सत्यमेव जयते

GOVT. OF MAHARASHTRA

MELGHAT TIGER RESERVE
AMRAVATI

TIGER CONSERVATION PLAN: CORRIDOR
(DRAFT)
Plan Period: 2024-25 To 2033-34

O/o Chief Conservator of Forest & Field Director
Melghat Tiger Reserve,
Camp, Amravati 444602

INDICATIVE PLAN-
CORRIDORS/CONNECTING AREAS
LINKING ADJOINING AREA

PART I: THE EXISTING SITUATION

CHAPTER-1

INTRODUCTION OF THE AREA

1.1 INTRODUCTION

This plan deals with landscape area of Melghat Tiger Reserve. The reserve forms an important corridor between forest areas of Madhya Pradesh and Maharashtra ensuring contiguity of forests in Satpuras. The areas falls under the Satpuda-Maikal Landscape and is located in Central India in the states of Madhya Pradesh, Maharashtra and Chhattisgarh and covers 14 districts. For Melghat Tiger Reserve, the area of the landscape dealt in this plan is the area bordering Madhya Pradesh in the North and East.

NATURAL HABITAT CORRIDORS

Satpuda melghat, Melghat-Pench Corridor, Melghat-Kanha Corridor is Natural corridor. The satpuda-Maikal landscape of central India is classified as a Global priority Tiger conservation Landscape due to its potential for providing sufficient habitat that will allow the long-term persistence of tigers. In the spatial genetic analysis, it was revealed that Satpuda Maikal landscape has high genetic variation and very low genetic variation and very low genetic sub division. The Vidarbha landscape (VL) is very important as it harbors a population of about 331 tigers and forms the connecting link between the central and southern Indian tiger populations. It plays the pivotal role in exchange of individuals and there by facilitates gene flow between these populations increasing the viability of tiger populations in India.

1.1.2 REMNANT HABITAT CORRIDORS

Such as strips of unlogged forest within clear cuts, natural woodland along road sides or natural habitats retained as links between natures Reserves, Satpuda Melghat, Melghat-Pench Corridor, Melghat-Kanha Corridor are the result of clearing, alteration or disturbance to the surrounding environment. The corridor provides shelter through plantations.

1.1.3 REGENERATED HABITAT CORRIDORS

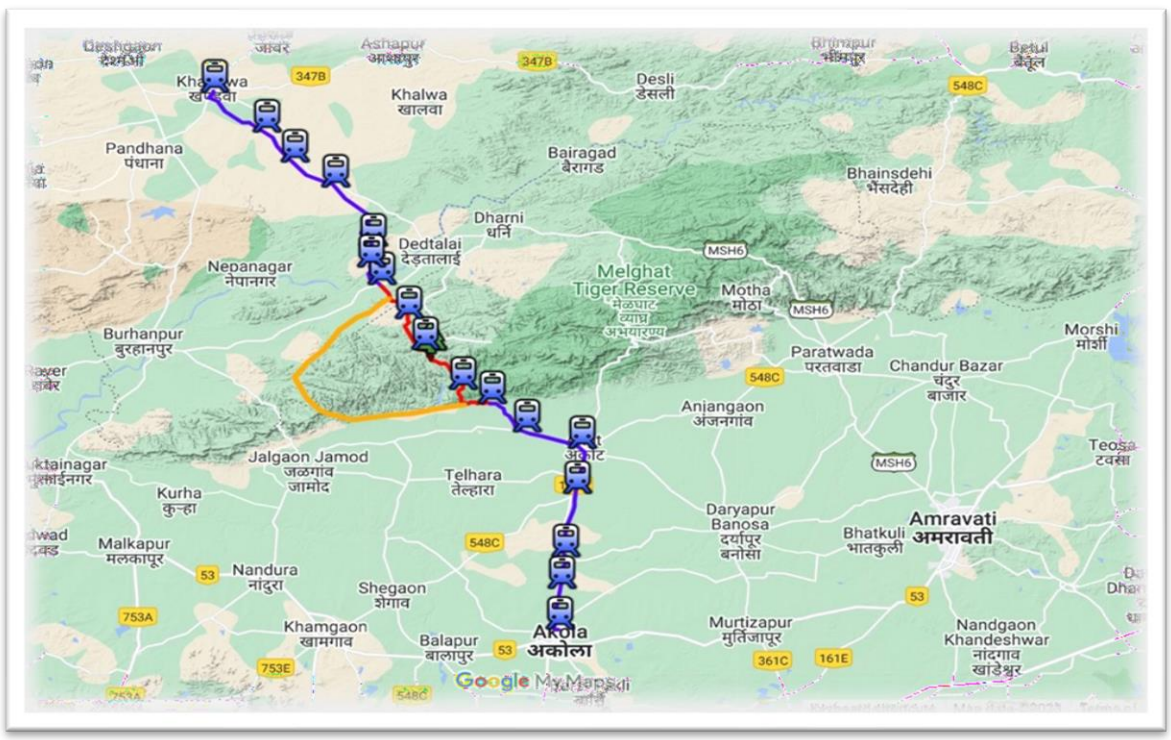
Regenerated habitat corridor: NIL

1.1.4 PLANTED HABITAT CORRIDOR

Nil.

1.1.5 DISTURBANCES IN HABITAT CORRIDORS (RAILWAY LINES, CLEARED TRANSMISSION LINE, ETC.)

Ministry of Railways Govt. of India has proposed one rail route project, The Maharashtra government has objected to the 176km, Akola-Khandwa narrow-to-broad gauge rail line conversion project within the Melghat Tiger Reserve. The proposed route is inside forest area runs through very important and ecologically strategic Satpuda-Melghat corridor which is crucial link between Melghat Tiger Reserve and Pench National Park. This route is very regularly used by Tiger, Elephants, Bison, leopard and. If this proposed track is constructed the entire corridor may get blocked and will lead to death of wild animals on the proposed track and will act as death trap for wildlife. If at all this track is to be made then it would be better to have an elevated track in the interest of the existing corridor.



Map-13(a): Map showing Railway line passing through Melghat-Satpura Corridor

Madhya Pradesh Road Development Corporation has reportedly bypassed Forest and wildlife laws and expanded **SH 43** at the cost of Satpura-Melghat-Pench tiger corridor. National Tiger Conservation Authority (NTCA) had, earlier recommended four animal underpasses (300 metres each), noise barriers, guide walls, fencing, monkey ladders etc. Later, National Board of Wildlife (NBWL) standing committee had also recommended the project with mitigation measures.

Map-13(b): Road network in Melghat Satpura Wildlife Corridor

1.1.6 STEPPING STONES (SUITABLE HABITAT PATCHES)

Government plantation and Private (Tribes) Gardens provide shelter for animals to move between two Tiger Reserve.

1.1.7 BRIEF DESCRIPTION OF THE AREA & SIGNIFICANCE FOR TIGER CONSERVATION

Table-13(a): Table showing different Corridors adjoining different forest block of MTR

No	Name of corridors	Status	Comments	Priority of conservation
1.	Melghat–Satpuda Corridor	Good	The Betul & Hoshangabad Districts	High
2.	Melghat-Pench Corridor	Poor	The Amravati & Nagpur Districts	High
3.	Melghat-Kanha Corridors	Poor	The Amravati Nagpur & Balaghat Districts	High

THE SATPUDA-MELGHAT CORRODOR:

It connects the major source populations of Satpuda Tiger Reserve in Madhya Pradesh with Melghat Tiger Reserve in Maharashtra. Tiger occupancy in the forest of Betul-Hoshangabad-East Nimar suggests the operational status of corridor.

The corridor passes through degraded forest, agricultural areas, and some low density human settlements areas. (Source: Status of tigers, co-predators and prey in India, 2010 reports.)

The landscape is also the meeting points of Sal (Shorea robusta) from the North and Teak (Tectona grandis) forests from the South. The forests of Melghat Tiger Project are classified as "Dry Deciduous Forests as per Champion and Seths revised survey of forests types of India." The most dominant tree species is teak and other timber species are Tiwas, Bija, Haldu, Saja, Dhawda, Ain, Lendia etc.

The important trees producing NTFP in the area are Mahua, Tendu, Achar, Amla, Behda, Bhilawa, Bor, Khair, Jamun, Apta, Bel,etc. The gregarious patches of Bamboo are common along the hill slopes. The major grass species occurring in the landscape are Heteropogon, Contortus, Aristida, Themeda.

The multifarious efforts to conserve the biodiversity of the area in general, and the “tiger” over the past 30 years has resulted in flourishing faunal and floral diversity in this landscape. The enforcement of the provisions of the Wildlife (Protection) Act,1972 and excellent protection by the Project Tiger and territorial staff has resulted better conservation of tiger & its prey base & habitat.

