans to be prepared by respective state governments:

It has been brought to our notice by the learned Additional Solicitor General that under sub section (3) of 38(V) of the Act, the State government is required to prepare a Tiger Conservation Plan. We direct that the respective State Governments will prepare within six month from today and submit the same the National Tiger Authority for approval in accordance with section 38(O)(1)(a) of the Act.

(Ajay Dubey Vs. National Tiger Conservation Auth. And Ors, SLP (Civil) No(s). 21339/2011, LAWS(SC)-2012-10-104, Decided on October 16,2012)

7. Guidelines for Control and Maintenance of Forest Rest Houses (FRH) / Inspection Bungalows (IB) located inside the Forests:

An application was filed in Hon'ble Supreme Court to effect that the Forest Rest Houses/ Inspection Bunglows located inside the Forests are being misused for a variety of activities. After due consultation between the Union of India, Central Empowered Committee (CEC) and the applicant, guidelines have been framed by the CEC for control and maintenance of Forest Rest Houses / Inspection Bungalows located inside the Forests. These guidelines are acceptable to all concerned including the Union of India. The guidelines are as follows;

(A) Forest officers are required to camp inside the forests where no alternate accommodation is available. Forest Rest Houses / Inspection Bungalows are facilities created for camping of forest officers primarily for discharge of their duties connected with conservation, protection and management of forests and wildlife. These Rest Houses have very limited number of rooms. Therefore the control of Forest Rest Houses, including their reservation, shall under all circumstances remain with the Forest Department.

(B) The District Administration may, in special circumstances and for a limited period be granted priority reservation of rooms in the FRH/ IB's for specific purposes. At no circumstance the control of the FRH/IB's located inside the forests be taken over by the District Administration / Government.

(C) Forest Rest Houses / Inspection Bungalows located within the forest area including the Protected Areas shall not be transferred to private and commercial entities in the name of public–private partnership or by whatever name such an arrangement is called, for promotion of any form of tourism including Ecotourism.

(D) The Forest Department should make every effort to retain the basic plan and elevation of old FRHs/IB's many of which are heritage buildings, while making improvement / addition to these buildings.

We expect these guidelines to prevent the misuse of Forest Rest Houses / Inspection Bungalows, particularly since they have the approval of the Union of India as well. Accordingly, we accept the guidelines and make them an order of this Court. The Ministry of Environment, Forests and Climate Change is directed to circulate a copy of this order to the Principal Chief Conservator of Forests of all the States and ensure that they abide by these guidelines. The applications stand disposed of in view of the above.

(I.A. No. 2354-2355 in W.P. (Civil) No. 202/1995 T.N. Godavarman Thirumulpad Vs. Union of India and Ors. decided on 05- 07-2018)

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8. Any disturbance in this connectivity shall isolate wildlife and tiger populations thereby resulting in inbreeding which shall manifest in unfavourable survival characters in these populations;

1. This application has been filed primarily against the rejection of the application for grant of Environmental Clearance (EC) for a Laterite Iron Ore Mine at village Manoli, Taluka Shahuwadi, District Maharashtra on the ground that the mining block falls in the Tiger Corridor linking Shayadri Tiger Reserve (Chandoli National Park).
2. By order dated 17.11.2017, direction was issued upon the Ministry of Environment, Forest and Climate Change (MoEF&CC) to place on record its contention including the explanation as regards the records placed before us and the impact on Tiger Corridor in the context of sustainable development. Further, a final map of the Tiger Corridor of the sanctuary, particularly, the portion passing through village Manoli depicting clearly the forest land, protected forest, un-class forest, areas under Maharashtra Private Forest Act, 1975 (Decided and undecided), private land and revenue land along with the location of the mine therein to be placed before us.
3. In terms of the aforesaid direction, MoEF&CC has filed an affidavit which is taken on record. The affidavit reveals that the Applicant in the Original Application had been heard and by a detailed order had rejected his application. The relevant portion of the affidavit reads as follows:

   "Keeping in view the landscape approach to conservation India, the NTCA has delineated such tiger meta-populations across the country which inter-alia includes the Sahyadri Tiger Reserve and its connectivity to the Radhanagari Wildlife Sanctuary. Any disturbance in this connectivity shall isolate wildlife and tiger populations thereby resulting in inbreeding which shall manifest in unfavourable survival characters in these populations."
4. The requisite map depicting the facts and circumstance set out in the order has been prepared and filed with the affidavit.
5. Upon consideration of the facts and circumstance stated above, we find no merit in the application and is accordingly dismissed.
6. No order as to cost.

(Vasant Vatkar Vs. Union of India & Ors, Original Application No. 20/2015 (WZ) before The National Green Tribunal, Principal Bench, New Delhi decided on 18.07.2019)

9. Permission to change in the legal status of the forest land approved under the F.C. Act for relocation of villages:

CEC has filed a report regarding the permission for change in the legal status of the forest land approved under the F.C. Act by the MoEF for the rehabilitation of villagers of the three villages Kosla, Botezari and Palasgaon (Single) in Andhari Wildlife Sanctuary in District Chandrapur, Maharashtra. It was also slaleo therein that the relocation of these villages is required because the boundary of the national park is to be extended and therefore, modification in the order passed by this court on 13.11.2000 in Writ Petition (C) No. 337/1995 is sought for. We make it clear that despite the order passed by this court on 13.11.2000, the MoEF is permitted to change in the legal status of the forest land approved

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under the F.C. Act for relocation of these villages for the purpose of extending the boundary and for rehabilitation of the tribal people residing there.

Application is disposed of accordingly.

(I.A. No. 1685 in WP(Civil) 202/1995T.N. Godavarman Thirumulpad Vs. Union of India and Ors decided by Hon'ble Supreme Court dated 21.11.2008)

10. Changing status of forestland to revenue land in case of voluntary relocation of villages;

Hon'ble Supreme Court, based on recommendation made in the CEC report dated 28.09.2018, in which it has extended the scope of its order dt. 21.11.2008 to all such cases of relocation/rehabilitation of the villages from the core/critical Tiger Reserves and core of the Protected Areas (National Park and WL Sanctuaries) to the periphery of Reserved forests/Sanctuaries/ National Park.

I.A. No. 3924 Report No. 50 of 2018 of the CEC dated 26.12.2018 is accepted since, it is not objected by the National Tiger Conservation Authority (NTCA). The application is disposed of.

(I.A. No.3924/2015 in WP(Civil) 202/1995T.N. Godavarman Thirumulpad Vs. Union of India and Ors decided by Hon'ble Supreme Court dated 28.01.2019)

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