The details regarding Tiger and its prey base status, Human Population, Man- Wildlife conflict if any and cultural practices etc. in proposed corridors of Melghat and Satpuda Tiger Reserve are being worked out and incorporated in the plan in due course. Wildlife Conservation Trust (WCT), an NGO is also working on Tiger Corridors between Melghat Tiger Reserve and Satpuda Tiger Reserve and also between Yawal Wildlife Sanctuary, Pench National Park (Maharashtra) Tadoba and Bor Tiger Reserves. Its report is expected in couple of months. It will be examined and incorporated if found useful in the plan in due course.

Bio-Diversity Values of the Landscape

Tectona grandis, Madhuka indica, Boswellia serrata, Anogeissus latifolia, Dispyros melanoxylon, Terminalia tomentosa, Terminalia arjuna are some of the predominant tree species in the landscape. Apart from the species mentioned in the predominant types, Bamboo also occurs in good patches along the slopes in Jarida, Rajadoh, Marita, Rangubeli and Kundara. The species yielding various Non-Timber Forest Produce such as Jamun, Aonla, Behada, Hirda, Bel, Gum, are commonly found in the tract. The faunal inventory of landscape includes Tiger, Gaur, Wild dogs, Sambar, Jackal, Fox, Sloth bear, Wolf, Wild boar, Chaushinga. The landscape also supports rich avifauna and more than 265 birds have been identified. Forest Spotted Owlet, the endemic species also rediscovered in Melghat Tiger Reserve.

Forest Cover

The forest cover Melghat Tiger Reserve is bordering the forest of Betul, Harda, Nimar East district of Madhya Pradesh. The details are as below;

Table-13(b): Table showing Forest cover in the Corridor area of MTR in Sq. Km.

State	District	Dense	Moderate dense forest	Open	Forest Area	Total G.A.	Percentage under forest cover
Madhya Pradesh	Betul	201	1967	1404	3572	10043	35.57
--"--	Harda	19	546	463	1028	3330	30.87
--"--	Nimar East	200	1830	1381	3411	10776	31.65
Maharashtra	Amravati	655	1455	1077	3187	12210	26.10

Value of Corridors

Isolated populations of wild animals face the risk of extinction owing to singularization. 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 equilibrium theory of island biogeography predicts greater species richness in large wildlife areas or in smaller areas connected by habitat corridors owing to increased movements of wild animals. Such connecting habitats, apart from facilitating animal movements also act as refuge for spillover populations from the core areas.

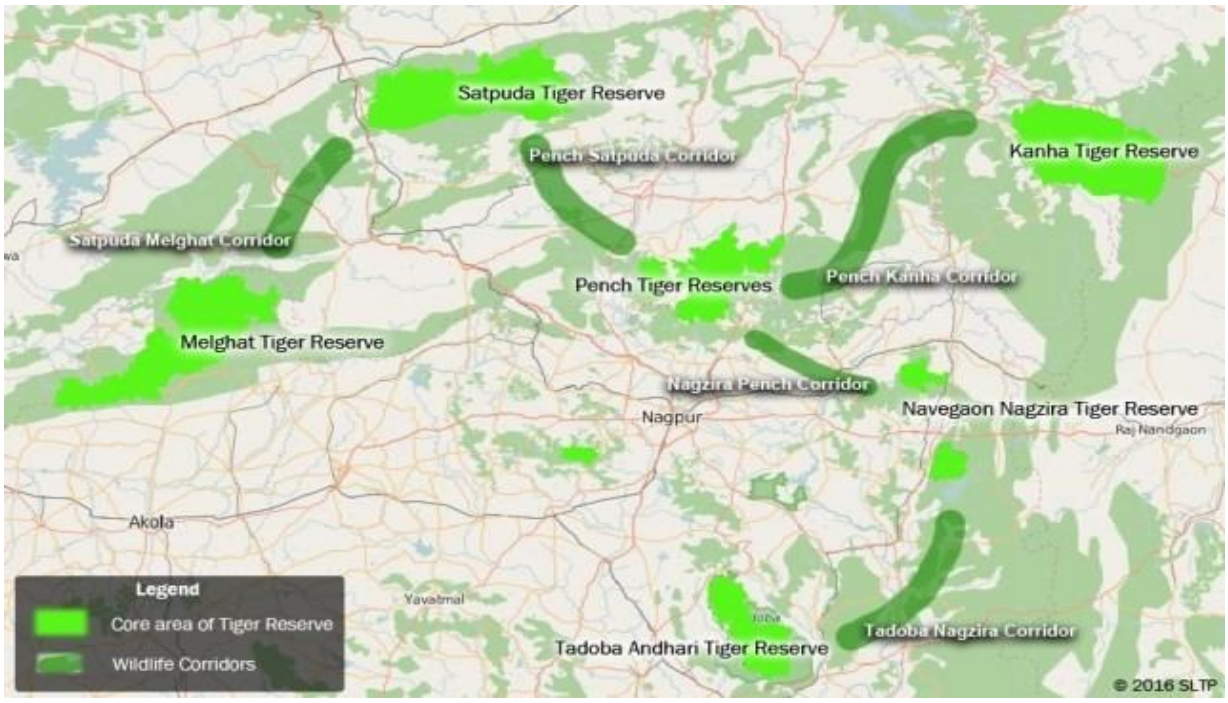
They may also act as smaller "source" by facilitating breeding and movement of native wildlife populations to colonize adjoining habitats. Natural linear features like rivers or mountain ranges may act as boundaries for wildlife populations. However, disturbance of corridors on account of human interventions (highways, canals, industries, roads, railway tracks, transmission lines) isdeleterious to wildlife.

The presence of tiger populations in the Satpura-Melghat region is contingent on maintaining habitat connectivity through functional corridors. Dutta et al., (2016) find the Satpura-Melghat corridor to have high centrality, implying that this corridor is important for supporting tiger movement across the Central Indian landscape.

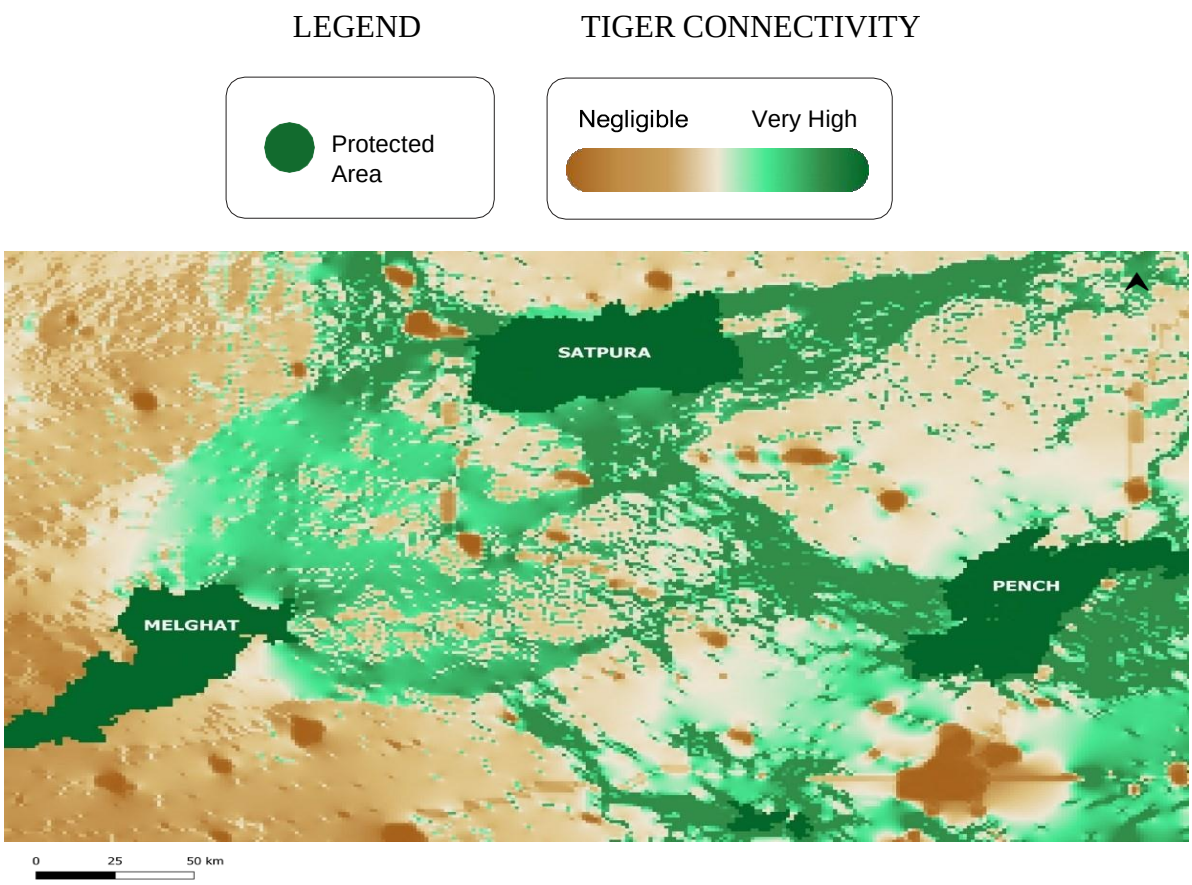
Modelling to predict tiger movement patterns and connectivity across the Central Indian landscape (based on data from Thatte et al., 2018) reveals an elaborate network of potential animal movement, pathways spanning forests and other land-use types between the Satpura- Pench and Satpura-Melghat corridors (Figure 1). Several news articles document evidence of tigers using these links (Times of India, 2021). A recentrecord of a radio-collared tigress traveling around 250 km from STR to reach Ambabarwa Wildlife Sanctuary, which is a part of MTR.

Table-10(c): Internal Corridors in and around Melghat TR

No	Name of Corridors	Status	Comments	Priority of conservation
4	Melghat-Betul Forests Corridor Jarida-Hatru-Chaurakund Ranges share boundary with Forest Ranges of Betul Divisions	**Good**	Forest area with good connectivity. Human Dominated landscape	High
5	Melghat-Morshi & Warud Corridor Jarida Range (both MTR &Territorial)with Morshi-Warud Ranges of Amarvati Forest Division	**Good**	Forest area with good connectivity. Orange orchards area. Human Dominated landscape	High
6	Melghat-Jalgaon Jamond- Wadodha Corridor Ambabarwa Range withJalgeon Jamond range of Buldhana Forest Division and further to Wadodha range of Jalgaon Forest Division	**Good**	Forest area with good connectivity. Banana orchards area. Human Dominated landscape	High
7	Melghat-Polhra&Malkhed Corridor From southern boundary of Melghat through Paratwada,Chandurbazaar and Anjangaon ranges up to Pohra-Malkhed areas around Amaravati city areas	**Poor**	No Forest area with very sparse vegetation. Agricultural landscape. Human Dominated landscape	Low
8	Melghat- Khandwa Corridor Through forest areas of Dharni& Dhulghat ranges of west Melghat Divisions to Khandwa Forests	**Poor**	Sparsely forested area with Human dominated and agricultural landscape	High
9	Vidarbha Corridor North-eastern region of Maharashtra, NagapurDivision& Amaravati Division	**Good**	Large basaltic rock formation Exist throughout Vidarbha.	High



Map-13(c): Corridors in and around Melghat TR



Tiger connectivity in the Pench-Satpura-Melghat region. Connectivity map was generated using a circuit theory based approach and a base map from Thatte et al., (2018). Green regions depict the areas most likely used by dispersing tigers and the brown regions depict areas that impede movement.

Map-13(d): Map showing Connectivity index of different Corridors of MTR

SIGNIFICANCE OF THE CORRIDORS FOR TIGER CONSERVATION.

The corridors mentioned above form part of Satpuada and Maikal landscape. The corridors provide crucial linkages for the dispersal of tigers to various protected areas like, **Satpuda-Pench-Kanha** Tiger Reserve. Madhya Pradesh has reported the presence of tigers in corridors and similarly there have been reports of tiger movement and between Pench and Melghat. Historically this landscape used to be very good home for large number of tigers hence it forms a significant landscape connectivity for Tiger Conservation. It seems like a long shot given the number of settlements and disturbance gradient of the areas. The entire stretch on MTR side is conducive only for leopards and hardy herbivore.

1.2 RESERVE FOREST/ PROPOSED RESERVE FORESTS/ UNCLASSIFIED STATE FORESTS (DIVISIONS/ RANGE/ BLOCKS/ BEATS):

The area corridor falls within the forest area of East Melghat and West Melghat Division of Maharashtra and adjoining districts of Madhya Pradesh such as Betul, East Nimar, Hoshangabad. The forests area is mainly reserved forests.

1.2.1 VILLAGES/ TOWNS/ CITIES (DISTRICTS, SUB-DIVISIONS, BLOCKS, PANCHAYAT):

The area following districts of Maharashtra and Madhya Pradesh falls in the corridor.

Table-13(d): Information about villages in corridor in Maharashtra

No	Village	Geographical area in Hectare			Wildlife population
		Revenue	Forest	Total	
1	Kund	44.81	301.19	346.00	Spotted deer, wild bour, blue bull, Langur
2	Bondilawa	151.92	350.32	502.24	
3	Chatwabod	627.69	0.00	627.69	
4	Kekadabod	446.81	0.00	627.69	
5	Dhakarmal	380.91	0.00	446.81	
6	Patiya	665.98	0.00	665.98	
7	Kakarmal	294.98	0.00	294.98	
8	Dharanmahu	575.23	0.00	575.23	
9	Karada	441.05	0.00	441.05	
10	Gobarkahu	310.98	0.00	310.98	
11	Chakarda	1029.50	0.00	1029.52	
12	Nirgudi	375.85	0.00	375.85	
13	Potilawa	436.15	0.00	436.15	
14	Chipoli	371.51	0.00	371.51	
15	Chitri	44.09	919.61	963.70	
16	Piparikheda	0.00	0.00	0.00	
	Total	**617.48**	**1571.12**	**7750.6**	

1.2.2 OTHER USES (AGRICULTURE, TEA GARDEN/PLANTATION ETC.):

The main land use in the corridor is for the agriculture purpose. No major industries are located the area of corridor.

1.2.3 Government Land

1.2.4 Quality of Habitat

The forest is tropical dry deciduous comparable to Champion and Seth ‘s Subtype V-A type. The composition in the top story consists of teak in association with others like Tiwas, Bija, Haldu, Saja, Dhawda, Ain, Moha, Tendu, Achar Amala, Baheda, Bhilwa, Bor, Mango, Khair, Jamun, Apta, Bel and Kulu. The corridor is interrupted by some crop field and settlements further south of the settlement up to the foothills on either side of the road. The developments in this region have cut off the forest corridor The corridors are extensively used by the wild animals especially the Tiger for movement between Pench And Kanha Tiger reserve. The signs of tiger have been found profusely in the different Forest blocks, in some specific areas. The area consists of old teak forests, with mixed type of forest, riverine forest and deciduous forest types. The corridor is interrupted by state highway 43, human habitations and farmlands**.**

1.3 Vegetation And Fauna

Teak is the dominant species. Others include; Tiwas, Bija, Haldu, Saja, Dhawda, Ain, Moha, Tendu, Achar Amala, Baheda, Bhilwa ,Bor ,Mango, Khair, Jamun, Apta, Bel and Kulu. As many as 769 plant species of plants have been recorded in the reserve. The tiger is the flagship species of Melghat. The cameras trapping exercise carried out by the Forest Department and WRCS in 2016 puts the minimum tiger population at 60 tigers. Melghat harbours a rich assemblage of wildlife found in Central India includingother large carnivores such as the leopard, dhole, sloth bear and hyena, and large herbivores sambar, chital, muntjac, four horned antelope and nilgai. Other large mammal species found in Melghat include jungle cat, langur, rhesus macaque, honey badger (ratel), palm civet, small Indian civet, grey mongoose and Indian porcupine. Melghat is rich in bird species, especially raptors – more than 250 species are found in Melghat. Melghat is considered a stronghold of the critically endangered forest owlet. The buffer areas of Melghat Tiger Project are of deciduous nature and have been classified as “**Dry Deciduous Forests**” in the Champion and Seth’s “Revised Survey of Forest types of India” and fall under the **Sub-group 5-A** southern tropical dry

deciduous forests. The tract being sparsely populated, the biotic factors are less influential except fires which along with general distribution of rainfall, aspect and change in depth and nature of soil are responsible in determining the local variations within the above broad type. Besides receiving less rain fall, the southern part of the region is also subjected to frequent fires, often twice in a year and bear more open forests with species rather resistant to fire.

The species with corky bark like Semal (*Bombax ceiba*) survives the fire and their percentage in the stand increases. Fire and biotic interference have increased the percentage of species like *Ziziphus, Stereospermum. Dalbergia Sissoo, and Diospyros* in the forests because of their capacity to produce root sucker, an adventitious shoot, from extensively branched underground root system.

The teak forests here owe their existence to the remarkable power of these species to withstand repeated burning and to establish itself on burnt grass land. The purity of the present teak forests is largely attributable to the fact that its associates are lees resistant, and none of them appears able to establish high forest in periodically burnt area. As the fire sweeps in, the bark of teak, having low conductivity prevents the damage of the cambium and phloem. The geological formation and the soil largely determine the type of vegetation it is going to support. The most of the area here has the soil of trap origin.

These soils are rich in mineral and have a high-water holding capacity. They have a high rate of exchangeable calcium and PH varying from 6.5 to 7.5 thus supporting the best form of teak. Teak needs a good quantum of moisture to support its long growing season. The places at ballas or on slopes, where the moisture condition deteriorates, the teak is soon replaced by Salai (Boswellia serrata) and Tiwas (Ougeinia oogeinensis) In Wasali, Zari and Khatkali area species of Chandan (Santalum album) is limited to some pockets. The Bel is mainly found in Khatkali, Wari Gullarghat area. Tendu is restricted in the pockets of Golai, Dhulghat and Gadgabhandum and Rangubelly area. The Mango and Jamun is found in Chikhaldara area Khair and Sisam are limited in Jarida, Hatru of Sipna Division.

1.4 STATUS OF TIGER & CO-PREDATORS

The study area of the Melghat Tiger reserve represent mostly the natural and self-contained ecosystem. This has so far, no present problems like spill over population of tigers and herbivores outside the protected areas. However, to provide a corridor for the movement of tiger to other habitat and protected area is an important aspect of wildlife management. The

conservation of tiger will not only require the management of core and buffer areas but it will also be necessary to identify the area of 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 this area of connectivity as corridors between two sources populations. In fact, management of these critical areas will be as important as the core areas. Tiger, leopard, wild dog, and jackal profusely found in Melghat tiger reserve. Our Diploma batch had one tiger, sighting two leopards they are drinking water in water hole and passing through forest road and almost around 25 wild dogs in their habitat respectively. Tiger hunt in Melghat especially gaur and sambar, and leopard mostly hunted by female sambar and wild dog act as a scavenger, so far this is best association of tiger and cooperators found in wildlife and a system of ecological niche. Monitoring and conservation are important aspects of healthy ecosystem. Now, the tiger and co-predator in compatible relationship occurring in Melghat tiger reserve. Predator and co-predator can occur conditional indicator of they can get sufficient their prey in their habitat.

Distribution and Abundance Status with Type of Use by the Tiger and Co-Predators

The data including tigers in Satpuda- Melghat corridor is given below:

Table-13(e): Table Showing abundance of Tiger & Co-predators in Corridors

Corridor	Habitat available(km²)	Tigers In corridor	Tigers in Tiger Reserve on either side of corridors	People in the corridor	Cattle In corridor	Priority in for Achievable intervention for WWF
Satpuda Melghat	Not so much (7,344)	17	39.30	Not so many	Not so many	Medium

In the recent Tiger census report of tiger in MTR has confirmed the presence of +- 80 Tigers in Melghat. However local villagers report the movement of Tiger from Kanha-Pench-Melghat forest corridors. The movement of elephant, Bison, wild buffalo, leopard is well known fact. The co-predators in the corridor are Leopard and Wild Dog. Satpuda Melghat Landscape is considered major stronghold of Wild Dog.

Prey-Predator Relationships: - The study of Prey Predator Relationship in Melghat Tiger Reserve was conducted by Centre for Wildlife Studies, Banglore in 2005, Enviro search, Pune 2006 and Wildlife Research and Conservation Society, Pune in 2009. However, the prey predator Relationship Study in the corridor area of the Satpuda- Melghat landscape has not been conducted so far. Gaur and Sambar are the good indicators of Satpuda-Melghat landscape connectivity for tiger's movements. The Occurrence of prey like Sambar within these contiguous forests is suggestive of viability of this corridor to the movements of large carnivore.

1.5 SOCIO-ECONOMIC PROFILE OF VILLAGES AND RESOURCE DEPENDENCY AND HUMAN- WILDLIFE MUTUAL IMPACTS.

The socio-economic and cultural factors exert strong influence on the forest. The human habitation along the forests of Satpuda Maikal landscape is divided into two types viz. revenue villages and villages at the fringe's forests. The revenue villages are outside the forest area and the earlier forest villages (now revenue villages) are on the forest land (inhabited by the people who were initially brought there as workers in the forests). The development of these villages is the responsibility of the Govt.

THE MAJOR TRIBES:

Gond, Korku, Nihal, Balai are the major tribes residing the landscape.

People's Economy and Major Employment sources

People residing in & around the Tiger reserve are very poor. There is no industry. Agriculture is the main occupation. Majority of tribal families are small and marginal farmers and number of large farmers are very few and Majority of people in this region are dependent on the cultivation for their livelihood. Due to poor irrigation facilities and terrain in the area crop pattern is mainly based on the monsoon. Rest of the time they are dependent on the forest-based resources, marginal labor and other activities huge laborer's force is present. Villagers follow the traditional agricultural practices. Irrigation facilities are poor and majority of the agricultural lands are mono cropped.

The sources of employment that now exists are plantation works, annual felling and thinning coupes, buildings and road construction, soil conservation and river training works, honey & other NWFP collection, works in the forest, etc.

The main season of unemployment is winter (December – March). Villagers maintain large no. of cattle, most of which are scrub cattle. No dairy co-operative is present. Cow dung is used mainly as manure in agricultural fields. People largely depend on forests for fuel wood while some fuel also comes from agricultural waste.

Vocations of people living in & around the Tiger reserve are agriculture, animal husbandry and agro-based, forestry-based cottage industries. Number of regularly employed is very little. Except school teaching, there is little scope of getting a job. Few people are engaged in cottage industries. Some are engaged in small scale business.

Human Wildlife Mutual impacts

The landscape of the corridors in west is mostly dominated by Teak. Teak invariably is contiguous with Forests and provide ideal shelter to wildlife during their movement along the corridors. Some fringe village farmers have raised plantations and crops, also provide ideal route for wild animal movement. Most of the local inhabitants depend on forests for their day-to-day sustenance with the increase in population, this has degenerated into overuse and overall degradation of forest areas and loss of corridor connectivity outside the PAs. The overuse has resulted into men wildlife conflict also to resources competition. Remoteness and inaccessibility have resulted into lack of development in the landscape. Illiteracy and ignorance has been the basic reason for lack of awareness towards conservation and protection of forests and wildlife.

The local people residing within the landscape do face problems owing to the regulations enforced under laws for wildlife management. The Major problems are;

a) Remoteness of the area: This poses severe constraints as far as the availability of various facilities.
b) Lack of grazing ground for the cattle, owing to the depleted state of ground cover outside PAs.
c) Loss of usual concessions like fuel wood, small timber, NTFP, fishing etc.
d) Loss of continuous income due to stoppage of forestry works, MFP collection etc.
e) Crop raiding by wild ungulates.
f) Loss of livestock to wild carnivores.
g) Human injury and loss of life due to lethal encounters with wild carnivores.

1.6 ASSESSMENTS OF INPUTS OF LINE AGENCIES/ OTHER DEPARTMENTS:

An effort is to be made to mitigate the problems of people through eco-friendly measures. Eco development, habitat improvement and soil and moisture conservation works are to be undertaken to generate employment to the extent possible by taking up such works, which are of significance and beneficial to wildlife conservation and at the same, they provide regular employment to the local people. The following developmental activities were taken up by the Govt. & Non-Govt. agencies in the Zone of Influence.

i) Road Construction: Mainly un-metalled roads.

ii) Road improvement: Existing village roads are repaired from time to time for better communication.

iii) Development of minor irrigation: As the area is situated in dry monsoon tracts, no water is available during summer. Perennial water sources are tapped for irrigating agricultural crops through the construction of -watersheds.

iv) Construction of culvert & causeway: Small culverts, causeways and concretes bridges are constructed for better communication.

v) Increasing drinking water facility: For increasing drinking water facility, ring wells, tube wells are dug. Sometimes pipelines are laid for tapping perennial springs in the hills for supply of drinking water.

vi) Ponds and earthen dams: To encourage fishery and to supply water to domestic cattle during lean period ponds & dams are constructed.

vii) Construction and repairing of school buildings: To provide education facility to school going children, these activities are going on.

viii) Self-employment Scheme: Various self-employment schemes are being implemented by the Govt. in the fringes of the Reserve.

ix) Social Forestry Scheme: Under this scheme, afforestation works have been taken upby the Panchayat (village council) for planting up of roadsides, canal banks, riverbanks, community lands, etc. This is to meet up the future fodder & fuel wood demand of the fringe villages.

x) Forest Department: Forest department has taken up afforestation works in forest areas through the timber, fuel wood & fodder plantations. Fodder plantations are taken up in forest areas for supply of fodder to herbivores.

xi) NGO activities: There are a limited number of NGOs & Eco-club in the vicinity of M.T.R.

1.7 MAJOR CHANGES IN THE LANDSCAPES (SETTLEMENTS/OTHER INFRAGTRUCTURE)

The area Under corridors are interspersed with natural forests, government plantation, human settlement & agricultural fields which are immensely under numerous anthropogenic pressure such as encroachments, illicit activities like felling, encroachments, faulty land use pattern as well as developmental pressure. Laying of various linear infrastructure like roads and railway are crisscrossing the corridors responsible fragmentation of the corridors resulting isolation of two or more population & genetic depression.

1.8 ADMINISTRATION & ORGANIZATION

In Maharashtra & Madhya Pradesh site all the corridors are falling under the territorial forest division with control over separate CCF level Officer. Therefore, to maintain integrity of the corridor & to facilitate the continuous movement of the Tiger & other wildlife an interstate coordination committee shall be constituted.

The Satpura-Maikal corridor recover two states viz, Maharashtra Madhya Pradesh and therefore, there is a need to have a Corridor Conservation Committee (CCC). The CCC primarily is a community-based management system. The Corridor Conservation Committee (CCC) shall include all major stakeholders in order to have a participatory monitoring. The CCC consist of the following members

1. Representative of Forest Department
2. Representative of Agriculture Department
3. Representative of Horticulture Department
4. Representative of Irrigation Department
5. Representative of Livestock Department
6. Representative of Electric Department
7. Representative of Local Representative of the area
8. 4 Eco-Development Committee Member (2 should be women)
9. Representative of Local NGO.
10. Any other member as decided by CCC.

1.9 ASSESSMENT OF THREATS:

The corridors face many threats most of which are anthropological. Some of the threats include human settlements, roads passing through the corridors, partially non protected status of the corridors, lack of enough prey base, degraded forests etc.

Major threats in each corridor: Major threats to the study area and its resources in the buffer are as below:

1) Poaching of tiger and its prey base.

2) Habitat destruction in corridors/ buffer zones**,** Encroachments.

3) Illicit felling of trees for local needs and commercial purpose.

4) Retaliatory killing due to men wildlife conflict.

5) Management of forests outside the PAs has other major considerations than the requirements of tiger and its prey species.

Poaching of tigers and its prey base

Poaching/ illegal hunting of tiger and its prey species is one of the major threats in some of the areas within the Satpuda-Maikal landscape. Tiger is poached due to the rising demands in the international markets. The poaching is done by organized gangs in connivance with the locals who know the distribution and movement of animals. The threats for poaching particularly on the areas bordering Madhya Pradesh towards Dharni, Rangubeli, Jarida in the North and towards Akot side in the South is very high.

The hunting of prey species is done either for domestic consumption or for the sale in the local market. Traditionally locals have been hunting herbivores for their own consumption with assistance from pet and trained dogs and by potting snares. A community named “Fasse Pardhi" is known to be traditional experts in making snares.

There is not much evidence for commercial poaching for tiger skin, horns, wildlife trophy or other animal article, organs for medicinal use or meat for sale. The threat for poaching, however, even for commercial purposes is rare, particularly on the areas bordering Madhya Pradesh towards Dharni, Jarida, in the North and towards Akot side in the South. Generally, the hunting of Samber, Chital, barking dear etc. are done by tribal traditionally on festival occasions for meat. Such type of hunting’s is carried out by groups of people with assistance from pet and trained dogs and local arms such as "Axe," "Koyata", "Bhala", etc. Sometimes carnivores kill cows or buffaloes, due to which owners get angry and poison the carcass to kill the carnivores, as revenge.

Timely payment of compensation and effective, control on illicit grazing etc. do help in reducing such poisoning cases. Such cases are also very rare since past few years and show decreasing trend.

Habitat destruction in corridors/ buffer zones in some PAs and Encroachments.

Habitat of tiger is shrinking because of its destruction, fragmentation and degradation. This leads to less and unevenly distributed prey species across landscape. This also results in tigers being separated in isolated populations within PAs. The major underlying causes for shrinking habitats are as below;

a) Overgrazing in corridor and buffer zone:

Allotment of grazing units to the villagers as per the State Govt. grazing policy is being carried out in Melghat Tiger Reserve and its landscape, but the number of cattle grazing tremendously outnumbers the permissible grazing units.

This is illegal grazing in the forest lands which seems inevitable considering local tribal population despite strenuous efforts by forest departments to prevent it. Grazing is most dangerous foe for forests regeneration and wildlife conservation in all respects. Excessive and rampant grazing is one of the important reasons for degradation of habitats in the corridor.

b) Encroachment:

As human population and cattle population have increased in the landscape area, more and more forests were deforested and encroached upon to meet the growing needs of agriculture and habitation. The encroachment is a major threat for the connectivity between the tigers of two or more protected areas via corridors.

c) Unsustainable collection of NTFP and medicinal plants:

in the corridor and buffer zone. Illicit felling, bamboo extraction and collection of NTFP causes disturbance in the corridor forests. The unsustainable collection of NTFP many times leads to intentional forest fires and human wildlife conflicts in the corridor.

d) Forest fires:

Forest fires are of very common occurrence. It is most damaging in summer season. Recurring fires deteriorate and destroys the natural habitat of wildlife. These fires aggravate the already existing water scarcity in the area.

The following are the reasons for fire incidences in the landscape.

i) The area comes under the dry tropical zone so the summers are dry, hot and long.

ii) The major species are deciduous, which produces an inflammable leaf litter.

iii) Intense biotic pressure.

iv) For collection of NTFP.

Encroachment:

The encroachment on forest land has become a regular phenomenon as periodically govt. regularized the encroachment on forest land. The encroachment reduces the forest area and fragments the important wildlife habitat.

As human population and cattle population increased in the area, more and more forests were de-forested and encroached to meet the growing needs of agriculture and habitation. In 1964, a High-Power Committee was appointed to investigate the matter of illegal encroachments. Encroachments were regularized by the Govt. on the recommendations of this committee. Then Govt. launched scheme to grow more grain to fight against hunger. People tried to grow more crops over agriculture land, fallow lands and even on encroachments on forest land in 1971. This movement of growing more crops lead the landless laborers and land holders adjoining fallow forest land to encroach the forest land. Then, again in 1978 Govt. passed special resolution to distribute forest encroached land to encroachers. These gestures have encouraged forest villagers to encroach more forest land. All the encroachers have strong belief that one day the Govt. would distribute the encroached forest land to them. On this belief, the encroachers are always trying to collect some proof of their encroachment such as entry of crop cultivation record over 7/12 abstract from local patwari and other documented proof to fight with forest department in court of law.

There are some vested interests, pseudo-organizations and even some Non-Government Organizations instigating and supporting them to hold possession over encroached forest land by any means. Sometimes vested interests behind these organizations harass the ground forest staffs who try to evict the encroachment. In view of this complex scenario, it has been extremely difficult, rather impossible for the forest staff to control and remove encroachments. Strong administrative and political will is needed to control this devastatingly harmful phenomenon. To stop the encroachment completely following control measures are needed to be applied strictly.

1. Strict legal action against pseudo-organizations, and vested interests as even N.G.O.s who misguides and instigates forest villagers to encroach forest land.
2. Joint survey of village land with revenue department and fixing correct boundaries and removing encroachment existing over the forest land. Demarcation of boundaries by constructing permanent pillars, digging of T.C.M. or constructing stone walls and regular maintenance need to be done on.

3. Strict legal action against encroacher necessary legal steps and time bound approach to remove encroachment.

Illicit Felling:

The illicit felling of trees is another serious threat to the wildlife habitats in buffer area of Melghat Tiger Reserve. The illicit felling is done to meet out local requirements of small timber, bamboo, for housing and agricultural implements, fuel wood for domestic purposes from wind fallen trees, dead, dying, diseased, dried trees, or even cutting of pole size crop is resorted to for this purpose. Due to increase in the price and heavy demand for valuable timber like Teak, Sajad, etc. as also the development of roads and good communication network, Melghat dweller now, may soon be lured to illicit felling of timber for sale outside is increasing. So, it is necessary to develop suitable strategies and exercise strict controls and checks for protection of forests from increasing threats for illicit cutting of trees on the area.

Retaliatory killing due to men wildlife conflict:

In this landscape the men wildlife conflict occurs due to the following reasons.

- Crop depredation by wild herbivores
- Livestock kills by wild carnivores leading to the retaliatory killing of the later.
- Injuries to human by wild carnivores.

Management of forests outside the PAs has other major considerations than the requirements of tiger and its prey species

The thrust of Management of forest outside the PAs may not be the conservation of tiger and its prey species- The underlying causes for this are-

i) Lack of intra-departmental coordination.

ii) Lack of infrastructure including staff.

iii) Orientation of staff towards wildlife issues.

iv) Inadequate enforcement of environmental legislations due to lack of capacity.

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PROPOSED MANAGENT

1.10 MANAGEMENT STRATEGIES

Vision

Well defined corridors established ensuring maintenance of the dynamics of population of tiger, co-predators, and prey in MTR.

Management Goals

- Mainstreaming of wildlife concerns through an integrated landscape approach.
- Creating situation conducive to have a dynamic population of tiger, co-predators & prey.
- Integrating the habitat isolates and correlating/upgrading the sink populations with source population of mainland core.
- To establish secured corridor connectivity by acquiring private lands wherever possible.
- Ensuring better management in sync with the concept of Joint Forestry Management.
- Improving condition of fringe area people to remove hostility towards wild animals like tiger, co-predators, their prey as well as elephants.
- Promoting farmers to go far plantation crops so that corridor connectivity and shelter can be ensured for wild animals
- To have an inclusive agenda of Co-existence with a focus on the wild life habitat parameters and livelihood needs of the people in the corridor.

Management Objectives:

- To reduce the magnitude of deforestation & fragmentation of habitat in the Satpuda-Maikal Tiger Conservation Corridor.
- To have a forest management practices with a focus on wildlife
- To provide suitable passage to the spill over population of tiger, co-predators and prey and to link the meta-populations with the core, source population at MTR
- To improve the Satpuda - Maikal Tiger Conservation landscape for providing conducive habitat that will allow the long-term sustenance of tiger.
- To create proper sustainable passage for the tiger, co-predators, and prey population by way of creating plantation of indigenous and local trees, grasses, fodder, and fruit species.
- To give away benefits of Joint Forestry Management through fuel wood, fodder, small timber, NTFP collection, ecotourism.

- To reduce the dependence of the fringe area people of forest by taking initiatives under J.F.M. concept to:

i. Regulate use of firewood.

ii. Minimize grazing – by initiating stall feeding option.

iii. Reduce the number of scrub cattle.

iv. Grow cash/commercial crop in agricultural land, instead of foodgrain cultivation to reduce man-animal conflict.

v. To take proper eco-development initiatives in consultation and in coordination with other line departments to improve the economic condition of the fringe area population through FPC/JFMCS & SHGs by- Giving training in handicrafts, bamboo weaving, local handlooms, apiculture, sericulture/tassar cultivation, soft toy/bag making, repairing of electronic & electrical goods, cycle/motorcycle repairing etc.

vi. Providing veterinary care in the form of A.I., Vaccination for improvement of the quality of the cattle.

vii. Tying up with user agencies for collection and marketing of NTFP, creation of medicinal plant gardens and plantations.

viii. Raising intercrop in forestry plantations.

ix. Arranging and managing eco-tourism activities as an alternative income generation resource, resource besides raising funds for management.

x. To provide proper protection to the corridors from illegal felling, poaching of wild animals, uncontrolled grazing of cattle, and collection of fuel wood by involving FPC/JFMCS/SHG members with the departmental staff through regular patrolling.

Problems in Achieving Objectives

- High level of biotic interference.
- Most of the area in the corridor is highly degraded due to overuse & unsustainable activities.
- Small or no land holding of the fringe population with increasing dependence on natural resources.
- Huge problem of unemployment – idle youth (who indulge in unlawful activities adversely affecting MTR)
- Traditional dependence on forests and other natural resources by the locals.
- Lack of sufficient/adequate man power of Forest Department at all levels.
- Lack of proper orientation/capacity building of Forest Departmental staff.
- Permanent disturbing barriers like Roads and rail lines

SWOT Analysis

Strengths – Weaknesses – Opportunities – Threats (Limitations) (SWOT) Analysis:

Strengths:

i. Presence of well-established historic corridors.
ii. Presence of good, productive, resilient forest cover.
iii. Well distributed population of predators other than tiger and prey and elephants in the buffer region.
iv. Well demarcated administrative network.
v. Presence of network of FPCs with good relation with administration
i. Potential area for wildlife and aesthetics

Weaknesses:

i. Overpopulated fringe area.
ii. Over dependence on forestry resources by local people, mainly due to overall backwardness of the area
iii. Easy access for cattle grazing and fuel wood, timber collection.
iv. Lack of young, energetic work force.
v. Lack of co-ordination among line departments.
vi. Lack of coordination among the states
vii. Absence of proper ecotourism initiatives.
viii. Huge man animal conflict in the zone
ix. Presence of migrant population settlements.

Opportunities:

i. Availability of good habitat to achieve the goal of management.
ii. Willingness of people to accept changes for betterment.
iii. Undisputed presence and control of Forest Department all over the area.
iv. Good coordination with FPC/JFMCS/SHGs
v. Renewed coordination with line departments
vi. Vast scope of ecotourism.
vii. Protocols for inter-state coordination
viii. Coordinated and continuous research.

Limitations/ Threats:

i. Severe unemployment among locals.
ii. Backwardness of local area due to poor development of infrastructure etc.
iii. Traditional dependence on forests and other natural resources.
iv. Occasional poaching of small animals for local consumption.
v. Absence of young, energetic, trained workforce and vacancies at all levels to sustain all round developmental activities.
vi. Lack of proper coordinated utilization of development funds by line departments.
vii. Private tea estates in the corridor.
viii. Busy road network.
ix. Severe grazing pressure/heavy settlements.
x. Over dependent of fringe population on forest resources viz. fuelwood, timber & NTFP.

1.11 DELINEATION OF CORRIDORS AND OTHER HABITAT USED BY TIGERS AND CO-PREDATORS

Conservation of Tiger will not only require the management of core and the buffer areas but it will also be the necessary to maintain 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 the under tremendous pressures due to habitations and human activities. Therefore, in such areas the existing management practices will have to be modified 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.

Tiger Population in India have been increasingly isolated over the last century due to habitat fragmentation and population decimation (Project Tiger- Tiger task force report 2005). The Genetic deterioration of insular population can be prevented by means of dispersing individuals and their successful breeding in the new population thus maintaining a large-scale gene pool. The large terrestrial predators like tiger exhibit limited genetic subdivision because of high rates of dispersal mediated gene flow.

Delineation of corridors and other habitat used by tigers and co-predators: The present area of the Melghat represents mostly the natural and self-contained eco system, which has so far not presented the problems like spill over population of tigers and herbivores outside the protected areas. However, to provide a corridor for the dispersal of tiger population to other forest and protected area is a important aspect of wildlife management. The conservation of tiger will not only require the management of core and buffer areas but it will be also necessary to identify this area of 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.

Natural Habitat Corridor: The Satpuda-Maikal landscape of central Indian is classified as a Global priority Tiger Conservation Landscape due to its potential for providing sufficient habitat that will allow the long-term persistence of tigers. In the spatial genetic analysis, it was revealed that Satpuda- Maikal landscape has high genetic variation and very low genetic sub division (Sandeep Sharma et al, 2013). This high genetic variation is attributed to the presence of Natural Habitat Corridor between Melghat Tiger Reserve and Satpuda Tiger Reserve.

Disturbances in Habitat Corridor:

The corridor passes through degraded forests, agricultural areas, and some low-density human settlements (NTCA report, 2010) the corridor has human population and crisscrossed with road network and railway lines (Map). The corridor has limited documentation of prey base. Agriculture is the prime occupation in the area and there are some agro based industries and other small-scale industries. Because of the above-mentioned reasons, the habitat is fragmented and disturbed. Suitable Habitat Patches:

In the context of Meta population, the natural forest Habitat in the Betul and Khandwa Division is more important. In these divisions, the herbivores and carnivores' presence are reported in Working Plan. However, the prey base density or other habitat suitability is not documented. The forest patches with minimum biotic interference will be the suitable habitats. Forest patches adjoining the protected areas and away from the human settlements may can be suitable habitat patches. These suitable habitat patches should be given priority for executing the wildlife management prescriptions.

The spatial genetic structure of the tiger meter-population in the Satpuda-Maikal landscape revealed that there is high genetic variation and very low genetic sub division which is attributed to forest connectivity and high gene flow in the Satpuda-Maikal landscape (Sandeep Sharma ct. al, 2012)

Management Strategy: The management strategy would involve…

- Co-existence agenda in buffer/fringe areas (landscape approach/sectorial integration) with ecologically sustainable development programme for providing livelihood options to local people, with a view to reduce their resource dependency on the core. The strategy would involve reciprocal commitments with the local community on a quid- pro-quo basis to protect forests and wildlife, based on village level, participatory planning and implementation through eco-development committees (E.D.C.)
- Mainstreaming wildlife concerns in the buffer landscape by targeting the 30 various production sectors in the area, which directly or incidentally affect wildlife conservation, eco-development through 'Tiger Conservation Foundation' as provided in the Wildlife (Protection) Amendment Act, 2006 and in coordination with various Govt. departments in various production sectors of economy.
- Addressing tiger bearing forests and fostering corridor conservation though restorative strategy inspective working plans of forest divisions, involving local communities, to arrest fragmentation of habitats.
- Ensuring safeguards/retrofitting measures in the area in the interest of wildlife conservation.

Management Principle:

The management of the buffer area will have to be carried out on following broad principles:

- Implementation of forestry activities after mainstreaming wildlife concerns. Melghat-Pench Corridor, Melghat-Kanha Corridors, Melghat-Polhra & Malkhed Corridor, Melghat- Khandwa Corridor these corridors are sparsely forested area, agricultural land and human crowded areas. Need to growing trees, bamboo plantation and habitat connectivity facility for wildlife safety and shading, hiding place for intentionally. Range officers are set guideline to eco-development committee members will do. Forest Department is distribution seeds and technical assistance for locals. And after planting monitoring and collect growing tree and death tree data set. Replacement of death plant area other appropriate plant filling is important.

- Implementation of eco-developmental activities for reducing resource dependency of local people on surrounding forests. Forest Department provides 20 lakh per village and eco-development activities (eg. women group formation and dancing for visitors some cooking traditional style) how to divide budget and clarification is important for long-lasting. Man, group can trek or guide for visitors) Facility of clean international standard preparation and cooking style training will be provided. Steel format style dish

instead of leaf and hot item rice and roti other main dish side dish and soup. If visitor asking some special food keeping for readiness. Eco-development team to excursion for other visitor center to study-tour and open their thinking.

- Co-ordination with governmental / non- governmental production sectors in the landscape for mainstreaming conservation. Some food item to upgrade and dry system training need to provide.
- Habitat management and improvement activities in the existing habitat of tiger and its prey species through active involvement of local communities. The management will be based on specific forest lands and non -forest lands forming part of village level micro plans. Community participation will be solicited in the overall management of the buffer area.
- Grass growing activating or animal food tree growing (Forest department or Melghat tiger reserve provide seed bank for they can get timely to grow. Air-conditioning system how to get and provide for management.
- Site specific eco-development initiatives based on participatory village level micro plans will be carried out for the local communities for strengthening their livelihoods through a balanced approach of rationalization of resource use, biomass regeneration and alternatives, so that the ecological status of the area could be improved and maintained.
- To encourage love to their native beauty and value of wilderness and conserve their way.
- Young people men, women to support guide training and food and beverage or housekeeping for their respective educational back-ground.
- Information network established and connect timely to send information of hunting activities. In dry season, the formation of village youth people watching for fire protection and doing fire line under range responsibility. Crime dossiers of every village within buffer zone will be maintained and updated every time. The dossiers should contain the name of wildlife offenders, his socio-economic profile, modus operandi, particular of each offence. A watch should be kept by concerned beat guard on such offenders and weekly report about the activity of such criminals should be submitted by beat guard to his Range Forest Officer.
- Ecotourism activities in the buffer area will be used as an important tool of Eco development for strengthening the livelihood of the local people and the nature education. Some tourism areas raining season visitors are to see tiger and regardless of wildlife behavior and noisy causes disturbance for wildlife. Visitor educate are essential for these purposes.
- Capacity building of the field staff as well as eco-development committee members will

be undertaken on a regular basis through the Govt. funds and through the Tiger Conservation Foundation. Similarly intensive nature conservation awareness programme shall be part of the buffer area management strategy with a focus on different stakeholders, particularly, local communities.

- The local people residing within the area do face problems owing to stringent laws for wildlife management and this fact need to be taken note by a management which needs to be sensitive on this issue. Main problems are –

i. Remoteness of the area- This poses severe constraints as far as the availability of various facilities.

ii. Undulating terrain – Though the inhabitants are used to it, this proves to be an obstacle for movement of provisions and other things of day-to-day need from main areas, especially in monsoon period, when some areas are cut off.

iii. Loss of usual concessions like fuel wood, small timber, NTFP fishing etc. and limitations the alternative provided.

iv. Loss of continuous income due to stoppage of forestry works, MFP collection etc.

v. Occasional crop raiding by wild ungulates, though few complaints are normally lodged for this.

vi. Scarcity of water especially during summer season.

vii. Loss of livestock by wild carnivore's killings.

viii. Inflicting of injury or death due to attack from wild animals specially mauling by sloth bear.

ix. Lack of industrial and infrastructure development due to strict implementation of the provisions of Forest Conservation Act, 1980 and Wildlife Protection Act, 1972 as well as relevant judgments of honorable Supreme Court in the matter.

1.12 PRIORITIZATION OF LINKAGES:

Vidarbha lies on the northern part of the deccan plateau. Unlike the western Ghats, there are no major hilly areas. The Satpura Range lies to the north of Vidarbha region in Madhya Pradesh Vidarbha is the North-eastern region of the Indian state of Maharashtra, comprising Nagpur Division and Amravati Division. It occupies 31.6% of the total area and holds 21.3% of the total population of Maharashtra. It borders the state of Madhya Pradesh to the north, Chhattisgarh to the east, Telangana to the south and Marathwada and Khandesh-

regions of Maharashtra to the west. It lies between 18º 40' 21.42" N to 21º 38' 58.23" N and 75º 59' 24.90" E to 80º 53' 49.03" E. It encompasses an area of 97,321 km2 covering the 11 districts of Akola, Amravati, Bhandara, Buldana, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha, Washim, and Yavatmal. It houses a human population of 2,30,03,179 people (Census of India, 2011), and at the same time has a forest cover of about 26775.06 km2 (27.5%) (FSI, 2019). Vidarbha lies on the northern part of the Deccan Plateau. Unlike the Western Ghats, there are no major hilly areas. The Satpura Range lies to the north of Vidarbha region in Madhya Pradesh. The Melghat area of Amravati district is on the southern offshoot of the Satpura Range. Large basaltic rock formations exist throughout Vidarbha, part of the 66-million-year-old volcanic Deccan Traps. Bhandara and Gondia district are entirely occupied by metamorphic rock and alluvium, making their geology unique in Maharashtra. Buldhana has the Lonar crater created by impact of an asteroid. The eastern districts of Gondia, Bhandara, Gadchiroli and Nagpur are in earthquake zone 1, which has the least seismic activity in India, while other districts are in zone 2. Wainganga is the largest river in Vidarbha; along with its major tributaries, the Wardha, Kanhan, and Painganga, its waters flow south into the Godavari River. In the north, five small rivers- Khapra, Sipna, Gadga, Dolar and Purna—are tributaries of Tapti River. The Vidarbha Landscape (VL) is very important as it harbors a population of about 331 tigers and forms the connecting link between the central and southern Indian tiger populations. It plays a pivotal role in exchange of individuals and thereby facilitates gene flow between these two populations increasing the viability of tiger populations in India. There are 8 protected areas or wildlife divisions where these tigers live, but these refuges are scattered like islands in a sea of human dominated landscape. Therefore, knowing the locations of tiger movement corridors and probable areas of human tiger conflict is especially important for a wildlife manager.

Improvement of habitat connectivity for wild animals in fragmented landscapes is increasingly being used as a strategy to mitigate the effects of habitat fragmentation, land-use dynamics and climate change (Doerr et al., 2011). However, movement data are yet to be systematically incorporated into assessments and prioritization of connectivity (Sawyer et al., 2011; Zeller et al., 2012). This study uses movement data to quantify habitat use outside PAs and incorporate the same information into connectivity modelling. This is first such study in India. The findings of this study indicate that tigers in VL are using a much wider swatch of the landscape outside PAs for movement than earlier known. It extends well beyond forested structural corridors or the least cost corridors modeled by earlier studies (Qureshi et al., 2014).

First corridor study based on tiger telemetry data in India. Habitat permeability for tigers is favored by Southern Dry Mixed Deciduous Forest (5A/C3), followed by Very Dry Teak Forest (5A/C1). Such forests in the landscape needs protection. Study identified 37,066.94 km2 of tiger corridors, which was further categorized into 5classes according to the tigers using them into very low (10,289.19 km2), low (18,727.69 km2), medium (5,689.63 km2), high (1,418.25 km2) to very high (942.19 km2). Attempt should be made to bring these identified areas under corridor management plans and legal protection. Vidarbha landscape is dissected by roads totaling a length of 84,202 km. Pre-emptive mitigation needs to be drawn at places where such roads cross important tiger corridors.

1.13 DEVELOPMENT OF INTEGRATED LAND USE APPROACH FOR THE AREA COMMENSURATE WITH TIGER CONSERVATION AND CO-EXISTENCE AGENDA (FORMULATION AND COORDINATION).

Wildlife management overlapping working circle exists in the working plan of all the concerned forests divisions. The management of wildlife is based on the prescriptions given in working plan. It is to mention here that more funds need to be allocated for the areas proposed for corridors of the territorial divisions, so that works of habitat improvement and protection can be effectively implemented.

1.14 WILDLIFE MANAGEMENT IN TERRITORIAL FOREST AREA

The forest areas of territorial divisions are worked under various silvicultural operations and the forest area of Sipna, Gugamal, Gugamal & Melghat Buffer wildlife division are worked as per prescriptions are based on wildlife management prescriptions. This is need of following similar prescriptions in buffer area in charge of territorial division and wildlife division. The NTFP's collection and regeneration felling in buffer areas as per working plans approved needs to be followed to meet local people livelihood needs and habitat improvement works to increase the prey base in buffer areas proposed to be carried out to sustain the tigers of the areas. The non-forest area of 4 territorial divisions consisting of 79 villages and non-forest area of Sipna and Gugamal wildlife divisions consisting of 39 villages are included in the Eco-Development zone, as these areas needs villages based eco-development activities.

Following prescriptions are recommended from the wildlife point of view.

- Mature and available tree should not be fell in open areas.
- The status of regeneration should be used as an overarching condition of tree felling.
- Area with un-established regeneration should not be felled.
- Timber removal / thinning permitted should not open the canopy more than 60% in winter month.
- The plantation activity and tree felling activity should be staggered and safeguard from induce as effect especially near the human habitat.
- Only indigenous species should be taken up for plantation. Monoculture plantation should not be Tiger reserve area even Teak plantation.
- NTFP harvesting should be based on regeneration status and productivity of each produce.

Protection Strategy for wildlife management in Territorial area

The protection measures in the corridor area should be taken up in order to facilitate safe passage of tigers between the protected areas and also to reduce the human animal conflict in the area. In this context, in the entire area, mainstreaming of Wildlife issues should be considered.

- The local youths from the selected villages shall be the members of the committee and report any movement of tiger of other carnivore to the concerned authorities. The details of monitoring aspects should be taken up with the facilitation of Forest Department and Non-Government Organization.
- The local youths should also be trained in tracking & tackling of problematic animals. The rogue wild animals should be captured in time. This can be ensured by having rescue team at identified places.
- Regular and timely compensation should be given in order to avoid retaliatory killing.
- Local youths should also be involved in monitoring the electricity line passing to avoid electrocution of wild animals.

Conservation recommendations for the landscape:

- No healthy green tree of any kind is permitted to fell.
- Plantation of Teak and Anjan and miscellaneous specious at prescribed spacing shall be carried out.
- Soil and moisture conservation works will be carried out.
- All dead trees, after retaining 2 dead trees per ha. shall be marked by felling.
- All malformed advance growth of teak up to 30 cm. shall be cut back.
- No fruit bearing tree shall be marked for felling.
- Cut-back operation will be carried out in the year following main felling.
- All climbers, except of NTFP importance, in the plantation area shall be cut.

1.15 ECO DEVELOPMENT AND LIVELIHOOD SUPPORT

Proposal for constitution of Corridor Area Management Committee

Constitution of Adjoining Corridor Area Management Committee (with representation of different Forest Divisions, Line agencies and other Stakeholders) and Linkages with Tiger Conservation Authority is proposed for effective linkage & coordination for holistic management of corridor area.

The Tiger Reserve will have an Adjoining Corridor Area Management Committee that includes all officers of Deputy Conservator of Forests Rank that manage either a territorial division or a wildlife division within the Tiger Reserve and adjoining areas, all managers of private lands (Govt./semi-govt./companies/individuals) which tigers use either seasonally or the whole year around, one elected representative/their nominee from local bodies (e.g. Panchayat/Municipalities etc.), local political leader (MLA/MP- could be tricky of course) as opinion maker, police chief or his representative, representative of a regional/national wildlife scientific institution/wildlife biologist with a history of conducting research in that area (preferably on Tigers), heads of departments of zoology, botany/life sciences of nearest relevant University and members of two NGOs/individuals with significant conservation work in and around the Tiger Reserve. Other individuals/NGOs/Researchers, with certain skills, that may be required, can be invited as observers to the management committee meetings from time to time. The Reserve Director will be the member secretary of this committee. This committee will ideally meet once every month otherwise at least once every three months. The proceedings of the meetings should be placed in the public domain (through project tiger website) within a month of such meetings. The Chief Wildlife Warden of the state shall be the chair of such Committee.

Formation of Joint Forest Management Committee and supporting institutional framework

Joint Forest Management Committee and Self-Help Groups (SHGs)

At the level of people ‘s participation there exists either a Joint Forest Management Committee (JFMCs) each carrying out participatory management in a village (sometimes in two or three) either directly or indirectly through SHGs. Several conservation programmes are managed by JFMCs or SHGs induced by such committees.

The executive body of both JFMCs is constituted by members elected by general members in an annual general meeting. In the co-management model, JFMCs are entrusted with carrying out the government ‘s conservation programme. There is a government order (vide resolution no. 5062-For/D/IS-16/88) dated27th July, 1990), dealing with meeting protocol for forest protection committees which was revised vide Resolution No 5969-For dated 3.10.2008.

- The JFMCs shall hold a general body meeting once every year where activities of the Committee as well as details of distribution of usufructuary benefits are to be discussed, besides electing representatives of the beneficiaries to the Executive Committee.
- The JFMCs shall maintain a minute’s book where in proceedings of the meetings of the Executive Committee held from time to time as well as the proceedings of the Annual General Meeting of the JFMCs will be recorded under the signature of the President of the Committee and such minutes duly attested shall be sent to the concerned Range Officer for record.

The SHGs are groups that come together under the Central government‘s self- employment generation programme, which encourage the development of micro- entrepreneurship among low-income groups.

Livelihood Support Initiatives through Village Micro-plans supported by Tiger Conservation Foundation and Other Line Agencies:

JFMCs with the help of MTR shall prepare micro plans highlighting the problems and suggested solutions. Such micro plans shall be the guiding principles for executing community development programmes in each JFMCs Once the village micro plan is ready, JFMCs would have to be conducted in order to;

- Revisit the solutions of identified problems
- Prioritize the solutions: since resources will be limited the GS will have to prioritize the solutions using an acceptable criterion. This criterion can be working first with the households that have unsustainable dependence on natural resources of the area.
- Identify solution and strategies: Based on the PRA baseline data, the problems prioritized, the solutions and strategies will have to be listed
- Identification of resource base: the various sources of financial and human resources required to implement the plan will have to be listed against the resources available. The different ways to mobilize additional resources using the convergence route will also have to be debated and worked out.

1.16 MONITORING AND EVALUATION

The reserve is a connecting habitat between the forest areas of Madhya Pradesh. Tiger occupancy in forests of Betul, Hoshangabad, district of Madhya Pradesh suggests the viability

of corridor with Melghat. However, owing to varied land uses and human activity, the linkages are weak requiring restoration and monitoring as in buffer areas. Maharashtra Forest Department in collaboration with Wildlife Institute of India has initiated long-term study to understand the landscape use by dispersing tigers. As a part of the study, movement corridors have been model led based on the actual movement data of tigers. Tiger corridors of Vidarbha are the first study in India to delineate tiger corridors based on actual movement data of tigers. More scientific analysis and local condition combination is important. Data confirmation is supported to some of the management issue.

Habitat rehabilitation Sector:

Every season we can get seeds for habitat require fulfillment we keep seed bank in accessible and electric reachable area. We keep constant temperature and store seeds in this bank. The facilities of Agriculture Dept. and they demonstrate for our staff and locals every circumstance is essential. And some area plot no 566 -567 area we found when we surveyed period, multiple use zone has Tapai river beside area agriculture land uses Fertilizer and Pesticide we are difficult to control that's why we provide with Agriculture expert to hire and trained for local farmers to organic fertilizer and pesticide making process technique to share them.

Grazing:

Our field staff monitoring every time and carried out the domesticate cattle grazing and very crowded they stop and another alternated place to shift. When our field survey time, half of domestic cattle are ear tag of vaccine certificate and others are no ear -tag. We need watch out our wildlife health situation if some abnormal manner found, timely to report. Be careful delicate manner and strong decision making for village societies and staff communication behavior.

Eco-tourism sector:

We need to collect visitor feedback and good feedback mention in online booking, bad feedback we have to change and modified their impropriate liking. Some we need to provide kitchen people to training international food preparation and cooking. Some provide self -cooking facilities and each chalet in front of the roasted facilities and selling food varieties like South African style.

And no need to prohibit not allow to alcoholic because of the area is picnic or recreational area. This prohibit is Asian style (typical Indian) not do like this. Because of every site we have assigned staff and locals are ready for security. Bene fit from eco-tourism how to divide is most important local people should be centered. Their livelihood changes to eco-tourism and less dependent for natural resources this is our target and get chance to making alternative income generation.

Climate-change Sector:

The socio-economic data of last 10 -15 years and every type of temperature, rainfall, suddenly change weather circumstance everything needs to be recorded. Some work calendar we also keep for some activity we want to do and adjust for time frame. If drought, Earth-quake, heavy rain problem occurring this area how to prevent technique we must prepared. This preparation is not only for people and visitors, but also for wildlife including.

The agency anchoring the process at the village level will have to set a time frame for periodic meetings with the JFMCs. In these meetings:

- The goal and objective of the micro-plan will be revisited
- The people present will run through the micro plan to see what took place as planned and what evolved during the implementation cycle
- Review what needs to be done less/more/ differently

The anchoring agency publicly acknowledges the contributions of the community and others. The agency also uses the media to publicize good practices Monitoring and evaluation is an extremely important component for the successful implementation of the Eco-development programme. This will highlight the strengths & weakness of the system and suggest midterm corrective measures.

The following records must be maintained for monitoring & evaluation.

1) Resolution of formation of JFMCs
2) Minutes of meetings in FPC/JFMCSs
3) Village registers
4) Bimonthly account of JFMCs with Assets /Activity Register.
5) Annual audit register.

Monitoring & evaluation remarks:

Tiger Reserve management will carry out suitable monitoring & evaluation from time-to-time Indicators of Success:-

The following indicators are identified for monitoring the success of the scheme:

1 Reduction in Man animal Conflict

2 Restoration of corridor connectivity

3 Positive impact of the practices by JFMCs on wildlife Health and population

4 People becoming more aware of conservation needs

Increased cooperation among stake holder groups towards conservation.

Means of Verification:

The following means of verification is proposed: -

1) Sample survey of PA and the villages at an interval of 6 months with the involvement of JFMCS/FPCs, NGO and PA staff.

25)) Interview with the villagers and field staff at a suitable interval.

3) Study of village register and forest records.

4) Offence registers in Range office.

Other indicators, sampling tools, sampling intervals and assessment criteria for project activities relating to different P.A. values, disturbances, socio economies value etc. can be suitably chosen.

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